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Evaluation of the Corrosion Threat of the Waste in the Tank 241-AY-102 Annulus

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Abstract: Waste has leaked from the primary tank into the annulus of Tank 241-AY-102. The propensity for corrosion of this waste was evaluated to determine if it is corrosive enough and must be promptly removed or if it is benign and may remain in the annulus. Uncertainits in the waste composition, the temperature and the character of the steel complicate the corrosion assessment. It was concluded that the available analytical data and the information about the temperature of the waste in contact with the secondary liner are not sufficient to determine the corrosion threat to the secondary linter with a desired degree of confidence. Recommendations for further testing and analytical data were developed in collaboration with the Expert Panel Oversight Committee.

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EXECUTIVE SUMMARY

Up to 520 gallons of waste has leaked from the primary tank to the annulus of Tank 241-AY-102 (Tank AY-102). Approximately 20-50 gallons of waste residual is estimated to be on the floor of the secondary liner in the annulus. The propensity for corrosion of this waste was evaluated to determine if it is corrosive and must be promptly removed or if it is benign and may remain in the annulus.

A previous evaluation of the potential for corrosion concluded that the depletion of the hydroxide ion content of leaked waste might initiate stress corrosion cracking and threaten the integrity of the secondary liner (RPP-ASMT-27062, *Stress Corrosion Cracking Evaluation for the Secondary Liner Exposed to In-Specification Waste in a Double-Shell Tank Annulus*). The report recommended that the waste be immediately removed. The Savannah River Site has also experienced waste leaks onto the annulus pan, but their assessment concluded that the potential for corrosion was minimal due to the high nitrite ion concentrations and low temperatures. These conflicting recommendations prompted this assessment of the composition of the waste and possible threat of corrosion in the Tank AY-102 annulus.

The chemical composition of waste, the temperature and the character of the steel are important factors in assessing the propensity for corrosion. Unfortunately, the temperatures of the wastes in contact with the secondary steel liner are not known; they are estimated to range from 45 °C to 60 °C. It is also notable that most corrosion tests have been carried out with un-welded, stress-relieved steels, but the secondary liner in Tank AY-102 was not stress-relieved and many problems were encountered with flattening and welding during its construction.

One sample of the actual leaked waste has been collected and partially characterized. The analytical results suggest that the solid was formed by the evaporation of water from an approximately equal mixture of the supernatant and interstitial liquids that had reacted with carbon dioxide as it dried. Comparison of the composition of this waste with the chemistry control limits implies that it would not cause stress corrosion cracking or pitting of stress-relieved steels at 50 °C because of the high hydroxide ion content and the favorable nitrite ion/nitrate ion concentration ratio.

Other leaked wastes may have different proportions of the two waste liquids and may have formed liquids of still different compositions as they reacted with carbon dioxide and water evaporated. Some waste may have reacted with the refractory as it seeped through it to the top of the secondary liner. The propensities for corrosion of these other liquids were examined in this report.

In brief, undiluted interstitial liquid and undiluted supernatant liquid do not cause cracking or pitting of stress-relieved steel at 77 °C in corrosion tests. Mixtures of the interstitial liquid and the supernatant liquid that contains from 10% to 90% interstitial liquid have compositions that are within the chemistry limits for the minimization of stress corrosion cracking at 50 °C. However, the chemistry limits for the control of pitting from the Savannah River Site imply that several of these mixtures have insufficient hydroxide ion or nitrite ion for the control of pitting.

The hydroxide ion content of the leaked liquid will be reduced by the reaction with carbon dioxide in air as water evaporates. The behavior of a solution with 50% of the supernatant liquid and 50% of the interstitial liquid was explored. Since the rate of evaporation is more rapid than the rate of incorporation of carbon dioxide, it is unlikely that the neutralization reaction will proceed to completion. The composition of the waste would remain within the chemistry control limits for stress corrosion cracking at 50 °C. However, the propensity for pitting increases as the pH is reduced and pitting may occur in these circumstances.

Also, the carbonate and hydroxide ion concentrations may be decreased by reactions between hydroxide ion in the waste and the refractory. A significant reduction in the hydroxide ion content would increase the propensity for corrosion for wastes that seeped through the refractory and reached the secondary liner. Although the final pH of the waste liquid is very difficult to estimate from the information in the literature, it is reasonable to infer that the final pH would not be smaller than the pH dictated by the carbonate ion content, somewhat greater than 11. A waste of this composition would remain within the chemistry control limits for stress corrosion cracking at 50 °C largely because the nitrite ion content would not be decreased as the waste passed through the refractory. However, as noted previously, the reduction in the hydroxide ion content may initiate pitting.

The following recommendations were developed in collaboration with the Expert Panel Oversight Committee, who reviewed the information about the present status of Tank AY-102. It was concluded that the available analytical data and the information about the temperature of the waste in contact with the secondary liner are not sufficient to determine the corrosion threat to the secondary liner with the desired degree of confidence. Consequently, the length of time that the waste may remain in the annulus is inclusive.

The initial recommendations are that Washington River Protection Solutions:

- Initiate efforts to obtain accurate temperature information regarding the temperature in the refractory and regarding the temperature of the wastes in the annular space in contact with the secondary liner.

- Initiate efforts to obtain analytical samples of the leaked waste sufficient to perform the conventional suite of analyses including the water content and the pH as well as the conventional group of anions and metal analytes.

- Assess the compositions of the liquids that form during the evaporation of water from leaked waste and the introduction of carbon dioxide into leaked waste. Experience suggests that this information can be obtained by thermodynamic calculations for the compositions shown in the table below.

Suggested Compositions for Tank AY-102 Waste Calculations

Case	Composition
1	Supernatant
2	Interstitial Liquid
3	50% Supernatant + 50% Interstitial Liquid
4	25% Supernatant + 75% Interstitial Liquid
5	75% Supernatant + 25% Interstitial Liquid

The supernatant and interstitial liquid compositions will be derived from the 2012 Best-Basis Inventory

- Perform slow-strain rate tests to evaluate the propensity for stress corrosion cracking and perform cyclic-potentiodynamic polarization tests to evaluate the propensity for pitting for selected compositions at the limiting high temperature. The tests should be carried out with as received, non-stress-relieved steels that are representative of the steel in the secondary liner of Tank AY-102.

- Investigate the chemical reactions between the waste and the refractory with special emphasis on the assessment of the concentrations of the aggressive ion and the inhibitors.

These tests will indicate whether plausible compositions of the leaked waste are a threat for the pitting or cracking of as-received, non-stress-relieved steel at the temperature of the secondary liner. If corrosion is not observed in these tests, other carefully designed tests may be necessary to determine if the same compositions pose a threat to the liner because of the difficulties, such as low quality welds, that were encountered during construction.

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TERMS

Acronyms and Abbreviations

BBI	best-basis inventory
CPP	cyclic-potentiodynamic polarization
DST	double-shell tank
EPOC	Expert Panel Oversight Committee
ISL	interstitial liquid
OSD	Operating Specification Document
PCSACS	personal computer surveillance analysis computer system
PNNL	Pacific Northwest National Laboratory
SCC	stress corrosion cracking
SCE	saturated calomel electrode
SEM	scanning electron microscopy
SRS	Savannah River Site
SST	single-shell tank
TIC/TOC	total inorganic carbon/total organic carbon
TWINS	tank waste information network system
WRPS	Washington River Protection Solutions, LLC

Units and Symbols

°C	Celsius
μ	micron
%	percent
cfm	cubic feet per minute
ft	foot
g	gram
gal	gallon
in	inch
kg	killogram
L	liter
M	molar
mol	mole
mV	millivolts

1.0 INTRODUCTION

Routine visual inspections in August 2012 discovered small amounts of foreign material on the floor of the annulus space in Tank 241-AY-102 (Tank AY-102). Materials identified near Riser 83 and Riser 90 was determined to be leaked waste from the primary tank (RPP-ASMT-53793, *Tank 241-AY-102 Leak Assessment*).

Corrosion of the primary tank may have contributed to its failure. Thus, corrosion of the secondary liner could provide a path for the waste to breach the secondary containment. The corrosive properties of the leaked wastes are examined in this report.

The available analytical work suggests that one of the dried solid wastes originally consisted of approximately equal volumes of the supernatant liquid and the interstitial liquid (ISL) from the solid layer. However, the chemical compositions of the other leaked materials in the refractory and the annular spaces of the tank have not been characterized. Consequently, this corrosion assessment considers the properties of the liquids that might leak from the tank and the liquids that would be formed in the subsequent chemical reactions of these leaked substances. Specifically, the supernatant liquid, the ISL, simple mixtures of these two liquids from 10% to 90% supernatant material, a liquid with 50% ISL and 50% supernatant liquid that has absorbed carbon dioxide (CO_2) from the air, a liquid of the same composition that has reacted with the refractory, and liquids from which different amounts of water have evaporated are considered.

2.0 BACKGROUND

2.1 CHARACTERISTICS OF THE WASTE IN THE TANK AY-102 ANNULUS

Routine visual inspections in August 2012 indicated that new foreign substances were present near Risers 83 and 90 in the annulus of Tank AY-102. The deposit near Riser 83 was a green liquid with white crystalline nodules as shown in Figure 1. Two materials were observed near Riser 90. One was a white crystalline solid that appeared to have flowed out of a refractory slot into the annulus as shown in Figure 2A. The second material near Riser 90 was a mound of brown solids as shown in Figure 2B.

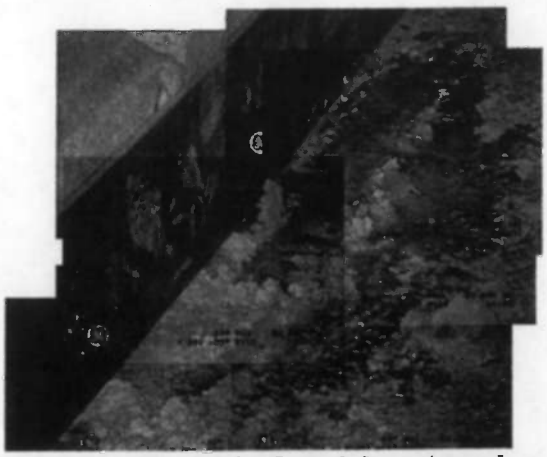

Figure 1. Riser 83 Material on Annulus Floor on October 21, 2012

Samples of the three different materials were collected in September and October 2012. The brown mound, which was composed of rust, mill scale, sand and soil, did not originate from tank waste. However, the white crystalline deposits near Riser 83 and Riser 90 proved to be leaked tank waste (RPP-ASMT-53793).

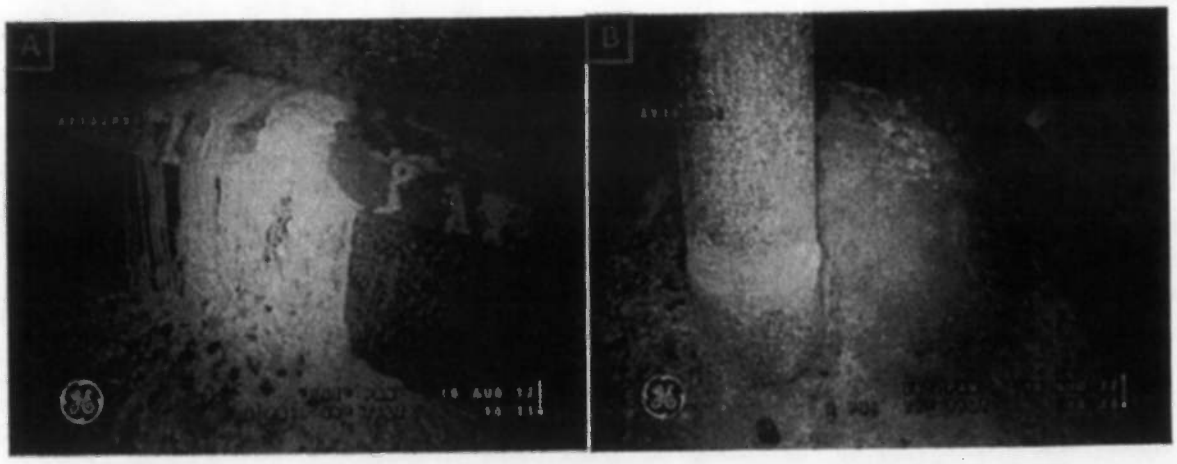

Figure 2. Riser 90 Material on Annulus Floor on August 10, 2012- Crystalline Material (A) and Mound (B)

Riser 90 Crystalline Material

Only a small sample of the solid near Riser 90 could be collected for characterization, and only very limited analytical work could be performed. X-ray work showed that anhydrous sodium carbonate was a major component with minor amounts of sodium nitrite, sodium oxalate, and possibly a phosphate. The concentrations of nitrate, nitrite, and hydroxide ion were not determined. Measurements of its sodium and potassium content and its radioactivity showed conclusively that the white solid was formed from tank waste. However, these limited measurements are insufficient to determine whether the leaked material originated from the solid or the supernatant layer of the tank or to define its corrosive properties.

Riser 83 Crystalline Material

Much more information about the character of the waste that leaked from the tank and eventually solidified on the floor of the secondary liner was obtained by the analysis of the solid that was collected near Riser 83. The major solid phases were identified by X-ray analysis as sodium nitrate and sodium carbonate monohydrate. There were smaller amounts of sodium nitrite and potassium nitrate and trace amounts of sodium fluoride sulfate and sodium oxalate.

The sample was too small to enable the determination of the customary suite of analytes and neither the water content nor the concentrations of hydroxide, chloride and sulfate ions were determined. The other analytical information and the analyte/sodium molar ratios for the solid material are summarized in Table 1.

The pH was not measured in the customary manner, but other tests implied that the pH of a dilute solution of the solid was over 11. This observation is consistent with

Table 1. Riser 83 Analytical Results

Analyte	Weight Observed µg/g	Analyte/Na Ratio
Cations		
Ca	3.08E+03	6.26E-03
Fe	4.75E+03	6.93E-03
K	3.85E+04	8.03E-02
Mg	7.70E+01	2.58E-04
Na	2.82E+05	1.00E+00
Anions[a]		
Al	9.42E+03	2.58E-02
TIC	4.37E+04	2.97E-01
F	8.61E+02	3.69E-03
NO2	5.80E+04	1.03E-01
NO3	1.79E+05	2.35E-01
PO4	2.14E+03	1.84E-03
Si	4.33E+02	1.26E-03
TOC	1.47E+03	9.98E-03

Source: RPP-ASMT-53793

the high total inorganic carbon (TIC) content (see Table 1) and the X-ray work that found sodium carbonate was a major constituent of the solid. It is pertinent that the TIC content of the solid is greater than expected on the basis of the concentration of carbonate ion in the supernatant and interstitial liquids.

Evaporation of Water and Absorption of Carbon Dioxide

The analytical observations for the white solid near Riser 83 are compatible with the viewpoint that liquid waste leaked from the tank and then absorbed CO_2 from the air as water evaporated from the liquid to form the essentially dry solid.

The primary tank is cooled by a ventilation stream originating underneath the center of the primary tank flowing into the annulus through the refractory slots. Carbon dioxide would react with the alkaline liquid wastes in the slots and on the annulus floor as water evaporated from them. The rates of evaporation and of depletion of the hydroxide ion concentration by the absorption of CO_2 are both dependent upon the liquid surface area and the ventilation flow rate. The high surface area and the high ventilation rate of approximately 850 cfm accelerate both these processes. The rate of consumption of CO_2 is also dependent on the hydroxide ion concentration and its rate of absorption slows as the neutralization reaction proceeds.

Laboratory work implies that the rate of evaporation of water is often faster than the rate of absorption of CO_2. This factor and the possibility that a solid crust may form on the surface of the liquid may prevent the attainment of equilibrium between CO_2 and bicarbonate and carbonate ion in the solution and CO_2 in the air to form solutions that retain low concentrations of hydroxide ion. This condition may have been realized with the Riser 83 solid which appears to have a relatively high pH and became moist during laboratory operations, possibly because it retained small amounts of deliquescent material.

As discussed more completely in the Appendix A, the relationship between the composition of the white solid and the compositions of the liquids in the supernatant and solid layers of the tank can be conveniently assessed by comparison of several analyte/sodium ratios. The nitrate ion/sodium ion ratio of 0.24 for the solid is incompatible with the lower value (0.002) for the interstitial liquid or the higher value (0.33) for the supernatant liquid. The same situation obtains for the potassium ion/sodium ion relationship. These findings suggest that the leaking liquid was formed by the combination of the supernatant and interstitial liquids. Table 2 provides an estimate of the original composition of the liquid that leaked from the tank and is compatible with the analyte/sodium ion ratios for the unreactive analytes (nitrate ion, nitrite ion, potassium, and total organic carbon [TOC]) on the basis of the assumption that 1.25 L of supernatant was diluted with 1 L of ISL.

Table 2. Calculated Concentrations and Concentration Ratios for Leaking Liquid and Solid Deposit near Riser 83

Analyte	Estimated Leaked Liquid* (M)	Estimated Current Composition(after CO_2 Reaction) (M)	Estimated Current Composition Analyte/Na Ratio	Riser 83 Sample Analyte/Na Ratio
Cations				
Ca	1.54E-04	1.54E-04	3.22E-05	6.26E-03
Fe	4.74E-05	4.74E-05	9.89E-06	6.93E-03
K	4.91E-01	4.91E-01	1.03E-01	8.02E-02
Mg	8.58E-05	8.58E-05	1.79E-05	2.58E-04
Na	4.79E+00	4.79E+00	1.00E+00	1.00E+00
Anions				
OH	1.34E+00	1.00E-03	2.09E-04	ND
Al	1.60E-01	1.60E-01	3.34E-02	2.85E-02
Cl	2.69E-02	2.69E-02	5.61E-03	ND
CO_3	1.03E+00	1.58E+00	3.55E-01	2.97E-01
F	5.73E-02	5.73E-02	1.20E-02	3.69E-03
NO_2	6.07E-01	6.07E-01	1.27E-01	1.03E-01
NO_3	1.07E+00	1.07E+00	2.23E-01	2.35E-01
PO_4	2.94E-02	2.94E-02	6.13E-03	1.84E-03
Si	2.52E-03	2.52E-03	5.26E-04	1.26E-03
SO_4	3.06E-02	3.06E-02	6.38E-03	ND
TOC	1.55E-01	1.55E-01	3.24E-02	9.98E-03

*Estimated leaked material based on 1.25 L supernatant and 1 L ISL mixture using BBI (2012) estimates
ND = not determined

The notion that CO_2 absorbed into the leaked liquid is consistent with the estimated pH value (11) and with the fact that the carbonate ion/sodium ion ratio for the deposited solid is significantly larger than the carbonate ion/sodium ion ratios for the supernatant and ISL. The hydroxide ion and carbonate ion contents that would be realized by the complete neutralization of hydroxide ion by CO_2 are shown in the center column of Table 2. The general agreement between the calculated analyte/sodium ion ratios for the neutralized liquid with the observed analyte/sodium ion ratios for the solid deposit is shown in the two right hand columns.

The decrease in temperature and the time dependent evaporation of water from the leaked liquid result in the deposition of solids from the leaked liquid. The changing liquid compositions that occurred during the drying of several wastes were studied in the laboratory and thermodynamically modeled (PNNL-19767, *Chemical Species in the Vapor Phase of Hanford Double-Shell Tanks: Potential Impacts on Waste Tank Corrosion Processes*).

The PNNL study evaluated the changes in pH and the changes in the compositions of the liquids and solids during evaporation. The pH never fell below 10 in any of the solutions that were investigated. It was also noted in the experimental work that one simulant, which had high concentrations of carbonate, nitrate and nitrate ions, did not reach thermodynamic equilibrium with atmospheric CO_2, resulting in a higher pH than predicted by the thermodynamic model. This state occurred because water loss was faster than the CO_2 incorporation from the atmosphere. The more rapid loss of water relative to the uptake of CO_2 means that the final pH of the evaporating solution will be higher than predicted by the thermodynamic model.

Characteristics of the Leaked Waste that Affect Corrosion

As discussed in Section 3.1, the properties of the steel, temperature, pH, the nitrite ion content and the concentrations of aggressive ions (nitrate, carbonate, chloride and sulfate) are important factors in assessing the propensity for corrosion of the estimated leaked liquid and the liquids that are produced during the evaporation of water.

The temperature of the waste in the bottom of Tank AY-102 is currently around 60 °C. Thermocouples in the outer radius of the refractory concrete indicate lower temperatures of approximately 45 °C. The annulus ventilation originates at the center of the primary tank, thus the outer radius of the refractory experiences higher temperatures. Recent ventilation outage events have caused the temperature in the primary tank to increase by approximately 20 °C.

The pH of the liquid in the solid layer of Tank AY-102 is between 11 and 12 and the pH of the liquid in the supernatant layer is more than 14. If the liquid that leaked from the tank was formed from approximately equal volumes of these two liquids, the pH would be more than 14. The absorption of CO_2 apparently reduced the concentration of hydroxide ion significantly in the solid material near Riser 83 sample, and its pH was estimated to be 11. The pH of the evaporating liquid presumably ranged between these two values during the solidification process.

The ISL can be accurately described as a 'carbonate ion waste', but any mixture of supernatant and ISL would be described as a 'nitrate ion waste.' The high concentrations of the nitrate ion, nitrite ion and hydroxide ions in the supernatant dominate any mixture of the two waste types. The complete range of concentrations that would be realized by mixtures of the supernatant and ISL indicate a pH above 12 and nitrite ion/nitrate ion concentration ratios above 0.50. It should be noted that the ISL and supernatant compositions used in the best-basis inventory (BBI) are derived from sampling, and any bottom ISL layer that may not have been sampled is not included in the estimated compositions.

The average nitrite ion concentrations of the ISL and the supernatant liquid are about 0.10 M and 0.90 M, respectively. If the liquid that leaked from the tank was formed from approximately equal volumes of these two liquids the concentration of nitrite ion in the leaking liquid would be about 0.60 M. A mixture of 90% by volume ISL and 10% by volume supernatant would result in a nitrite ion and nitrate ion concentrations of 0.18 M and 0.23 M, respectively. The evaporation of water would increase their concentrations.

The nitrite ion/nitrate ion concentration ratio of the ISL in the solid layer is very large because the concentration of nitrate ion is very small. The nitrite ion/nitrate ion concentration ratio of the

liquid in the supernatant layer is about 0.50. The nitrite ion/nitrate ion ratio for a liquid formed from approximately equal volumes of these two liquid would be about 0.56. This ratio would not change appreciably during the first stages of the evaporation of water because sodium nitrate and sodium nitrate are both very soluble in water. The ratio would increase when the solutions became very concentrated because sodium nitrite is somewhat more soluble than sodium nitrate in concentrated salt solutions. The chloride ion also increased during the phases of evaporation and has the potential for becoming the aggressive ion for pitting corrosion. The sulfate ion concentrations are too low in the waste to be a corrosion concern.

Reactions of the Leaked Waste with the Refractory

Visual observations show that the waste flowed through the refractory slots underneath the primary tank to reach the annulus. The waste has the opportunity to react with the refractory prior to reaching the annulus and the waste could flow downwards through the refractory to the bottom of the secondary liner. The analysis of the waste near Riser 83 does not show signs of significant reactions with the refractory.

The leaked waste may chemically react with the constituents in the refractory that is made of Kaolite 2200-LI[1] that rests on the top of the secondary liner beneath the bottom of the primary tank. The principal constituents of the refractory other than oxygen are silicon, aluminum, and calcium with small amounts of iron, magnesium, sodium and titanium (RPP-ASMT-53793).

Silicon	17.5 weight %	6.2 mol/kg Kaolite
Aluminum	21.5 weight %	8.0 mol/kg Kaolite
Calcium	13.2 weight %	3.3 mol/kg Kaolite

Testing of Kaolite 2200-LI with simulated waste showed it was susceptible to alkaline hydrolysis (RPP-ASMT-53793). This observation is consistent with the known chemistry of the oxides of calcium, aluminum and silicon and the behavior of calcium silicates and calcium aluminates as well as aluminosilicate clays (Zhao et al., 2004). It is notable that the heterogeneous reaction between kaolinite and waste simulants with about 1.4 mol/kg or 2.8 mol/kg sodium hydroxide required 4 to 8 weeks at 80 °C and produced not only simple aluminates and silicates but also more complex products as illustrated by the formation of sodalite, where X^- is chloride, hydroxide, or 0.5 carbonate ion.[2]

$$6\ Al(OH)_4^- + 6\ Si(OH)\ O^{2-} + 8\ Na^+ + 2X^- \rightarrow Na_6Si_6Al_6O_{24}\ (2NaX) + 12\ OH^- + 12H_2O \qquad (1)$$

High concentrations of hydroxide ion favor the formation of the soluble aluminate and silicate ions rather than the insoluble aluminosilicates. In addition, the calcium that is produced in the hydrolysis reaction is converted to insoluble calcium carbonate by the carbonate ion rich waste.

$$Ca^{2+} + CO_3^{2-} \rightarrow CaCO_3(s) \qquad (2)$$

[1] Kaolite is a registered trademark of Babcock & Wilcox Company

[2] A calcium containing aluminosilicate such as cancrinite, $Na_6(CaCO_3)Si_6Al_6O_{24}(2H_2O)$, may form in a sodium ion rich waste solution.

Assuming the waste reaction with the refractory went to completion, the hydroxide ion content (1 M) would be reduced to a negligible level as a consequence of the reactions to form a solution with about 0.22 M silicate ion and 0.28 M aluminate ion.

The carbonate ion content of the liquid (1.0 M) would also be reduced by the precipitation of calcium carbonate as calcium is liberated from the refractory. The relationship between the amounts of hydroxide ion that is consumed and the amount of carbonate ion that is consumed in the reaction with the refractory is dictated by its compositional stoichiometry in Equation 3.

$$\text{Depletion Factor} = 2 \times (6.2[OH^-]/Si + 8.0\,[OH^-]/Al)/3.3\,[CO_3^{2-}] = 8.6[OH^-]/[CO_3^{2-}] \qquad (3)$$

Consequently the reduction in the hydroxide ion content of the leaked liquid by 1 mole per liter would reduce the concentration of carbonate ion by about 0.11 moles per liter. The carbonate ion concentration in the leaked waste would be reduced from about 1 M to about 0.89 M. Approximately 0.22 M silicate ion and 0.28 M aluminate ion would be formed in the reaction, but significant portions of these substances would precipitate from the solution. These reactions would produce a liquid with the pH that is dictated in large part by the relatively high carbonate ion concentration.

The reaction of the liquid waste with the refractory occurs in competition with the evaporation of water and the neutralization of the hydroxide ion in the liquid by reaction with CO_2 in air. It is pertinent that the observed carbonate ion content of the solid near Riser 83 is significantly higher than implied by its concentration in the supernatant and ISL, and that the analyte/sodium ion ratios for aluminum, calcium and silicon in the solid near Riser 83 are not significantly different that the values of these ratios for the estimated supernatant and interstitial liquids[3]. These two observations suggest that the liquid that reached the vicinity of Riser 83 did not react in a significant way with the refractory. The lack of reactivity of the refractory may be a consequence of a short residence time for the flowing liquid or of the fact that the surface layers of the slots, which have been exposed to CO_2 for many years, have been thoroughly carbonated as discussed in RPP-ASMT-53793.

In contrast, the slot in the refractory near Riser 90 is blocked with solid waste. Liquids that leak into this slot may remain liquid for longer times because they are not be subject to the same rapid air flows and the alkaline waste will be in contact with the solid refractory for longer times.

In summary, the rates of the reactions between the leaked waste and the refractory are difficult to predict because unknown physical factors such as the blockage of air passages are difficult to assess, but any reactions of the alkaline leaked waste with the refractory that do occur will degrade the refractory and consume hydroxide ion to reduce the hydroxide ion content of the leaking liquid waste and increase the concentrations of soluble aluminate and silicate ions in the liquid as it passes through the refractory. New solid aluminosilicates that are formed in the process will deposit in the refractory together with solid calcium carbonate. Waste liquids that pass through the refractory and deposit on the top of the secondary steel liner will probably be less alkaline and will probably contain less carbonate ion than the estimated leaked waste.

[3] The increase in calcium is equivalent to no more than a 0.03 M decrease in hydroxide ion.

2.2 CHARACTERISTICS OF THE SECONDARY LINER

Tank AY-102, which was constructed in 1968, was the first DST to be constructed on the Hanford Site. The secondary liner bottom plates and bottom knuckle are made of ¼ in. thick carbon steel. The secondary liner bottom was sized to make the bottom section an 80-ft diameter secondary liner around the 75-ft diameter primary tank. As summarized in RPP-ASMT-53793, many difficulties were experienced during the construction of the secondary liner.

The secondary liner bottom knuckles were fabricated offsite at the Pittsburgh-Des Moines Steel Company in Provo, Utah, prior to being shipped to the worksite for welding to join the knuckles with the adjacent plates. Excessive distortion was experienced in the flat sections of the plates during the fabrication of the ¼ in. lower knuckle plates for secondary liners of Tank AY-102. Attempts were made to flatten the distorted areas by flattening the repaired plates with a hydraulic press. However, there was no significant improvement, and it was decided to ship the plates to the worksite, complete all welding, and then employ carefully regulated flame-shrinking to aid in meeting flatness tolerances.

Difficulties in welding of the secondary liner continued with reports of repaired welds that were increased from the original nominal ½ in. to a dimension of 1 ¾ in. wide and more buckling of the material during preheating in cold weather. Once all welds were complete, flame shrinking was used to reduce the wrinkles, but was unsuccessful.

The flatness of the liner was examined in February 1969 upon completion of welding. Of the 33 shots of the bottom plates, five were near the 2 in. maximum convexity. Of the 23 on the knuckles, 12 were between 2 in. and 3 in., with one slightly more than 3 in.

Due to the continued issues, the construction specifications for AY Farm were changed from what was original specified to allow the slope of "bubbles" or ripples in tank bottom to be 1 in. per foot rather than ⅜ in./ft. per specification.

A second survey of the liner identified 22 places that exceeded the 2-in. peak-to-valley tolerances, none that exceeded the 3-in. tolerance, and slopes approaching 1 in./ft. in several locations. These conditions were accepted, completing work on the secondary liner bottom. Further stresses on the secondary liner in the annulus would not be expected; however the secondary liner that is underneath the refractory concrete would experience similar stresses as the primary tank. The remaining stresses or low quality welds that may be present in the secondary liner should be further investigated to determine the increased risk to cracking corrosion.

3.0 CORROSION EVALUATION

The propensity for corrosion of the secondary steel liner is addressed in this section by consideration of previous evaluations and by new evaluations of the corrosive properties of wastes formed from different amounts of the interstitial and supernatant liquids. Changes that occurred in the composition of these leaked liquids as they evaporated and reacted with the CO_2 and the refractory are also addressed.

3.1 CORROSION MECHANISMS AND SPECIFICATIONS

The types of corrosion that may occur in the Tank AY-102 annulus include pitting corrosion and SCC. For nitrate ion concentrations of >1 M, the main corrosion concern is SCC, and for nitrate ion concentrations of < 1 M, pitting is the main corrosion concern. The results of corrosion testing programs provide a technical basis for assessing the propensity of the different waste compositions for pitting corrosion and for the initiation of SCC with stress-relieved steels. This approach has been used in the preliminary assessment of the corrosion threat even though the secondary liner has not been stress-relieved. Tests with steel that is representative of the secondary liner are subsequently recommended in Section 4.0.

Due to the lack of temperature data in the annulus, three possible temperature scenarios are used for the corrosion evaluation. First, is the conservative assumption that the annulus experiences temperatures similar to the temperatures at the bottom of the primary tank, which are generally around 60 °C. Second, is to assume that the annulus floor experiences similar temperatures as the outside radius of the refractory concrete underneath the primary tank, which are an average of approximately 45 °C. The third scenario includes the outer radial refractory temperatures experienced during a ventilation outage. Assuming that the waste has been in the annulus since approximately 2006, the highest temperature recorded in the outer refractory since that time is approximately 57 °C. The annulus floor temperature is expected to be lower than the measured temperatures in the tank and the refractory; however, these measured temperatures provide a conservative temperature range of 45 °C to 60 °C for corrosion analysis.

Stress Corrosion Cracking

Stress-corrosion cracking can occur in solutions with high nitrate ion or high bicarbonate ion concentrations. The ISL of Tank AY-102 is characterized as a carbonate waste and the supernatant is characterized as a nitrate waste. The specifications that were recommended by the Expert Panel Oversight Committee (EPOC) for the minimization of the SCC for DST wastes are shown in Table 3 (RPP-RPT-47337).

Table 3. Proposed Specifications for the Control of Stress Corrosion Cracking in Nitrate Ion Wastes in Double-Shell Tanks with Temperatures Less than 50°C

DST Specification Criteria	Limit
Maximum temperature	50°C
Maximum concentration of nitrate ion	6.0 M
Maximum concentration of hydroxide ion	6.0 M
Minimum pH	11
Minimum concentration of nitrite ion	0.05 M
Minimum nitrite ion/nitrate ion ratio	0.15

Source: RPP-RPT-47337, *Specifications for the Minimization of the Stress Corrosion Cracking Threat in Double-Shell Tank Wastes*

Pitting Corrosion

The Savannah River Site (SRS) has produced multiple studies on pitting corrosion in dilute wastes, as preparation for feed to their vitrification facility required washing and storing sludge slurries. While waste compositions at the SRS site vary from the Hanford Site, the work on pitting corrosion provides further insight on dilute nitrate solutions.

Nitrate ion was determined to be the usual controlling aggressive species for pitting corrosion when its concentrations ranged between 0.01 M and 1 M (WSRC-TR-90-512, *Effect of Temperature on the Nitrite Requirement to Inhibit Washed Sludge*).

Table 4. Savannah River Site Chemistry Specifications for Dilute Nitrate Ion Concentrations at pH 10.3 and 40 °C

For $[NO_3^-]$ Range	Variable
$0.1M < [NO_3^-] \leq 1.0M$	$[NO_2^-] = 0.038*[NO_3^-]*10^{(1.64)}$
	AND $[NO_2^-] = 6.11*10^{(1.64+1.34*\log[Cl^-])}$
	AND $[NO_2^-] = 0.04*10^{(1.64+0.84*\log[SO_4^{-2}])}$
	AND pH > 10.3

Source: WSRC-TR-2002-00327, *CSTF Corrosion Control Program*

Other pitting corrosion studies determined that chloride ion becomes the controlling corrosive ion if its concentration is greater than 3 percent of the nitrate ion concentration, while sulfate ion becomes controlling if its concentration is greater than 30 percent of the nitrate ion concentration (WSRC-TR-94-0250, *Recommended Nitrite Limits for Chloride and Sulfate in ESP Slurries* and SRNL-STI-2011-00479, *Effect of Chloride and Sulfate Concentration on Probability Based Corrosion Control for Liquid Waste Tanks – Part IV*). The limits shown in Table 4 were developed to establish the nitrite ion inhibitor concentrations when the hydroxide ion concentration was less than 1 M in dilute nitrate ion solutions. These chemistry limits have been adopted at the SRS Site (WSRC-TR-2002-00327).

Testing showed that a minimum nitrite ion concentration of 0.033 M at 40 °C and pH 10.3 would prevent pitting in the presence of any of these aggressive ions. However, more stringent restrictions are recommended on the basis of the concentration of each particular aggressive ion. This is a conservative specification as the observations imply that pitting can be avoided when

the nitrite ion concentration is 0.01 M at very low nitrate ion concentrations (< 0.01M), as experienced in the Tank AY-102 ISL (WSRC-TR-94-0250 and SRNL-STI-201-00479).

While these specifications focus on the nitrite ion concentration at a pH of 10, the additive concentration of both the nitrite ion and increased hydroxide ion concentrations in relation to the aggressive ion concentrations reduces the propensity for pitting corrosion.

Specifications for Chemistry Control at the Hanford Site

Corrosion testing programs that have been underway for many years provide the technical basis for the current DST chemistry control limits outlined in Tables 1.5.1-1 and 1.5.1-2 in OSD-T-151-00007, *Operating Specification Document for Double-Shell Tanks.* Both pitting and SCC have been assessed for the various waste compositions at the Hanford Site. Table 5 and Table 6 outline the chemistry specifications for the supernatant and ISL in the Hanford Site DSTs.

Table 5. Current Waste Chemistry Limits for Tanks AN-102, AN-106, AN-107, AY-101, and AY-102 Interstitial Liquid

Temperature	Variable	Limit
≤122°F	$[NO_2^-]/[NO_3^-]$[a]	≥0.32
	pH	≥10
>122°F	Limits in Table 6 apply[b]	

[a]The $[NO_2^-]/[NO_3^-]$ limit > 0.32 does not apply to Tank AY-102.
[b] Tank AY-102 chemistry limits apply for temperatures not in excess of 170°F.
Source: OSD-T-151-00007

Table 6. Current Waste Chemistry Limits for All Double-Shell Tank Wastes Except Tank AN-102, AN-106, AN-107, AY-101, and AY-102 Interstitial Liquid

For $[NO_3^-]$ Range	Variable	For Waste Temperature (T) Range		
		T <167 °F	167 °F < T < 212 °F	T > 212 °F
$[NO_3^-] \leq$ 1.0 M	$[OH^-]$	0.010M≤ $[OH^-] \leq$ 8.0 M	0.010 M≤ $[OH^-] \leq$ 5.0 M	0.010M≤ $[OH^-]$ < 4.0 M
	$[NO_2^-]$	0.011M≤ $[NO_2^-] \leq$ 5.5 M	0.011 M≤ $[NO_2^-] \leq$ 5.5 M	0.011M< $[NO_2^-] \leq$ 5.5 M
	$[NO_3^-]/([OH^-] + [NO_2^-])$	< 2.5	< 2.5	< 2.5
1.0M< $[NO_3^-] \leq$ 3.0 M	$[OH^-]$	0.1 ($[NO3^-]$) ≤ $[OH^-]$ < 10 M	0.1 ($[NO_3^-]$) ≤ $[OH^-]$ < 10 M	0.1 ($[NO_3-]$) ≤ $[OH^-]$ < 4.0 M
	$[OH^-] + [NO_2^-]$	≥ 0.4 ($[NO3^-]$)	≥ 0.4 ($[NO_3-]$)	≥ 0.4 ($[NO_3^-]$)
$[NO_3^-]$ > 3.0 M	$[OH^-]$	0.3M≤ $[OH^-]$ < 10 M	0.3M≤ $[OH^-]$ < 10 M	0.3M≤ $[OH^-]$ < 4M
	$[OH^-] + [NO_2^-]$	≥ 1.2 M	≥ 1.2 M	≥ 1.2 M
	$[NO_3^-]$	≤ 5.5 M	≤ 5.5 M	≤ 5.5 M

Source: OSD-T-151-00007

3.2 PAST EVALUATIONS

Stress Corrosion Cracking of the Secondary Liner

Stress corrosion cracking of the secondary liner has been evaluated previously in RPP-ASMT-27062, *Stress Corrosion Cracking Evaluation for the Secondary Liner Exposed to In-Specification Waste in a Double-Shell Tank Annulus*. Testing at the SRS indicated that the leakage of a relatively large volume of waste into a DST annulus containing adequate amounts of corrosion inhibitors would not be expected to lead to a breach of the secondary liner. The SRS experiments were conducted with steels similar in composition to Hanford Site DSTs at 95 °C to

105 °C in solutions containing adequate amounts of corrosion inhibitors. No crack growth was seen in stress-relieved carbon steel specimens at 95 °C when the nitrate to inhibitor ratio ($[NO_3]/[OH]+[NO_2]$) was less than 4.2. The current specifications at the Hanford Site limit the maximum nitrate to inhibitor ratio to 2.5. This testing showed a lack of crack initiation and crack growth, even when it was assumed that cracks were already present in the secondary liner. It was unlikely that cracks are present inasmuch as the secondary liner has never been exposed to non-compliant wastes or an aggressive environment. The Tank AY-102 annulus temperature is estimated to be lower than those tested, and in the range of 45 °C to 60 °C. The secondary liner was not stress-relieved, and may be more susceptible to SCC than implied by the results of these tests.

If the waste remained liquid in the annulus space for an extended period of time, the evaluation noted that the liquid-air interface would become caustic deficient because of reaction with CO_2 in the annulus air. The evaluation estimated that eight to 44 weeks would be required for the waste surface to become caustic deficient and support crack initiation, and that an additional three to five weeks were required for crack growth to penetrate the secondary liner. The time that was required for the neutralization of the hydroxide ion in the liquid waste varied inversely with the leak volume in the annulus, and could be extended by shutting down the annulus ventilation system. The evaluation concluded that it would be prudent to pump the waste from the annulus of the leaking DST into a sound DST at the earliest possible opportunity.

The volume of the waste that leaked from the primary tank was estimated to be between 190 and 520 gallons of liquid in October 2012. This estimate includes the waste that remains in the refractory as well as the waste on the annulus floor. The volume of the evaporated solid remaining in the refractory slots and the annulus is estimated to be 20-50 gallons. The liquid on the annulus floor either shows evidence of drying or has already dried. The amount of waste that has actually leaked into the annulus space of Tank AY-102 is a much smaller volume than the waste considered in the evaluation (RPP-ASMT-53793). The small amount of material in the Tank AY-102 annulus is mostly solid and has restricted mobility. Factors such as the changing composition of the waste during evaporation and possible reactions when passed through the refractory were not considered in this assessment; therefore this particular case must be separately evaluated.

Savannah River Site Tank 9 Annulus Waste Corrosion Evaluation

The SRS site has experienced multiple tank leaks due to SCC. A leak from the primary tank into the annulus of Tank 9 was discovered in 1957 (WSRC-TR-2001-00149, *Annual Radioactive Waste Tank Inspection Program-2000*). Similar to the Hanford Site, the Tank 9 primary tank and annulus pan were constructed of ½ in. thick carbon steel, but neither the primary tank nor the annulus pan was stress-relieved. The Tank 9 annulus contains 8 to 10 in. of dry leaked waste. In 2004, observations indicated water leakage into the annulus space. Salt dissolution and subsequent evaporation was a potential corrosion concern. It was assumed that the majority of the surface remained coated with the original paint coatings; however, corrosion was evaluated for waste in contact with the carbon steel liner (SRNL-MTS-2004-50022, *Cost/Benefit Analysis for Sampling the Waste in the Tank 9 Annulus*, Internal memo from B.J. Wiersma to M.W. Loibl, September 27, 2012).

The composition of the saltcake in the Tank 9 annulus was primarily sodium nitrate, sodium nitrite, and sodium bicarbonate. As of 2004, the composition of the waste was expected to be the same as the sampled material in 1980 and 1991 and no nitrite was expected to have depleted. The pH of the waste is unknown, and samples indicated the sodium hydroxide concentration was less than 0.1 wt%. The sodium nitrate and sodium nitrite salts are very soluble in water and would have dissolved in the water. The liquid would then contain high concentrations of both salts. It was concluded that potential for SCC and pitting were minimal due to the presence of significant quantities of nitrite ion and relatively low temperatures. Keeping the salt as dry as possible by maximum annulus ventilation operation (with steam to the pre-heater) was recommended as a mitigation action.

3.3 EVALUATION OF CORROSION THREAT

The analytical information about the composition of the waste that has leaked onto the secondary liner is very limited. The uncertainty about the waste composition prompted the evaluation of the corrosive character of leaked materials with several different compositions. The propensity for the initiation of pitting and cracking corrosion for each of the following compositions is assessed in Sections 3.3.1 through 3.3.7.

- Tank AY-102 supernatant liquid
- Tank AY-102 ISL
- Mixtures of the Tank AY-102 supernatant and ISL
- A mixture of Tank AY-102 supernatant and ISL after CO_2 absorption
- A mixture of Tank AY-102 supernatant and ISL from which water has evaporated
- A mixture of Tank AY-102 waste after passage through the refractory

3.3.1 Corrosion Threat of the Supernatant Liquid

Simulants of the present and aged supernatant in Tank AY-102 were studied in 2006 (RPP-RPT-33284, *Hanford Tanks AY-102 and AP101: Effect of Chemistry and Other Variable on Corrosion and Stress Corrosion Cracking*). Simulants of the current Tank AY-102 supernatant did not show cracking or pitting at pH 11 and temperatures of 50 °C or 77 °C (RPP-ASMT-35619, *Expert Panel Oversight Committee Assessment of Fiscal Year 2007 Corrosion and Stress Corrosion Cracking Simulant Testing Program and Impact on Double-Shell Tank 241-AY-102*).

The test observations indicate that the supernatant liquid in Tank AY-102 has a very low propensity for pitting or cracking corrosion of stress-relieved carbon steel at temperatures below 77 °C.

3.3.2 Corrosion Threat of Interstitial Liquid

The ISL in Tank AY-102 has a high carbonate ion concentration with a very low concentration of the nitrate ion (< 0.01 M). The pH is greater than 11 and the nitrite ion concentrations range from 0.33 M to 0.01M from the top to the bottom of the bulk solids layer.

As discussed in Section 3.1, the propensity for pitting by dilute solutions is low if the nitrite ion concentration is greater than 0.033 M at pH 10 and at 40 °C. This is a conservative specification

since other observations imply that pitting can be avoided when the nitrite ion concentration is 0.01 M in very dilute solutions.

Simulants of the least inhibited ISL in the lower segment of Tank AY-102 were examined at pH below the pH of the actual waste (RPP-RPT-33284). The carbonate ion rich simulants, which contained less than 0.01 M nitrate ion, were examined at pH 10, 10.5 and 11. They did not cause pitting or cracking of stress-relieved carbon steel at either 50 °C or 77 °C.

The specific testing for Tank AY-102 ISL and other tests at the SRS imply that the ISL of Tank AY-102 have a low propensity for pitting and cracking corrosion of stress-relieved carbon steel at temperatures below 77 °C.

3.3.3 Corrosion Threat of Combinations of Supernatant and Interstitial Liquid

As discussed in Section 2.1 and Appendix A, the compositions of mixtures of the supernatant and ISL are dominated by the higher pH and higher nitrate ion and nitrite ion concentrations in the supernatant liquid.

Table 7 shows the nitrite ion/nitrate ion concentration ratio would be above 0.5 and the pH above 12 for the range of mixtures of the supernatant and ISL.

Table 7. Compositions of Combined Interstitial Liquids and Supernatant

Analyte	Combination of Interstitial Liquid to Supernatant Composition				
	100% ISL	90% ISL + 10% Supernatant	50% ISL + 50% Supernatant	10% ISL + 90% Supernatant	100 % Supernatant
OH (M)	0.032	0.295	1.345	2.395	2.657
NO_2 (M)	0.158	0.248	0.607	0.967	1.057
NO_3 (M)	0.006	0.219	1.068	1.917	2.129
Cl (M)	0.004	0.008	0.027	0.046	0.050
pH	12.5	13.5	14.1	14.4	14.4
NO_2/NO_3	25.25	1.13	0.57	0.50	0.50

Source: ISL and Supernatant Compositions from BBI, 2012

The relatively high pH of these mixtures coupled with relatively high nitrite ion/nitrate ion concentration ratios result in a low propensity for cracking corrosion of stress-relieved carbon steel at temperatures below 77 °C.

Assessing the propensity for pitting corrosion of the mixtures of the supernatant and ISL is more complicated because the pH ranges from about pH 12 for the liquid with 10 % supernatant liquid to greater than 14 for the liquids with more than 50 % supernatant liquid.

The adoption of the SRS approach, which is shown in Table 4 indicates the nitrite ion concentration is insufficient to prevent pitting by the aggressive chloride ion and nitrate ion at pH 10.3 and temperature of 40 °C. A pH of 14 (> 1 M OH^-) is used at the SRS site for pitting

prevention when the nitrite ion concentration is insufficient. The pH of the waste in Tank AY-102 is presumably higher, but the temperature is also higher and the propensity for pitting is therefore somewhat uncertain.

However, the compositions that may be realized by mixing the supernatant and ISL are within the current chemistry control specifications for the DSTs as outlined in OSD-T-151-00007.

3.3.4 Corrosion Threat of Waste Reacted with Carbon Dioxide

The next waste composition to be considered is one formed from an equal mixture of the ISL and supernatant liquid that has been neutralized by the absorption of CO_2 from the atmosphere. The analytical observations for the waste near Riser 83 imply the pH of a mixture of this kind will be greater than 11. This observation is in accord with the results of laboratory tests that imply waste may evaporate at a higher rate than the absorption of CO_2, resulting in a higher pH than would be expected if the liquid reached equilibrium with the CO_2 in air before water evaporated.

The composition of a waste of this kind is shown in Table 2. The pH and the high nitrite ion/nitrate ion concentration ratio imply the waste would not cause SCC at 50 °C, and testing of similar wastes implies that the waste would not cause SCC at 77 °C. The propensity for pitting is more difficult to determine, because the waste contains more than 1 M nitrate ion. However, the composition of the waste is within the chemistry control limits.

3.3.5 Corrosion Threat of Evaporating Waste

As discussed previously, the waste in the annulus is mostly solid material and shows evidence of solidifying liquid. While the composition of the initial leaked material remained within the boundaries of a mixed solution of the Tank AY-102 supernatant and ISL, the composition of the material has changed. The annulus material would have experienced various compositional changes during the stages of evaporation and CO_2 absorption. The hydroxide ion of the solution is reduced due to both evaporation and absorption of CO_2. The nitrate ions and nitrite ions would remain in solution initially, resulting in an increase of concentration in the solution before precipitating out. The fact that the nitrite ion is slightly more soluble than the nitrate ion is of benefit as the nitrite ion/nitrate ion concentration ratio in the liquid would increase.

The propensity for SCC would not increase importantly under these conditions because the nitrite ion concentration increases and because the nitrite ion/nitrate ion concentration ratio also increases. The propensity for pitting is more difficult to judge since the concentrations of at least two of the aggressive ions (chloride ion and nitrate ion) increase as water is evaporated. Technical work is now underway to determine the compositions of evaporating Tank AY-102 wastes to enable an assessment of these issues.

3.3.6 Corrosion Threat for Waste Reacted with the Refractory

Reactions between the leaked alkaline waste and the solid refractory would not alter the concentrations of chloride, fluoride, nitrite, nitrate, phosphate or sulfate ion significantly. However, the reactions would consume hydroxide and carbonate ion in the leaked liquid to

produce soluble aluminates and silicates and insoluble calcium carbonate. The propensity for corrosion can be illustrated by considering a bounding reaction in which a leaked waste composed of 50 % by volume of the supernatant and ISL passed through the refractory and completely reacted with it before reaching the secondary steel liner. As discussed in Section 2.1, if the reaction went to completion, the hydroxide ion content (1 M) would be reduced to a negligible level and the carbonate ion would be slightly reduced as a consequence of the reactions to form a solution containing silicate and aluminate ions.

The nitrite ion/nitrate ion concentration ratio of 0.58 with a pH of at least 11 would provide for a low propensity for SCC to occur at temperatures below 77 °C for stress-relieved carbon steels, as bounded by the Tank AY-102 supernatant simulant testing. Pitting by a solution with a nitrate ion concentration of less than 1 M cannot be dismissed as the SRS standards require a higher nitrite ion concentration. The concentration of nitrite ion in the solution exceeds the OSD-T-151-00007 limits; however, the pH is less than 12 and is lower than specified for corrosion prevention.

3.4 STRESS CORROSION CRACKING IN CARBON STEEL LINERS THAT WERE NOT STRESS-RELIEVED

Corrosion propensity studies for DST waste simulants were developed upon the notion that the welds were properly made as well as on the notion that the heat treatment removed stress. Work at the SRS site, WSRC-MS-2005-00078, *Stress Corrosion Cracking of Carbon Steel Weldments*, determined that these two matters can increase the propensity for SCC. In a situation where the weld or heat treatments were not adequate, the thresholds for stress induced corrosion would have been lower (i.e., the concentrations of the inhibitors would have to have been higher than those discussed and temperature threshold for corrosion would be lower). Thus, it is important to evaluate the increased susceptibility to SCC for the secondary liner inasmuch as it did not receive post-weld stress-relief (stress-relief).

A structural investigation (BNWL-B-475, *Computer-Based Structural Investigation of the SY-103 Waste Storage Tank which Contains an Out-of-Tolerance Bottom Bump*) in 1976 of the bottom liner 'bump' in Tank SY-103 that exceeded the bottom liner tolerance concluded that increased local tensile stresses would exist in the bottom liner. The document, BNWL-B-475, concluded that the increased localized stresses would not increase the concern for the initiation of SCC. A recent review of this document by members of the EPOC concluded that, based on current information, the presence of bumps in the bottom liner will increase the tensile stresses and could contribute to SCC initiation, especially if the bumps occurred near a weld defect or from stress concentration at the T-joint of the weld. Therefore, the wrinkling and bulging experienced during fabrication of the liner could impose further stresses on the liner, independent of the welding stresses.

In 2005, PNNL evaluated the susceptibility of SCC in the potentially stressed bottom knuckle of Tank AN-107. Appendix C of RPP-RPT-27574, *Evaluation and Recommendation of Stress Criteria for Stress Corrosion Cracking of Double-Shell Tanks*, provides a summary of the literature research of the influence of stress-relieving on SCC at the SRS site.

Stress corrosion cracking occurred with some early DSTs at Savannah River. These tanks were constructed of carbon steel but, unlike the Hanford tanks, were not stress-relieved to reduce welding residual stresses. The tanks with SCC were exposed to relatively high temperature wastes with adverse waste chemistries that were outside the 2005 limits imposed on both SRS and Hanford tanks. Other early Savannah River tanks (also of low carbon steels and without stress-relieving) were operated at less severe waste chemistries and temperatures without reported SCC.

The stress corrosion cracks at Savannah River were adjacent to and normal to seam welds and were in plates that made up the vertical walls of the tanks. The cracks penetrated the complete wall thickness but stopped after growing to a few inches in length; evidently, the cracks grew beyond regions of high welding residual stresses. The cracks had orientations normal to the direction of the seam welds and were near the top of the tank, evidently associated with local waste chemistries near the top surface of the stored waste (water line). In some cases, were no reported cracks in the lower regions of the tanks, including the lower knuckle of the tank that forms the joint between the vertical and bottom plates. Other tanks that had SCC did show cracks in the lower regions of the tanks.

The SRS experience demonstrates that SCC can occur if worst-case welding residual stresses, operating temperatures, and waste chemistries are present. Subsequent experience benefited from the combined effects of stress-relieving and specifications for waste composition. Although both stress-relieving of the liners and improved specifications on waste chemistries could individually have been sufficient to prevent cracking, the limited operating experience is insufficient to support such a conclusion.

Tests were performed at the Savannah River Site during the 1960s using simulated waste solutions. The welded specimens were intended to simulate tank materials and fabrication. Tests were performed for 100 to 200 days at significantly higher temperatures (32–35 °C) and far more aggressive chemistries (50 wt% NaNO3) than any conditions the current Hanford DSTs experience, even tanks such as Tank AN-107 with deviations from waste chemistry limits. Work was cited for evidence that susceptibility to SCC becomes greater with increasing temperature and nitrate concentration. The Savannah River specimens included surface conditions of mill scale and stress risers (repair welds and effects of welded attachments) that would enhance the initiation of stress corrosion cracks.

As-welded specimens during the tests cracked under conditions that caused cracking of as-welded tanks in the field. Cracking did not occur in specimens subjected to somewhat less severe conditions under which tanks in the field did not crack.

It is not possible to examine failed liners of single-shell tanks, which precludes the detailed analyses needed to determine whether the failures were caused by corrosion, wall thinning, pitting, or cracking. It is likely that SCC was a factor because none of the older tanks were stress-relieved to reduce welding residual stresses. Furthermore, the past service conditions included storage of wastes at high temperatures with chemical compositions known to contribute to SCC.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The propensity for corrosion was assessed by reviewing previous work directed to the assessment of the vulnerability of the secondary liner, by examining test results and by comparing plausible compositions of the leaked waste with the chemistry control limits employed at the Hanford and SRS. The temperature and stresses imposed on the steel are important factors in assessing the propensity for corrosion. None of these factors have been adequately defined for the situation in Tank AY-102.

A previous evaluation of the potential for corrosion of leaked waste the annulus identified hydroxide depletion as a possible cause of stress corrosion cracking, and thus, the recommendation of immediate removal of the waste. The Savannah River Site has also experienced waste leaks onto the annulus pan, but concluded that the potential for corrosion was minimal due to the high nitrite ion concentrations and low temperatures. These conflicting evaluations prompted the present assessment of the propensity for corrosion.

The available analytical work concerning the composition of the solid waste on the floor of the annulus provided a starting point for this assessment. However, it became evident that the results for this one sample were insufficient and it would be necessary to consider other alternative compositions for the leaked wastes. Consequently, this assessment was extended to include the known compositions of the supernatant liquid, the interstitial liquid and simple mixtures of these two liquids that contain from 10% to 90% supernatant liquid. The evaporation of water and chemical reactions with CO_2 in air and with the refractory can alter the composition of the leaked waste. Accordingly, the compositions of a liquid with 50% interstitial liquid and 50% supernatant liquid that had absorbed CO_2 from the air, a liquid of the same composition that had reacted with the refractory, and liquids from which different amounts of water have evaporated were considered. It is recommended that additional samples of the leaked waste be obtained to provide better perspective about the actual compositions of the materials in contact with the secondary steel liner.

The temperatures of the wastes in contact with the secondary liner are not known with confidence, the estimated values range from 45 °C and 60 °C. Inasmuch as the evaluation of the corrosion threat would be facilitated by more accurate temperature information; it is recommended that the annular floor and refractory temperatures be determined with greater accuracy. It is also recommended that corrosion tests be carried out if the temperature measurements indicate the leaked wastes are actually exposed to temperatures in excess of 50 °C.

The chemistry control limits were established for the minimization of the corrosion threat of stress-relieved steels. Unfortunately, the related limits for steels that have not been stress-relieved are not well defined. The stresses on the secondary liner presumably vary from locations beneath the refractory to locations in the annulus. In any case, studies at the SRS indicate that carbon steel liners that are not stress-relieved are more susceptible to SCC. The increase in the corrosion risk for the secondary liner due to the properties of the steel and the absence of stress-relieving of the welds is not well defined. It is recommended that slow strain

rate tests and electrochemical polarization tests be carried out with steels that have not been stress-relieved to gain perspective on this important matter.

Testing has demonstrated that the interstitial liquid and the supernatant liquid that are now present in Tank AY-102 have low propensities for the cracking or pitting of stress-relieved steels at temperatures as high as 77 °C. The leakage of either of these two liquids onto cooler, stress-relieved steel would not be expected to cause cracking or pitting. Corrosion tests of as received steels are recommended to establish the propensity for corrosion for the secondary liner.

The propensity for corrosion of mixtures of the interstitial liquid and the supernatant liquid that contains from 10% to 90% interstitial liquid was assessed by comparing the concentrations of the principal inhibitors, hydroxide ion and nitrite ion, and the concentrations of the aggressive substances, chloride, sulfate and nitrate ion, in the various mixtures with the chemistry control limits for cracking and pitting corrosion. The compositions of these mixtures are within the chemistry limits for the minimization of SCC. However, the chemistry limits for the control of pitting from the SRS imply that several of these mixtures have insufficient hydroxide ion or nitrite ion for the control of pitting.

The evaporation of water and reactions of the leaked waste with CO_2 in air and with the refractory are complicating features.

First, water evaporates from the leaked liquid in the ventilation slots in the refractory and on the floor of the secondary liner in the annular space. Recent work with a waste simulant, which had a composition similar to the composition of the liquid with 50% of each tank liquid, indicated that the concentration of nitrate ion can become quite large (3.5 M) before sodium nitrate begins to precipitate from solution. This undesirable result is mitigated in part by the higher solubility of the two principal inhibitors, sodium nitrite and sodium hydroxide. On balance, the available information suggests that the composition of the liquid will remain within the chemistry control limits for SCC at 50 °C. However, the results also suggest that the concentration of chloride ion will increase during evaporation and that the concentrated liquid may cause pitting. It is recommended that thermodynamic calculations be carried out to determine the compositions of evaporating waste solutions to gain perspective on the corrosion threat posed by the concentrated liquid solutions that form during the evaporation of water.

Next, the hydroxide ion content of the leaked liquid will be reduced by the reaction with CO_2 in air as water evaporates from the solution. Since the rate of evaporation is more rapid than the rate of incorporation of CO_2 into the liquid, it is unlikely that the neutralization reaction will proceed to completion and that concentrated liquid will retain unreacted sodium hydroxide. The available information suggests that the composition of the liquid will remain within the chemistry control limits for SCC at 50 °C. However, the propensity for pitting increases significantly as the pH is reduced and pitting may occur in these circumstances.

Also, the carbonate and hydroxide ion concentrations may be decreased by reactions between hydroxide ion in the waste and the refractory. A significant reduction in the hydroxide ion content would increase the propensity for corrosion for wastes that seeped through the refractory and reached the secondary liner. However, the available information implies that the extent of

the reaction between the refractory and the hydroxide ion in the waste diminishes as the hydroxide ion content decreases. Although the final pH of the waste liquid is very difficult to estimate from the information in the literature, it is reasonable to infer that the final pH would not be smaller than the pH dictated by the carbonate ion content, somewhat greater than 11. As in the other cases, the composition of liquid that reached the floor of the secondary liner under the refractory would remain within the chemistry control limits for SCC at 50 °C largely because the nitrite ion content would not be decreased as the waste passed through the refractory. However, as noted previously, the reduction in the hydroxide ion content may initiate pitting. It is recommended that the representative waste solutions be contacted with cast refractory to determine the pH and the composition of the solutions are produced by reactions with the refractory.

In summary, this evaluation suggests that certain leaked waste compositions may cause pitting of the secondary steel liner because of the relatively low pH that may be realized in some circumstances. The propensity for pitting would of course be greater at the higher temperature that may exist under the refractory. The evaluation also suggests that there is a lesser propensity for SCC because the pH apparently remains above 11 with a sufficient concentration of nitrite ion and a favorable nitrite ion/nitrate ion concentration ratio. However, this conclusion needs to be affirmed by tests of as-received non-stress-relieved steels, especially if the temperatures exceed 50 °C.

The following recommendations were developed in collaboration with the EPOC, who reviewed the information about the present status of Tank AY-102. It was concluded that the available analytical data and the information about the temperature of the waste in contact with the secondary liner are not sufficient to determine the corrosion threat to the secondary liner with the desired degree of confidence. Subsequently, the length of time that the waste may remain in the annulus is inclusive. The initial recommendations are that WRPS:

- Initiate efforts to obtain accurate temperature information regarding the temperature in the refractory and regarding the temperature of the wastes in the annular space in contact with the secondary liner.

- Initiate efforts to obtain analytical samples from the leaked waste sufficient to perform the conventional suite of analyses including the water content and the pH as well as the conventional group of anions and metal analytes.

- Assess the consequences of the evaporation of water from leaked waste and the introduction of CO_2 into leaked waste. Experience suggests that this information can be obtained by thermodynamic calculations for the compositions shown in Table 8.

Table 8. Suggested Compositions for Tank AY-102 Waste Calculations

Case	Composition
1	Supernatant
2	Interstitial Liquid
3	50% Supernatant + 50% Interstitial Liquid
4	25% Supernatant + 75% Interstitial Liquid
5	75% Supernatant + 25% Interstitial Liquid

The supernatant and ISL compositions will be derived from the 2012 Best-Basis Inventory

- Perform slow-strain rate tests to evaluate the propensity for SCC and perform cyclic-potentiodynamic polarization (CPP) tests to evaluate the propensity for pitting for selected compositions at the limiting high temperature. The tests should be carried out with as received, non-stress-relieved steels that are representative of the steel in the secondary liner of Tank AY-102.

- Investigate the chemical reactions between the waste and the refractory with special emphasis on the assessment of the concentrations of the aggressive ion and the inhibitors.

These tests will indicate whether plausible compositions of the leaked waste are a threat for the pitting or cracking of as-received, non-stress-relieved steel at the temperature of the secondary liner. If corrosion is not observed in these tests, other carefully designed tests may be necessary to determine if the same compositions pose a threat to the liner because of the difficulties, such as low quality welds, that were encountered during construction.

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APPENDIX A

COMPOSITION OF WASTE IN THE TANK AY-102 ANNULUS

Introduction

Three samples of dried solids were collected from the annulus floor to determine if they had leaked from the tank. Two rather small samples were obtained near Riser 90. One of these samples was rust, mill scale, sand and soil. The other sample contained rust and mill scale together with a solid white material that was radioactive and apparently originated from the leaking tank. Another larger solid sample was collected on the floor near Riser 83. The two white solids were examined by x-ray analysis and chemical analysis. The limited analytical results that were obtained in these analyses have been used to explore the origin of the leaked waste and to provide a technical basis for the preliminary discussion of its corrosive properties.

It is pertinent to mention that analytical observations may not be representative of other portions of the solid on the floor of the secondary steel liner and alternative interpretations about the composition of the material, its origin and its corrosiveness may need to be evaluated.

Analytical Observations

Riser 90

The small amount of the material collected near Riser 90 severely restricted the analytical work.

The major phase in the solid white sample was identified by the X-ray analysis to be anhydrous sodium carbonate. There were minor amounts of sodium nitrite and sodium oxalate. Another minor component was tentatively identified as either sodium hydrogen phosphate, Na_2HPO_4, or the related fluoride derivative, $Na_2F(PO_4)_2$ $(19H_2O)$ (RPP-ASMT-53793).

Laboratory analyses indicated sodium and potassium were the principal cations with a small amount of aluminum. The small sample size prevented the measurement of the pH and the concentrations of the anions. The observed potassium ion/sodium ion mol ratio was 0.01. It was concluded in RPP-ASMT-53793 that the analytical information was sufficient to establish that the solid originated from the tank, but there was insufficient information to determine whether the leaked material originated from the interstitial liquid or the supernatant layer.

Riser 83

Approximately 5 g of dried waste was collected near Riser 83 and more information was obtained about its composition.

The major phases in the solid sample were identified by X-ray analysis as the monohydrate of sodium carbonate and sodium nitrate together with smaller amounts of sodium nitrite, and potassium nitrate. Trace amounts of sodium fluoride sulfate, Na_3FSO_4, and sodium oxalate were also detected (RPP-ASMT-53793, *Tank AY-102 Leak Assessment*).

The sample was too small to enable the determination of the customary suite of analytes and the concentrations of hydroxide, chloride and sulfate ions were not determined. Similarly, the water content was not measured, but it was reported that the exposed surfaces of the solid became noticeably moist during the preparation of the analytical samples.

The pH was not measured in the customary manner, but test paper indicated that the pH of the solution that formed when less than 1 mg of the solid Riser 83 material was dissolved in two

drops of water was 11. For comparison, conventional equilibrium constants indicate that the pH of a solution produced from 1 mg of a solid that contained 10 wt % carbonate ion in 2 drops of water (0.1 mL) would be approximately 11.3.

The original analytical information, the mol/g content and the molar analyte/sodium ratio for the solid material are summarized in Table A1.

Table A1. Analytical Observations for White Solid From Riser 83.

Actual Analyte	Analyte AvgObsd microg/g	Probable Analyte	Analyte AvgObsd microg/g	Analyte/Na Ratio
Cations				
Ca	3.08E+03		3.08E+03	6.26E-03
Fe	4.75E+03	Ferric oxide	6.79E+03	6.93E-03
K	3.85E+04		3.85E+04	8.03E-02
Mg	7.70E+01		7.70E+01	2.58E-04
Na	2.82E+05		2.82E+05	1.00E+00
Anions				
OH	ND		ND	ND
Al	9.42E+03	Aluminate	3.17E+04	2.85E-02
Cl	ND		ND	ND
TIC	4.37E+04	Carbonate	2.19E+05	2.97E-01
F	8.61E+02		8.61E+02	3.69E-03
NO2	5.80E+04		5.80E+04	1.03E-01
NO3	1.79E+05		1.79E+05	2.35E-01
PO4	2.14E+03		2.14E+03	1.84E-03
Si	4.33E+02	Silicate	1.17E+03	1.26E-03
SO4	ND		ND	ND
TOC	1.47E+03		5.51E+03	9.98E-03

ND = not determined

Sodium and potassium are the principal cations and nitrate, nitrite, and carbonate are the principal anions. Consideration of the probable chemical composition (aluminum as aluminate, iron as iron oxide, silicon as silicate etc) indicates that the observed weights of the analytes account for 82 % of the material. Presumably, other unmeasured anions including chloride and sulfate ions and possibly hydroxide ion and retained water account for the remainder of the material. The anion charge/cation charge ratio is 0.88. The cation excess presumably is related in part to the neglect of chloride and sulfate ion and possibly hydroxide ion.

Discussion

Observations of the leaked material indicated the liquid waste leaked from the bottom of the primary tank and the water evaporated from it as it lay on the refractory concrete and the secondary steel liner (RPP-ASMT-53793).

The relative molar amounts of the principal analytes in the solid were compared with the relative molar amounts of these materials in the supernatant liquid and in the interstitial liquid as shown in Table A2.

Table A2. Compositions and Concentration Ratios for the Riser 83 Solid and Tank AY-102 Supernatant and Interstitial Liquids.

Actual Analyte	Solid Analyte/Na Mol Ratio	Supernatant Layer M	Supernatant Layer Analyte/Na Mol Ratio	Interstitial Liquid M	Interstitial Liquid Analyte/Na Mol Ratio
Cations					
Ca	6.26E-03	2.23E-04	3.41E-05	8.58E-05	2.80E-05
Fe	6.93E-03	7.86E-05	1.18E-05	1.79E-05	5.85E-06
K	8.03E-02	9.69E-01	1.49E-01	1.28E-02	4.20E-03
Mg	2.58E-04	1.30E-04	2.00E-05	4.11E-05	1.34E-05
Na	1.00E+00	6.52E+00	1.00E+00	3.06E+00	1.00E+00
Anions					
OH	ND	2.66E+00	4.08E-01	3.25E-02	1.06E-02
Al	2.85E-02	3.08E-01	4.72E-02	1.26E-02	4.13E-03
Cl	ND	5.02E-02	7.70E-03	3.55E-03	1.16E-03
CO3	2.97E-01	6.87E-01	1.05E-01	1.37E+00	4.49E-01
F	3.69E-03	1.11E-01	1.70E-02	3.45E-03	1.13E-03
NO2	1.03E-01	1.06E+00	1.62E-01	1.58E-01	5.15E-02
NO3	2.35E-01	2.13E+00	3.27E-01	6.24E-03	2.04E-03
PO4	1.84E-03	1.73E-02	2.65E-03	4.15E-02	1.36E-02
Si	1.26E-03	4.20E-03	6.44E-04	8.37E-04	2.73E-04
SO4	ND	4.63E-02	7.10E-03	1.48E-02	4.83E-03
TOC	9.98E-03	1.84E-01	2.82E-02	1.27E-01	4.14E-02

*The compositions of the supernatant liquid and the interstitial liquid are based upon BBI (2012).
ND = not determined

The composition of the solid differs significantly from the solid that would be formed by the evaporation of either the supernatant liquid or the interstitial alone (RPP-ASMT-53793). However, the high potassium ion/sodium ion ratio virtually requires that some of the leaking liquid originated from the supernatant layer, which has a very high and novel potassium ion content. The nitrate ion/sodium ion ratio of 0.24 for the solid is incompatible with the lower value (0.002) for the interstitial liquid and significantly smaller than the related ratio (0.33) for the supernatant liquid. The variations in the observed potassium ion/sodium ion and the nitrate ion/sodium ion ratios for the three materials suggest that the leaking liquid was formed by the dilution of supernatant liquid by interstitial liquid. Exploratory calculations indicated that the nitrate ion/sodium ion ratio in the solid at Riser 83 could have been realized by the mixing and subsequent evaporation of water from a liquid mixture formed from 1.25 L supernatant liquid per 1.0 L of interstitial liquid. The calculated and observed analyte/sodium ion ratios are

summarized in Table A3. The complete range of combine supernatant and interstitial liquid compositions is shown in Table A4.

Table A3. Calculated Concentrations and Concentration Ratios for Leaking Liquid and Solid Deposit at Riser 83.

Analyte	Estimated Leaked Liquid (M)	Estimated Current Composition (after CO2 Reaction) (M)	Estimated Current Composition Ratio Analyte/Na	Ratio Analyte/Na
Cations				
Ca	1.54E-04	1.54E-04	3.22E-05	6.26E-03
Fe	4.74E-05	4.74E-05	9.89E-05	6.93E-03
K	4.91E-01	4.91E-01	1.03E-01	8.02E-02
Mg	8.58E-05	8.58E-05	1.79E-05	2.58E-04
Na	4.79E+00	4.79E+00	1.00E+00	1.00E+00
Anions				
OH	1.34E+00	1.00E-03	2.09E-04	ND
Al	1.60E-01	1.60E-01	3.34E-02	2.85E-02
Cl	2.69E-02	2.69E-02	5.61E-03	ND
CO3	1.03E+00	1.70E+00	3.55E-01	2.97E-01
F	5.73E-02	5.73E-02	1.20E-02	3.69E-03
NO2	6.07E-01	6.07E-01	1.27E-01	1.03E-01
NO3	1.07E+00	1.07E+00	2.23E-01	2.35E-01
PO4	2.94E-02	2.94E-02	6.13E-03	1.84E-03
Si	2.52E-03	2.52E-03	5.26E-04	1.26E-03
SO4	3.06E-02	3.06E-02	6.38E-03	ND
TOC	1.55E-01	1.55E-01	3.24E-02	9.98E-03

*The compositions of the supernatant liquid and the interstitial liquid are based upon the BBI (2012).
ND = not determined

Table A4. Compositions of Combined Supernatant and Interstitial Liquids

Analyte	ISL (M)	90/10 (M)	80/20 (M)	70/30 (M)	60/40 (M)	50/50 (M)	40/60 (M)	30/70 (M)	20/80 (M)	10/90 (M)	Supernatant (M)
Al	0.013	0.042	0.072	0.101	0.131	0.160	0.190	0.219	0.249	0.278	0.308
Ca	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Cl	0.004	0.008	0.013	0.018	0.022	0.027	0.032	0.036	0.041	0.046	0.050
TIC as CO3	1.375	1.306	1.237	1.168	1.099	1.031	0.962	0.893	0.824	0.755	0.687
Cr	0.000	0.000	0.001	0.001	0.002	0.002	0.002	0.003	0.003	0.003	0.004
F	0.003	0.014	0.025	0.036	0.046	0.057	0.068	0.079	0.090	0.100	0.111
K	0.013	0.108	0.204	0.300	0.395	0.491	0.587	0.682	0.778	0.874	0.969
Na	3.062	3.408	3.755	4.101	4.447	4.793	5.140	5.486	5.832	6.178	6.525
NO2	0.158	0.248	0.337	0.427	0.517	0.607	0.697	0.787	0.877	0.967	1.057
NO3	0.006	0.219	0.431	0.643	0.855	1.068	1.280	1.492	1.704	1.917	2.129
PO4	0.041	0.039	0.037	0.034	0.032	0.029	0.027	0.025	0.022	0.020	0.017
Si	0.001	0.001	0.002	0.002	0.002	0.003	0.003	0.003	0.004	0.004	0.004
SO4	0.015	0.018	0.021	0.024	0.027	0.031	0.034	0.037	0.040	0.043	0.046
TOC	0.127	0.132	0.138	0.144	0.150	0.155	0.161	0.167	0.173	0.178	0.184
Free OH	0.032	0.295	0.557	0.820	1.082	1.345	1.607	1.870	2.132	2.395	2.657
pH	12.51	13.47	13.75	13.91	14.03	14.13	14.21	14.27	14.33	14.38	14.42
NO2/NO3	25.25	1.13	0.78	0.66	0.60	0.57	0.54	0.53	0.51	0.50	0.50

The relative amounts of the principal unreactive constituents (sodium, potassium, nitrate, nitrite ions and TOC) in the solid are in reasonable accord with the composition of a solid that would have been formed in this way. The hydroxide ion/sodium ion and carbonate ion/sodium ion ratios for the leaking liquid differ significantly from the ratios observed for the solid because CO_2 reacts with the hydroxide ion to form carbonate ion during the evaporation of water (PNNL-19767 *Chemical Species in the Vapor Phase of Hanford Double-Shell Tanks: Potential Impacts on Waste Tank Corrosion Processes*).

$$CO_2 + 2NaOH = Na_2CO_2 + H_2O$$

This reaction reduces the hydroxide ion content of the solid and increases the carbonate ion content as shown in the column on the right in Table A3. The calculated carbonate ion/sodium ion ratio, 0.36, is in reasonable according with the observed value, 0.30, for the solid.

The x-ray work, which indicates that the monohydrate of sodium carbonate is a principal constituent, is in accord with this interpretation. The finding that the observed ratio is lower than the calculated ratio implies that hydroxide ion may be present in the small amount of retained liquid in the solid. This result is consistent with the observation that the solid became noticeably wet during some analytical manipulations. The result is also consistent with the fact that the rate of reaction of carbon dioxide is slower than the rate of evaporation of water (PNNL-19767).

The consequences of the removal of water from waste liquids have been investigated by Felmy and his associates (PNNL-19767). The evaporation of water from alkaline waste solutions with low aluminate ion concentrations results in the sequential deposition of the compounds shown in Figure A1.

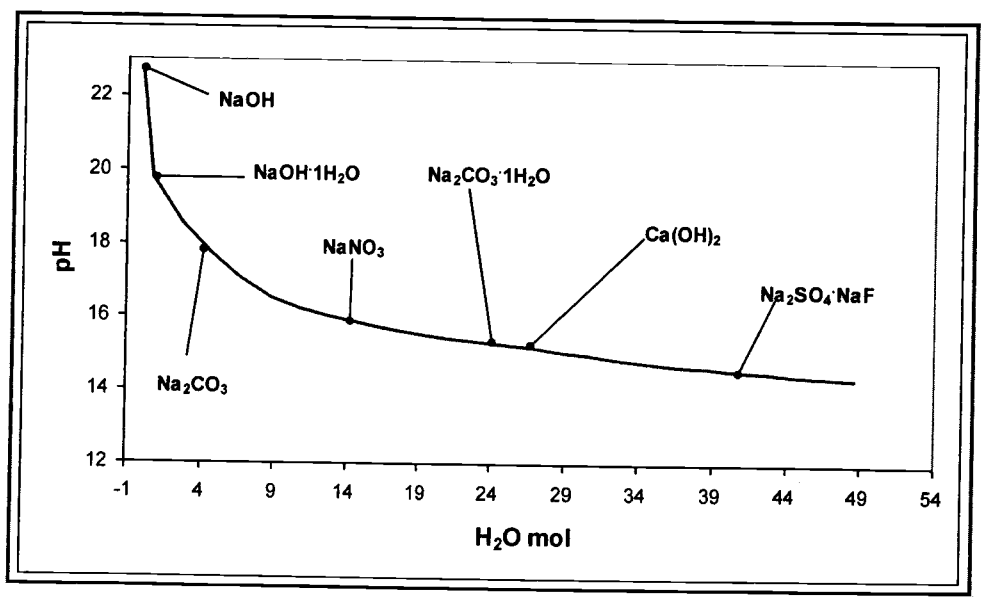


Figure A1. The Sequential Deposition of Solids as Water is Evaporated from a Simulated Waste Solution with Low Aluminate Ion Content

The compositional changes that were observed during the evaporation of water from a waste simulant with a composition related to the composition of the leaking waste from Tank AY-102 are shown in Table A4 (PNNL-19767).

Table A4. The Observed Compositions of a Waste Simulant during the Evaporation of Water (Amount of Water Evaporated, Mol %)

Analyte, M	0%	27%	49%	57%	67%
Na	4.96	6.61	8.35	9.48	9.66
K	0.04	0.05	0.10	0.12	0.17
Al	0.02	0.01	0.00	0.00	0.00
Cl	0.10	0.16	0.19	0.23	0.30
Cr	0.00	0.01	0.01	0.01	0.01
NO3	1.59	2.05	2.95	3.63	3.40
NO2	0.91	1.35	2.00	2.50	3.85
P	0.05	0.07	0.07	0.07	0.07
S	0.04	0.06	0.08	0.10	0.13
TIC	1.12	1.40	1.50	1.34	1.06
pH	12.51	11.42	11.20	11.29	11.68

These observations, which are in good accord with thermodynamic calculations, indicate that the solutions become very concentrated before many of the salts precipitate. The concentrations of several corrosive ions including chloride ion, nitrate ion and sulfate ion increase during the evaporation of water. The concentration of the nitrite ion, a principal inhibitor, also increases during the evaporation of water. It is pertinent that sodium nitrite is more soluble than sodium nitrate and the nitrite ion/nitrate ion concentration ratio increases as water is evaporated.

Summary

The analytical information regarding the composition of the solid waste residues that are now on the top of the secondary steel liner of Tank AY-102 is very limited, and any interpretation of the results must necessarily be regarded as tentative. However, the chemical and physical observations are compatible with the viewpoint that the leaking liquid waste is approximately an 125/100 by volume mixture of the liquids from the supernatant and the solid layers, and that carbon dioxide from the air dissolved in the liquid and reacted with hydroxide ion to form additional carbonate ion as water evaporated from the mixture to form the solid.

References

Felmy et al., 2010, PNNL-19767, *Chemical Species in the Vapor Phase of Hanford Double-Shell Tanks: Potential Impacts on Waste Tank Corrosion Processes,* Pacific Northwest National Laboratory, Richland, Washington.

RPP-ASMT-53793, 2012, *Tank 241-AY-102 Leak Assessment*, Washington River Protection Solutions, LLC. Richland, Washington.

Tank Waste Information Network System, 2012, *Best-Basis Calculation Detail and Best-Basis Calculation Detail Supplemental Analytes, Tank AY-102*, queried November 2012, Washington River Protection Solutions, LLC. Richland, Washington.

DISTRIBUTION SHEET

To	From	Page 1 Of 1
Distribution	Base Ops Process Engineering	Date 12/17/2012
Project Title/Work Order		EDT No.
RPP-RPT-54099,Rev. 0, Evaluation of the Corrosion Threat of the Waste in the Tank 241-AY-102 Annulus		ECN No.

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
K.D. Boomer	R2-53	X			
J.R. Follet	R2-58	X			
D.J. Houghton	S5-07	X			
W. Isom	R2-58	X			
N.W. Kirch	R2-58	X			
D.B. Little	R2-58	X			
W.J. Powell	R2-58	X			
C.L. Rosenkrance	R2-53	X			
T.L. Sams	R2-52	X			
D. Scott	R3-26	X			
M.J. Sheridan	S5-08	X			
D.W. Strasser	S5-63	X			
G.R. Tardiff	S5-07	X			
T.J. Venetz	R2-53	X			
D.J. Washenfelder	R2-53	X			
J.M. Johnson	H6-60	X			

Johnson, Jeremy M

From: Johnson, Jeremy M
Sent: Monday, November 05, 2012 4:27 PM
To: 'donald.blake@srs.gov'
Subject: FW: Update on Tank AY-102 Material Discovery

Don,

FYI here is a presentation summarizing the outcome of the leak assessment for AY-102.

Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

From: Johnson, Jeremy M
Sent: Monday, September 17, 2012 11:21 AM
To: 'donald.blake@srs.gov'
Subject: FW: Update on Tank AY-102 Material Discovery

Don,

Here's an update on AY-102 below, there's a presentation attached at the bottom. To answer your question, we have not yet sampled the material in the annulus but hope to very shortly. I will forward you more info as we get it.

Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

From: ^ORP Office of Communications
Sent: Tuesday, September 11, 2012 2:39 PM
Subject: Update on Tank AY-102 Material Discovery

ANNOUNCEMENT

Department of Energy
Office of River Protection
P.O. Box 450
Richland, Washington 99352

ORP No. 12-087

Issued: 9-11-2012

To: All ORP Employees
Subject: Update on Tank AY-102 Material Discovery

Work continues at tank AY-102 to understand the source of the material found within the annulus and determine the appropriate next steps. Late last week, I briefed Tom D'Agostino and the Hanford Advisory Board on the status of AY-102. I wanted to share the briefing with you and provide the most current information.

Visual inspections of the annulus through 10 risers are complete and provide video footage for approximately 95 percent of the annulus. As previously shared with you, material had been discovered near two risers. During the final visual inspections, no additional material was found. Crews are preparing to take samples of the material on the floor of the annulus later this month.

In addition, crews are preparing to move the camera for bi-weekly inspections to Riser 83, the location of the annulus where the last discovery of material was found. This work should be complete this week.

Liquid from the tertiary leak detection pit was sampled. Results show radioactivity at background levels, which is consistent with previous samples, indicating there are no leaks in the secondary containment.

Investigation activities will continue through September. I will continue to share information with you as it becomes available. As always, please feel free to contact me if you have any questions.

Tom Fletcher

washington river protection solutions

Office of River Protection

Tank AY-102 Leak Assessment

Tom Fletcher

November 1, 2012

washington river protection solutions

Leak Assessment Conclusion

Office of River Protection

- *Leak Conclusion*

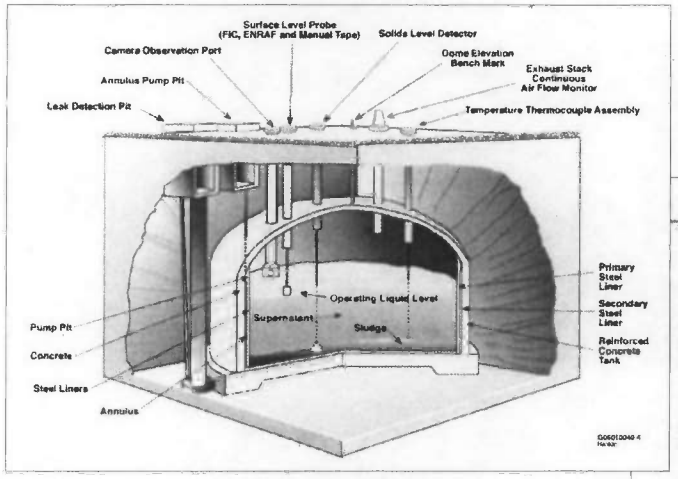
  The source of radioactive material discovered in the tank AY-102 annulus near Risers 83 and 90 is a leak from the primary tank.

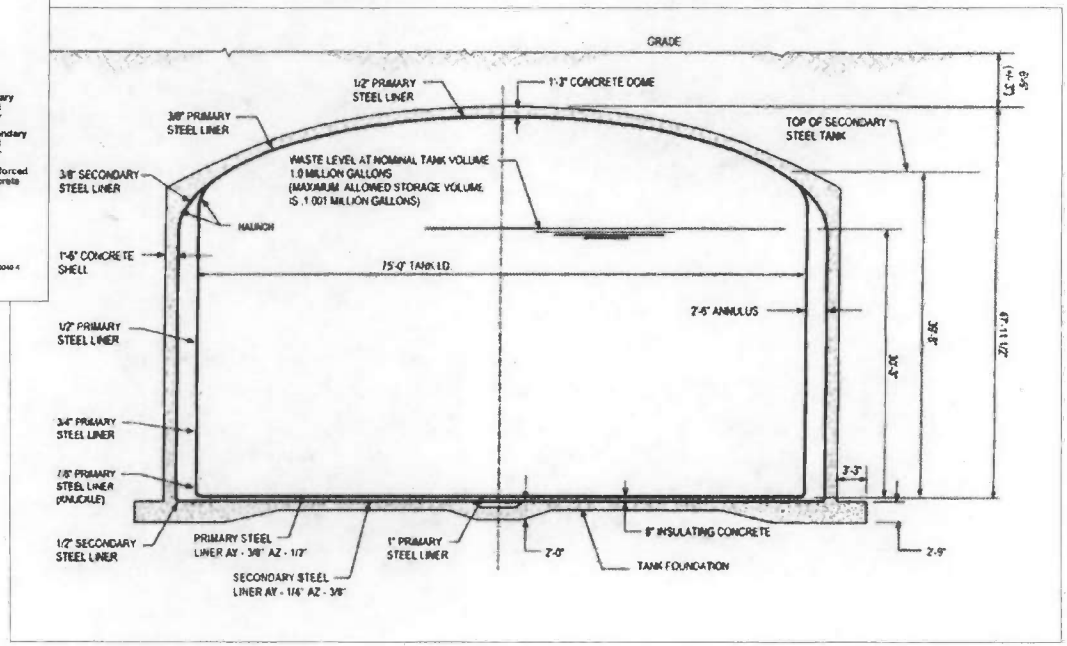
- *Probable Cause*

  Possible corrosion at high waste temperatures compounded by mechanical impacts to a tank whose waste containment margins had been reduced by construction difficulties.

241-AY Double-Shell Tank Cross Section

- Tank AY-102 was the first double-shell tank constructed at Hanford

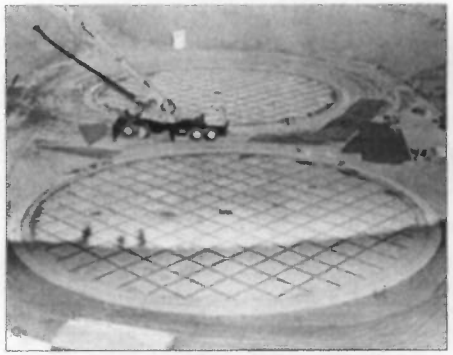


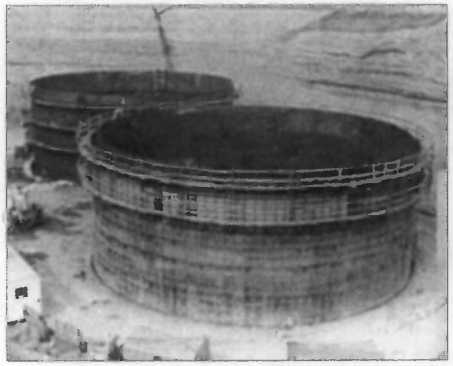


washingtonriver protectionsolutions

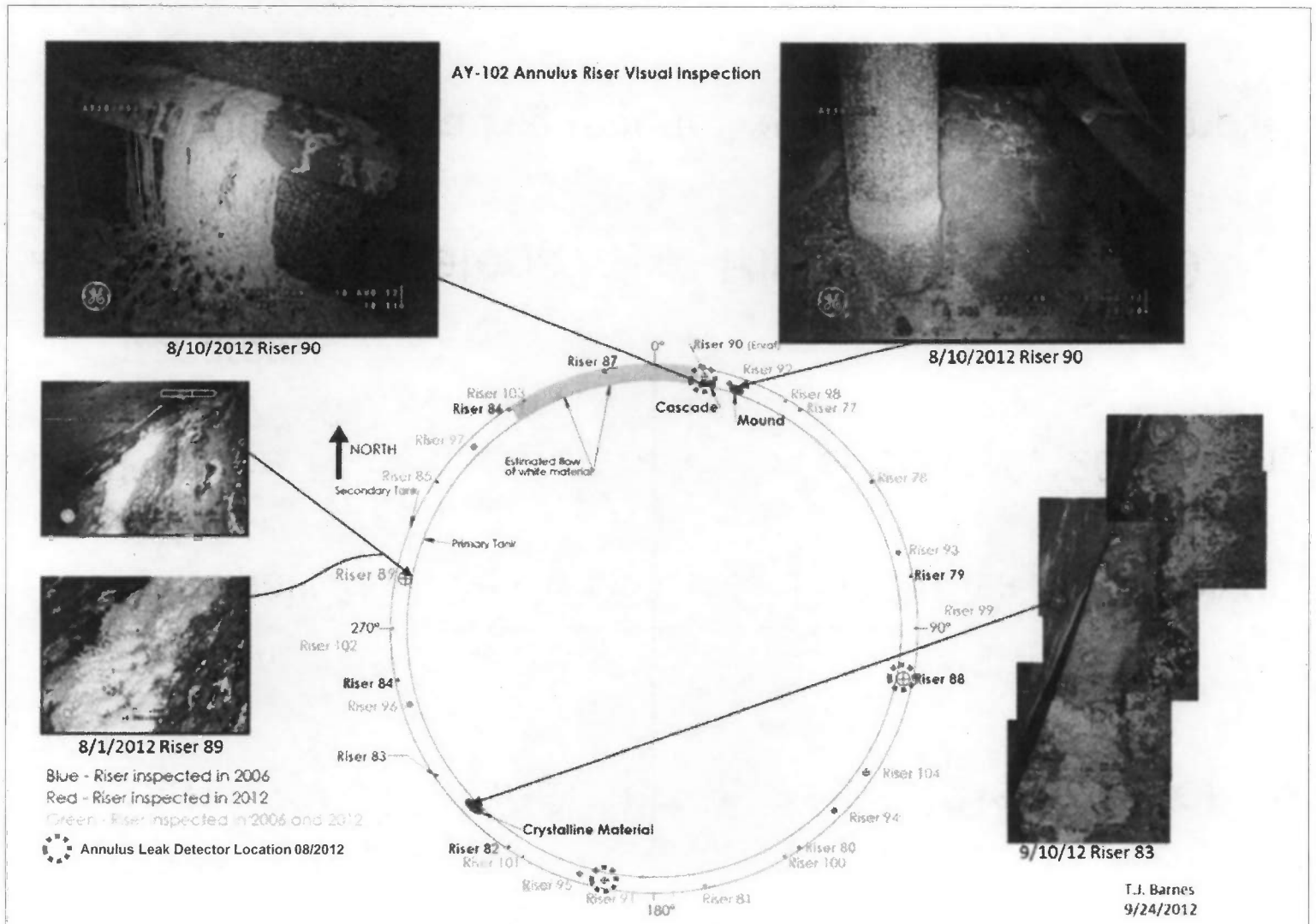
Construction Sequence

Office of River Protection





Annulus Inspections: Sites with Found Material



Annulus Sample Results - I

- Annulus Floor Material near Riser 83, September 26, 2012:
  - 45 mR/hr "Window Open"
  - Principal Chemical Constituents: $NaNO_3$, Na_2CO_3, $NaNO_2$, KNO_3[1]
  - Principal Radionuclide Constituents: Sr-90, 0.120 µCi/gm; Cs-137, 90.9 µCi/gm (202 million disintegrations per minute per gram)
- Annulus Floor Material near Riser 90, August 10, 2012:
  - 800,000 dpm reading reported with detector near sample[2]

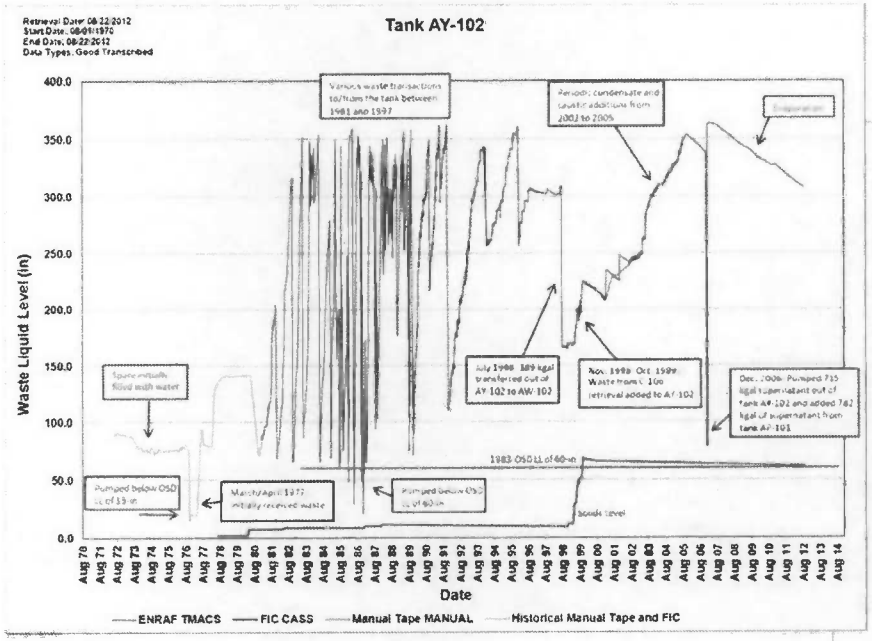
[1] In 1994, 4,000 gallons of KOH containing about 2,600 pounds of potassium were added to tank AY-102 to increase the pH. The tank AP-101 supernatant transferred into tank AY-102 in contained a significant potassium inventory. Tank AY-102 has second highest potassium inventory of any Hanford waste tank.

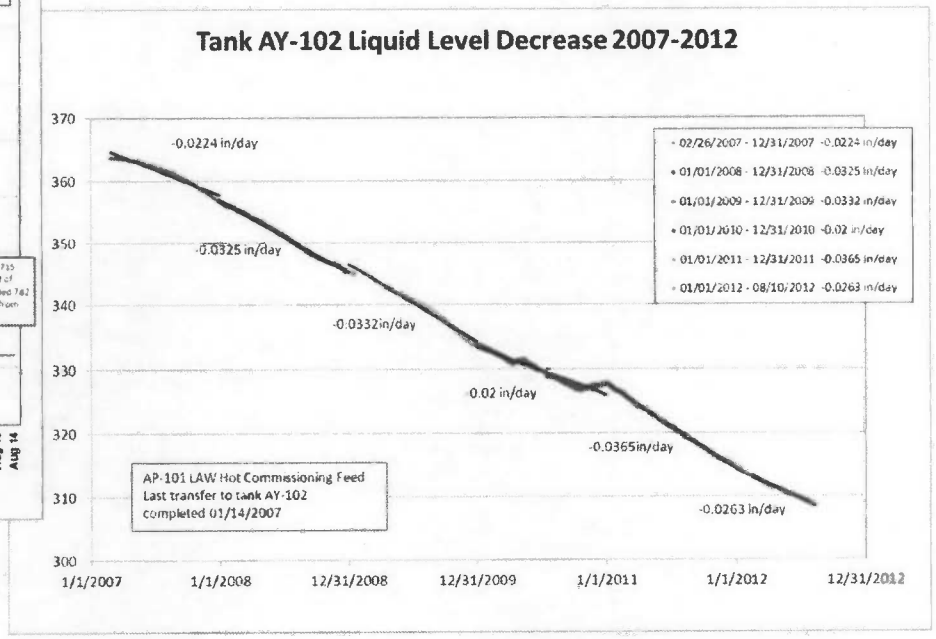
[2] Preliminary laboratory results from material collected near Riser 90 on October 15, 2012 are consistent with the results from the Riser 83 sample.

Corroborating Evidence of Leakage

Corroborating Evidence of Leakage	Yes	No
Liquid Level Changes		X
Chemistry	X	
In-Tank Corrosion Probe		X
Primary Tank Ultrasonic Wall Inspections		X
Waste Temperature		X
Tank Dome Deflection and Tank Settlement		X
Fill Cycle Fatigue		X
Tank Construction	X	

Liquid Level Changes



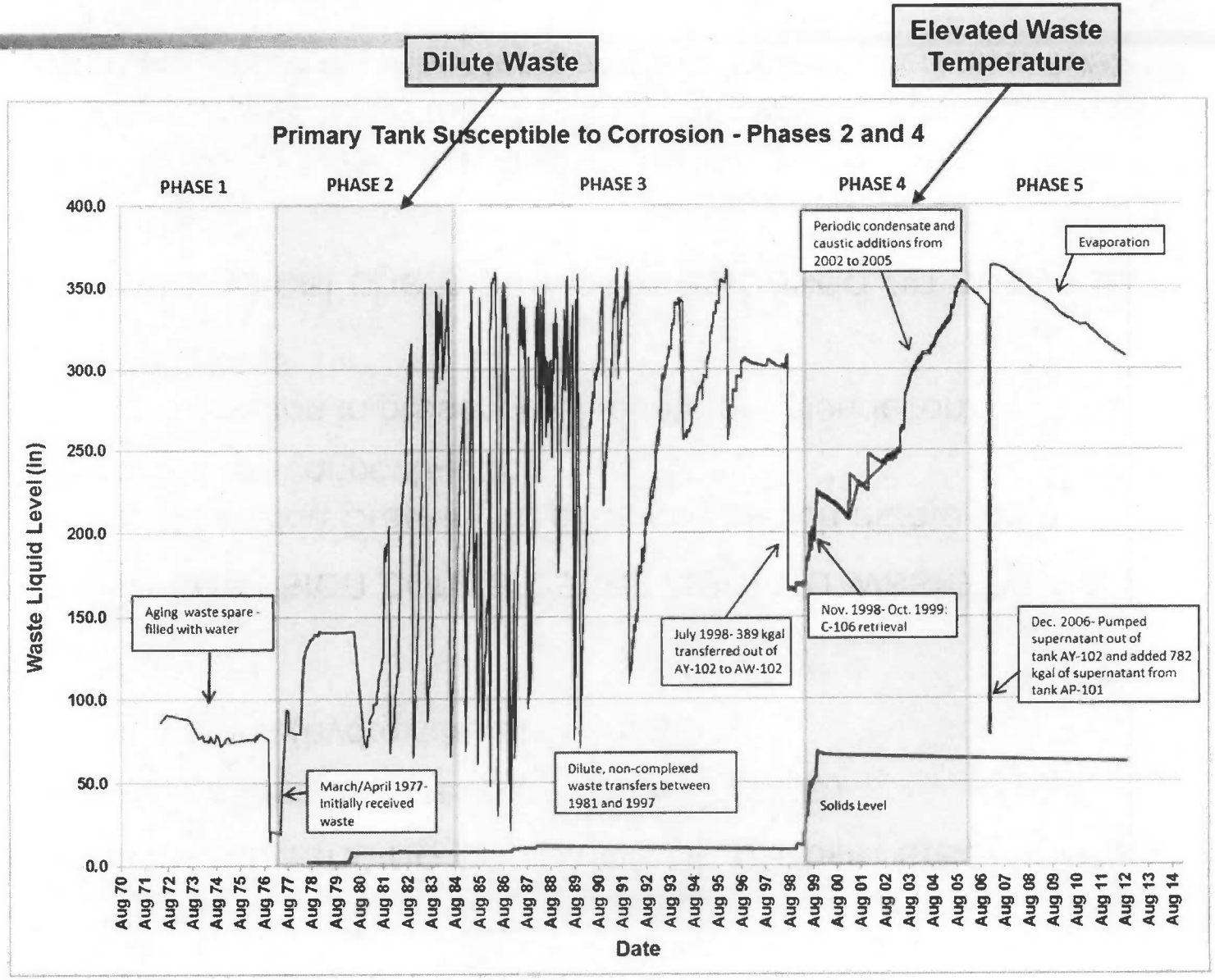


- Tank C-106 sludge retrieval during 1998 – 1999 increased the tank heat load by ~ 94,000 BTU/hr
- Since AP-101 transfer in 2007, evaporation rate has averaged ~ 77 gal/day, or ~ 28,000 gal/year
- **A small, episodic leak could occur undetected inside the evaporation rate**

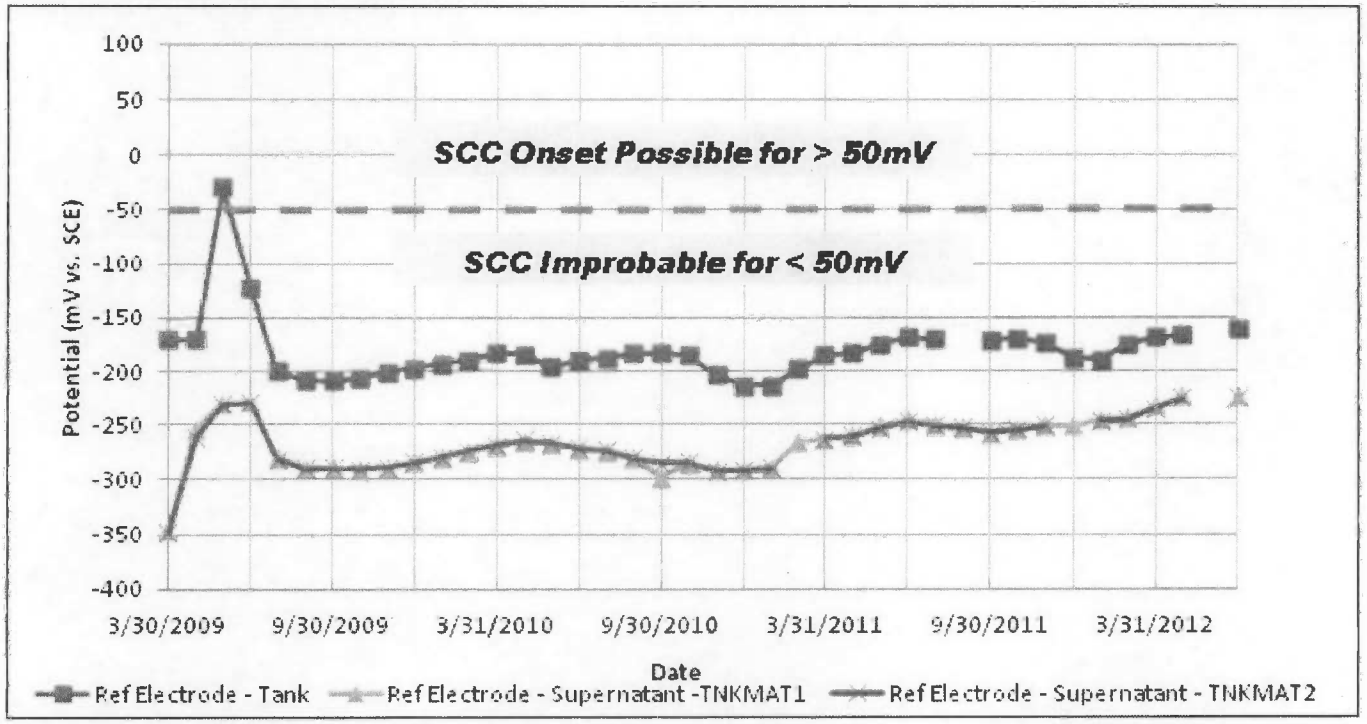
Chemistry

- Parameters influencing corrosion of carbon steel liner:
  - Aggressive ions (Nitrate, Carbonate, Chloride)
  - Inhibitory ions (hydroxide and nitrite)
  - Temperature
- Two main corrosion concerns for Hanford waste types:
  - Stress Corrosion Cracking in presence of high nitrate ion or carbonate ion concentrations
  - Pitting Corrosion in presence of nitrate or chloride ion concentrations
- Five chronological chemistry phases based on susceptibility to corrosion
  - The first solids layer deposited in tank AY-102 in 1979 – 1984 ("Phase 2") may have the characteristics which cause corrosion when subjected to higher temperatures experienced after 1999 ("Phase 4").

Chemistry (cont.)



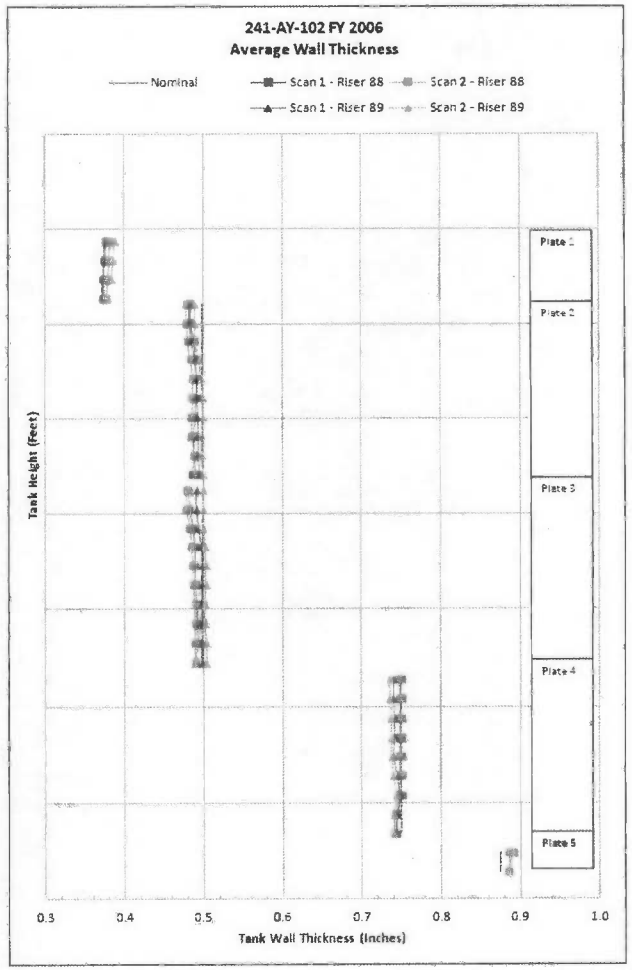
In-Tank Corrosion Probe



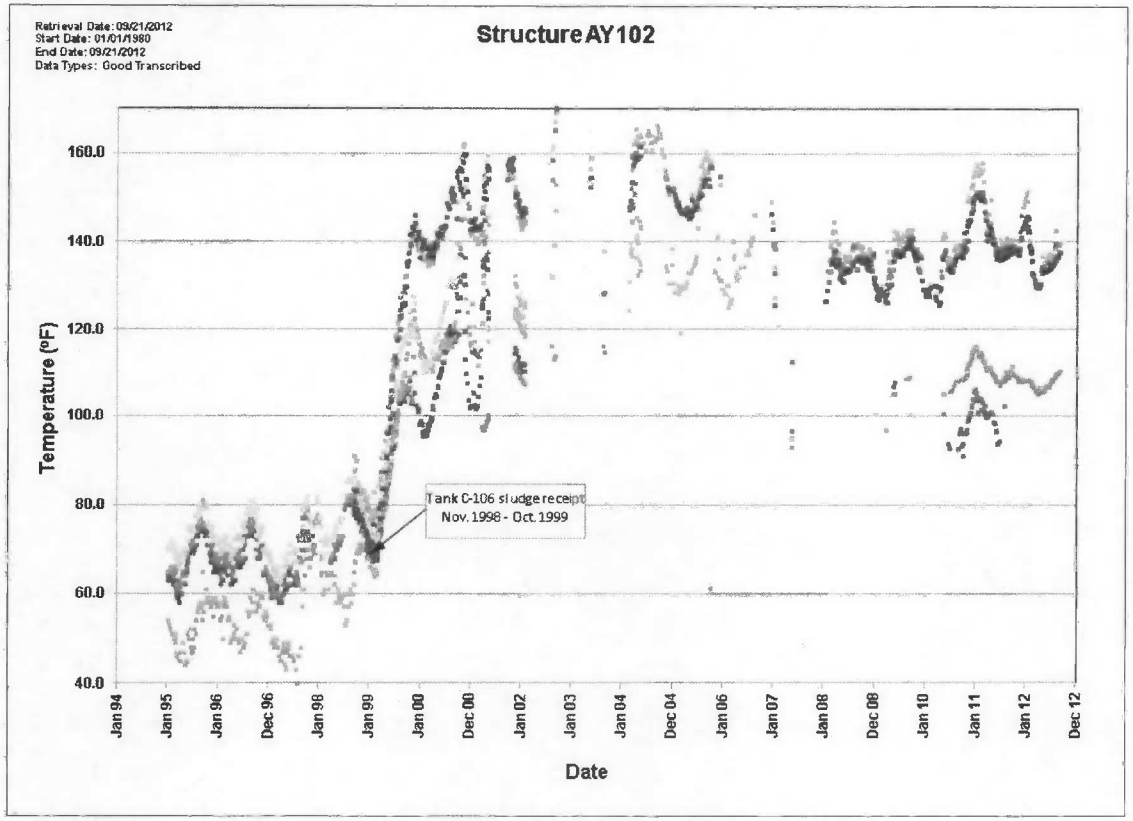
- Installed in March, 2009
- Electrodes located in supernatant and sludge layers and vapor space
- Sludge electrodes failed during corrosion probe installation. No readings are available.

Primary Tank Ultrasonic Wall Inspections

- In 2006 vertical scan pairs were completed in Risers 88 and 89 on surfaces
- **No significant primary tank wall loss has been detected by ultrasonic wall thickness scans**

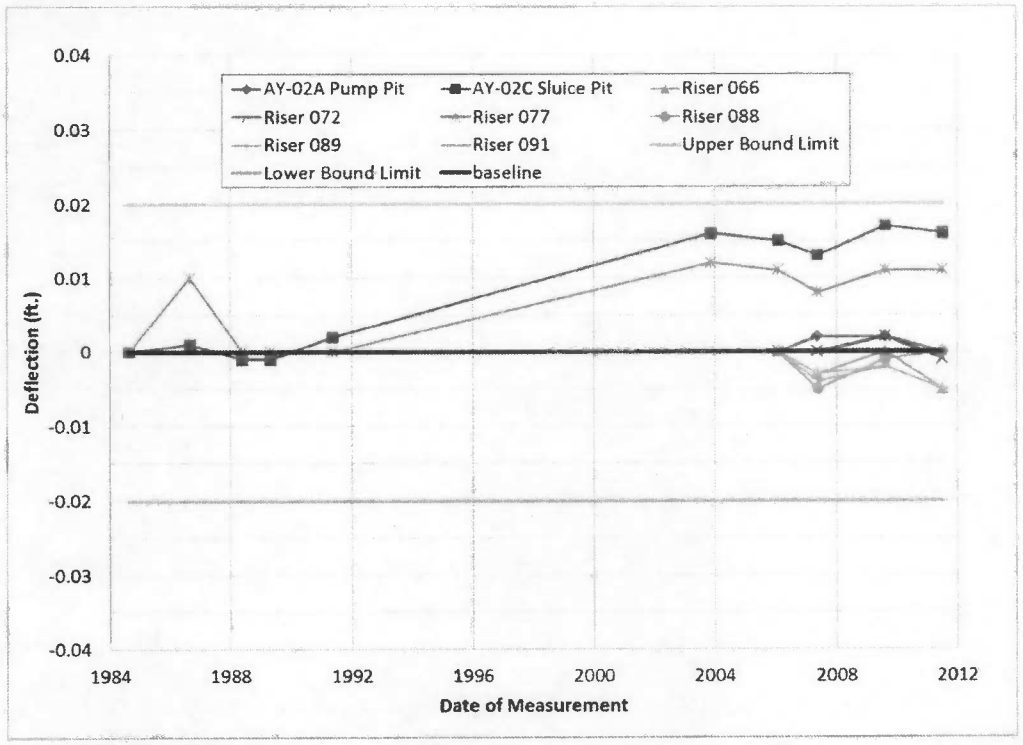


Waste Temperature



- Tank design and structural modeling temperature was 350°F; operating limit is 260°F
- From available records, highest waste temperature recorded is ~189°F in the sludge
- **Waste temperatures have been well within analyzed and allowable limits.**

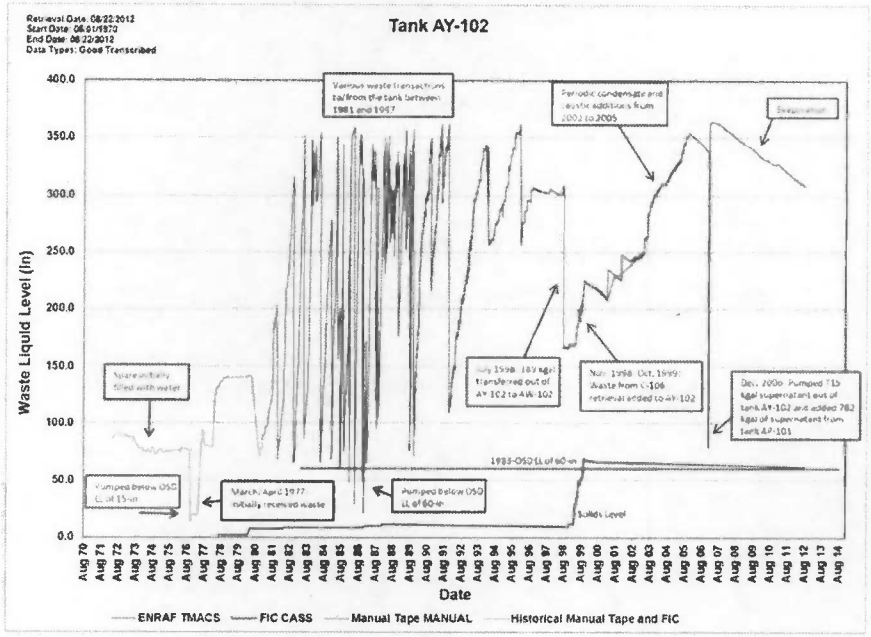
Tank Dome Deflection and Tank Settlement

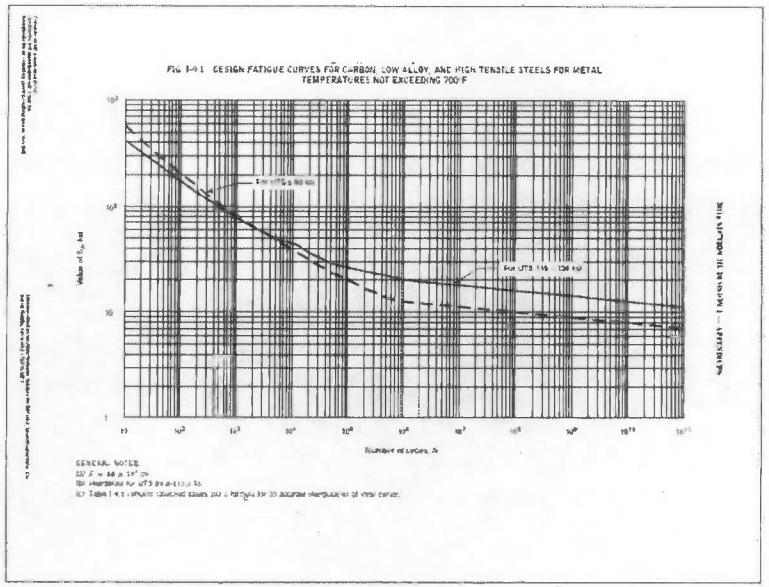


- Eight benchmarks in use – two with data since 1984 and six new benchmarks first recorded in 2006
- Dome deflections up to 0.5-inches (~ 0.04-feet) are within load limits[1]
- Survey data show a maximum dome deflection of < 0.02-feet since record keeping began
- **No evidence of dome deflection or tank settlement.**

[1]RPP-25782, *DST Dome Survey Program, and* RPP-RPT-25608, *Hanford Double-Shell Tank Thermal and Seismic Project- Increased Concentrated Load Analysis*

Fill Cycle Fatigue





- Cycle Fatigue evaluated in 1968 after structural modeling identified a region of the primary tank dome predicted to exceed minimum tensile stress.
- **Using ASME Section III Division I cycle fatigue guidance, safe cycles estimated to be 17,600**
- Backcheck using 2008 structural model results and 2010 version of code indicates ~ 25,000 safe cycles[1]

[1]ASME Section III Division 1 *Rules for Construction of Nuclear Facility Components*, Appendices, Figure I.9-1 "Design Fatigue Curves for Carbon, Low Alloy, and High Tensile Steels for Metal Temperatures not Exceeding 700ºF," and RPP-RPT-28968, Rev. 1, *Hanford Double-shell Tank Thermal and Seismic Project – Summary of Combined Thermal and Operating Loads with Seismic Analysis*

Tank Construction (Highlights)

- Tank Construction Difficulties
  - Secondary Liner Warpage
  - Refractory Concrete Cracking
  - Primary Tank Bottom Weld Rejection
  - Primary Tank Bottom Placement Refractory Concrete Depth Implications
  - Insulating Refractory Damage during Stress Relief and Hydrostatic Test of Primary Tank
  - Gaps beneath Primary Tank and Insulating Refractory

Welding of Tank AY-102 Secondary Tank Bottom (8051-1-Photo)

Tank Construction (cont.)

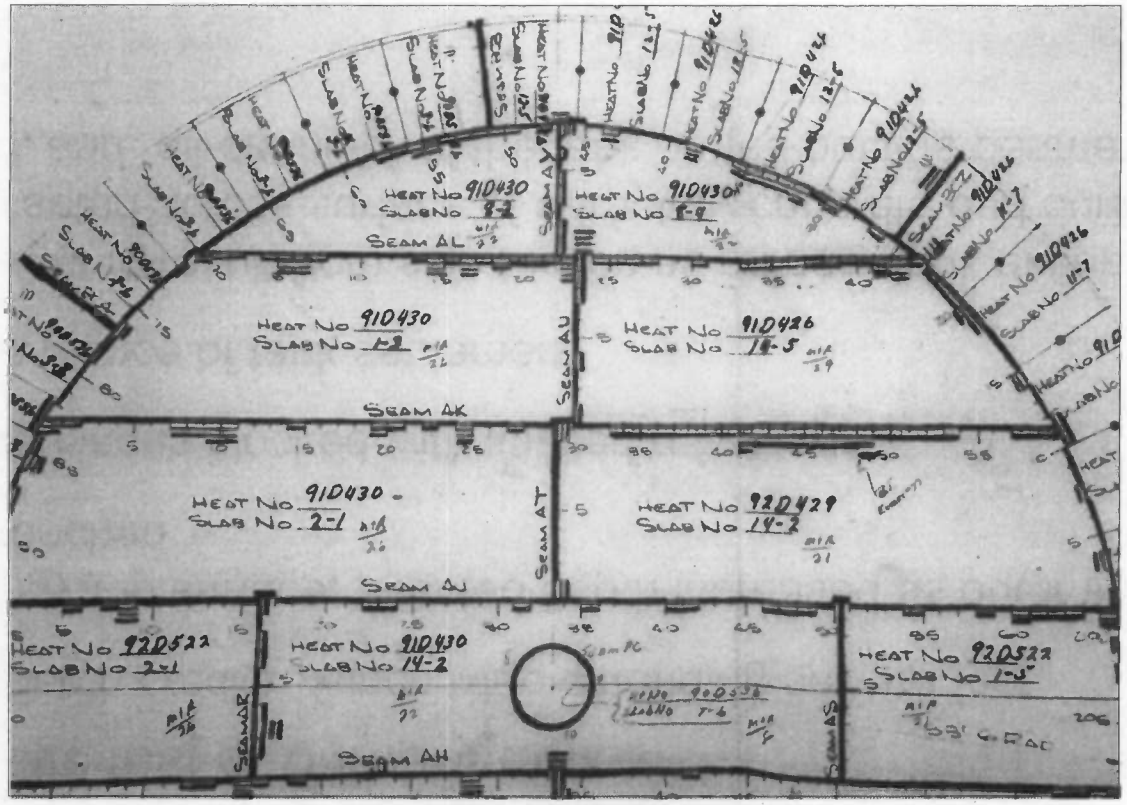
- Secondary Liner Warpage
  - Use of thin ¼-inch plates complicated by work in extreme cold (-20°F to -10°F) caused liner warpage . As plates were preheated and welded, convex bulges and wrinkles appeared.
  - Flame heating and water fast quench partially eliminated wrinkles. But when plates were heated by the sun new wrinkles appeared. These did not disappear as temperatures chilled.
  - February, 1969 survey found 22 liner locations exceeding allowable 2-inch convexity. Root-to-crown slopes up to1-inch per foot were present, exceeding allowable 3/8-inch per foot.
  - These were eventually accepted for placement of the insulating refractory.

Tank Construction (cont.)

- Primary Tank Bottom Weld Rejection
  - Weld quality was a continuing concern. The floor plate weld rejection rate was ~ 36%.[1] Many welds were repaired several times before passing radiography.
  - The radiography inspector accepted welds that were later rejected by the quality inspector.[2]

[1] By comparison the weld rejection rate for concurrent waste tank construction at the Savannah River Site was 10% - 20% (*Savannah River Plate Waste Tank Discussions and ITT Stress Analysis Study*, Trip Report); the weld rejection rate on AY-101 was 10%.
[2] Of 343 rejected floor plate welds, the inspector found only 294.

Tank Construction (cont.)



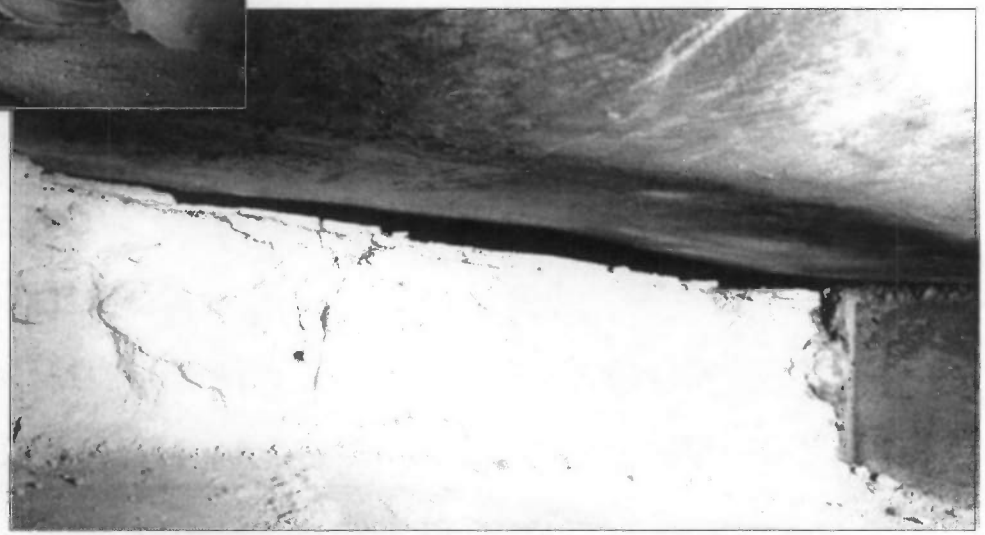
Primary Tank Bottom Plate Weld Map for northern section of tank showing rejected welds in red, and accepted welds in blue. The weld map shows instances of welds being repaired several times before passing inspection.

Tank Construction (cont.)

- Insulating refractory damage from stress-relief and hydrostatic test of primary tank
  - Full depth cracks ¼-inch wide extending several feet
  - Spongy top surface; affected depth increased as outer lip approached
  - Air passages blocked with spalled refractory
  - No evidence of tank settlement
  - Thought to result from skin friction as primary tank expanded and contracted across surface of refractory concrete pad during stress-relief, and "oil-canning" of the tank on the outside perimeter of the pad

Tank Construction (cont.)

Preparing Insulating Refractory for modification with use of reinforced concrete



Tank AY-101 Primary Tank Gap over Insulating Refractory (52788-8-Photo). Gaps in Tank AY-102 were reported to be larger.

Probable Leak Cause

- *Possible corrosion at high waste temperatures compounded by mechanical impacts to a tank whose waste containment margins had been reduced by construction difficulties.*

Tank AY-102 Leak Assessment Completion Activities

washington river protection solutions

Office of River Protection

Recommendation: Leak Integrity Status of Tank AY-102 be changed from "Sound" to "Assumed Primary to Secondary Leaker"

Johnson, Jeremy M

From: Gamache, Lori M
Sent: Wednesday, December 12, 2012 3:03 PM
To: Samuelson, Scott L (ORP); Charboneau, Stacy L; Fletcher, Thomas W; Trenchard, Glyn D; Johnson, Jeremy M
Cc: Mattlin, Ellen M; Olds, Theodore E (Erik); Meyer, Carrie C; Jones, Colin J; Seidler, Paul (Paul.Seidler@em.doe.gov); Trummell, Candice S
Subject: Media Inquiry on AY-102

FYI – I wanted to let you know that Annette Cary, with the Tri-City Herald, just called and asked about AY-102 and the visual inspections of the annulus of the next six DSTs. She was mostly interested in AY-101 as it was the second DST built and had weld rejections (just as AY-102 although not as much).

She is planning to write a story for tomorrow that we have completed visual inspections of Hanford's second DST built (AY-101) and found no issues. She feels this is good news and is trying to wrap up things before she is gone for two weeks.

Thanks,
Lori

Lori Gamache
Public Affairs Specialist
U.S. Department of Energy
(509) 372-9130

Johnson, Jeremy M

From: Gamache, Lori M
Sent: Tuesday, November 27, 2012 2:43 PM
To: Samuelson, Scott L (ORP); Charboneau, Stacy L; Olds, Theodore E (Erik)
Cc: Meyer, Carrie C; Fletcher, Thomas W; Trenchard, Glyn D; Mattlin, Ellen M; Johnson, Jeremy M; Jones, Colin J; Seidler, Paul (Paul.Seidler@em.doe.gov); Trummell, Candice S
Subject: AY102 Status Update - Media Inquiry

Mike Nartker has inquired about the status of double-shell tank AY-102 and visual inspections of the annulus of the other six DSTs. He is planning to do a progress piece on this topic, this week.

I have informed him that we will begin visual inspections of the annulus for AY101 and SY103, this week. However, I am working with him to wait until next week to run his progress piece because we will have finished the preparations to pump waste from the annulus and the primary tank (should the conditions of AY-102 change and we need to begin pumping).

Thanks,
Lori

Lori Gamache
Public Affairs Specialist
U.S. Department of Energy
(509) 372-9130

Johnson, Jeremy M

From: Johnson, Jeremy M
Sent: Thursday, November 01, 2012 4:03 PM
To: Lyon, Jeffery
Subject: RE: Weekly AY-102

Jeff,

I'm hopeful we can get a message out of Tom tomorrow identifying the ECY/DOE/WRPS/DOH team members with a recommendation to have our kickoff meeting next week. I'm still trying to tie up a couple members on our end. Shoot me a time early next week though if you have any openings, I need to sit down and talk about SST Integrity plans for this year with you.

Jeremy

-----Original Message-----
From: Lyon, Jeffery (ECY) [mailto:JLYO461@ecy.wa.gov]
Sent: Thursday, November 01, 2012 3:56 PM
To: Johnson, Jeremy M
Subject: Weekly AY-102

When is our next meeting?

Johnson, Jeremy M

From: Hendrickson, Michelle (ECY) <MICH461@ecy.wa.gov>
Sent: Thursday, October 11, 2012 11:07 AM
To: Nguyen, Duc M; Wold, Kristi (Washington State Department of Ecology); Lyon, Jeffery; Barnes, Michael (ECY)
Cc: Mauss, Billie M; Johnson, Jeremy M; Reynolds, Jacob G
Subject: RE: AY-102 Annulus DQO and SAP

Thank you.

Michelle

From: Nguyen, Duc M [mailto:Duc_M_Nguyen@rl.gov]
Sent: Wednesday, October 10, 2012 11:16 AM
To: Wold, Kristi (ECY); Lyon, Jeffery (ECY); Hendrickson, Michelle (ECY); Barnes, Michael (ECY)
Cc: Mauss, Billie M; Johnson, Jeremy M; Reynolds, Jacob G
Subject: AY-102 Annulus DQO and SAP

Attached are the DQO and SAP. Please let me know if you have any questions about these documents.

Thanks,
Duc M. Nguyen
Washington River Protection Solutions LLC
Contractor to the United States Department of Energy
(509) 372-3042

Johnson, Jeremy M

From: Barnes, Michael (ECY) <miba461@ecy.wa.gov>
Sent: Thursday, October 11, 2012 10:10 AM
To: Nguyen, Duc M; Wold, Kristi (Washington State Department of Ecology); Lyon, Jeffery; Hendrickson, Michelle (Washington State Department of Ecology)
Cc: Mauss, Billie M; Johnson, Jeremy M; Reynolds, Jacob G
Subject: RE: AY-102 Annulus DQO and SAP

Thanks for the documents. I will review them and let you know ASAP if I have any questions or comments.

Mike

From: Nguyen, Duc M [mailto:Duc_M_Nguyen@rl.gov]
Sent: Wednesday, October 10, 2012 11:16 AM
To: Wold, Kristi (ECY); Lyon, Jeffery (ECY); Hendrickson, Michelle (ECY); Barnes, Michael (ECY)
Cc: Mauss, Billie M; Johnson, Jeremy M; Reynolds, Jacob G
Subject: AY-102 Annulus DQO and SAP

Attached are the DQO and SAP. Please let me know if you have any questions about these documents.

Thanks,
Duc M. Nguyen
Washington River Protection Solutions LLC
Contractor to the United States Department of Energy
(509) 372-3042

Johnson, Jeremy M

From: Johnson, Jeremy M
Sent: Thursday, October 04, 2012 8:31 AM
To: Lyon, Jeffery; Barnes, Michael (ECY) (miba461@ecy.wa.gov)
Subject: AY-102 Annulus DQO and SAP

Jeff and Mike,

Is there a time Tue 10/9 that you are available to discuss the DQO and SAP for AY-102? Duc is available anytime Tuesday, morning would be best for me.

Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

Johnson, Jeremy M

From: Lyon, Jeffery (ECY) <JLYO461@ecy.wa.gov>
Sent: Thursday, October 04, 2012 8:34 AM
To: Johnson, Jeremy M
Subject: Re: AY-102 Annulus DQO and SAP

Yes in the morning.

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@rl.gov]
Sent: Thursday, October 04, 2012 08:31 AM
To: Lyon, Jeffery (ECY); Barnes, Michael (ECY)
Subject: AY-102 Annulus DQO and SAP

Jeff and Mike,

Is there a time Tue 10/9 that you are available to discuss the DQO and SAP for AY-102? Duc is available anytime Tuesday, morning would be best for me.

Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

Johnson, Jeremy M

From: Hendrickson, Michelle (ECY) <MICH461@ecy.wa.gov>
Sent: Wednesday, October 03, 2012 2:50 PM
To: Johnson, Jeremy M
Cc: Lyon, Jeffery; Whalen, Cheryl (ECY)
Subject: Presentation

Jeremy~

I have posted my presentation slides at the following location: ftp://ecy.wa.gov/

Once there, please click on the "Page" drop arrow in the upper right hand corner. Choose "Open ftp site in Window Explorer" option at the bottom of the menu. Click allow if prompted and then scroll to the bottom and you will see a 241-AY-102 Folder. My presentation is in that folder. Feel free to use any of them for your discussion with the HAB next week.

Please let me know if you cannot access the slides.

Thanks,
Michelle

Johnson, Jeremy M

From: Hendrickson, Michelle (ECY) <MICH461@ecy.wa.gov>
Sent: Thursday, August 16, 2012 9:52 AM
To: Boomer, Kayle D; Washington Alaskan Malamute Adoption League (wamal@wamal.com); Whalen, Cheryl (ECY); Lyon, Jeffery; Wold, Kristi (Washington State Department of Ecology)
Cc: Johnson, Jeremy M; McFadden, Daina (ECY)
Subject: Feb 2012 PER on AY-102 ENRAF

Follow Up Flag: Follow up
Flag Status: Completed

Gentlemen~

I did an IDMS search and could not locate the February PER for the ENRAF in the annulus in the 241-AY-102 Tank. I then went to the WRPS web site and did not have access to the PER program.

Please if you would send me a copy.

Thanks,
Michelle

Johnson, Jeremy M

From: Hendrickson, Michelle (ECY) <MICH461@ecy.wa.gov>
Sent: Wednesday, August 15, 2012 1:33 PM
To: Johnson, Jeremy M
Subject: RE: AY-102 Info

Yep...I do have access to IDMS.

Thanks for the info and your time today after the SST intrusion meeting.

Michelle

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@rl.gov]
Sent: Wednesday, August 15, 2012 12:02 PM
To: Hendrickson, Michelle (ECY)
Subject: AY-102 Info

Michelle,

Here's some info on AY-102 from the last time we observed annulus intrusion. If you have access to IDMS I can send you another document number that has a lot of good info on AY farm, but it's too large to attach.

Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

Johnson, Jeremy M

From: Hendrickson, Michelle (ECY) <MICH461@ecy.wa.gov>
Sent: Thursday, April 18, 2013 12:21 PM
To: Hardesty, Michael B; Johnson, Jeremy M
Cc: Lyon, Jeffery; Wold, Kristi (Washington State Department of Ecology); Whalen, Cheryl (Washington Department of Ecology)
Subject: RE: Exhauster

Mike~

Thanks for the note...I will not be able to attend on Monday. And will be out most of next week.

I'll hope to catch you on the following week.

Michelle

From: Hardesty, Michael B [mailto:Michael_B_Hardesty@rl.gov]
Sent: Thursday, April 18, 2013 9:00 AM
To: Hendrickson, Michelle (ECY)
Subject: Exhauster

Michelle,

We are in the process of upgrading the Record Sample Pump in the AY102 Annulus Exhauster from a ½ horse pump to a ¾ horse pump. The upgrade has taken longer than expected and the wiring is not fully configured. Therefore, the lock and tag is still in place and as you know we need the annulus exhauster running while performing the video. Our hope is to have everything ready for Monday's video. I'll keep you posted the best I can.

Thanks,

Michael Hardesty
Field Work Supervisor
509-373-4573

Johnson, Jeremy M

From: Hendrickson, Michelle (ECY) <MICH461@ecy.wa.gov>
Sent: Thursday, April 11, 2013 9:55 AM
To: Johnson, Jeremy M
Subject: RE: AY-102 Annulus Vent

Thanks for the note Jeremy! That's great news! I'll forward this along to the rest.

Michelle

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Thursday, April 11, 2013 7:27 AM
To: Hendrickson, Michelle (ECY)
Subject: AY-102 Annulus Vent

Michelle,

The annulus ventilation repair is scheduled to be complete next week on the 17th.

Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

Johnson, Jeremy M

From: Hendrickson, Michelle (ECY) <MICH461@ecy.wa.gov>
Sent: Tuesday, April 09, 2013 4:52 PM
To: Johnson, Jeremy M
Subject: RE: AY-102 Riser 83 Inspection Results 4/8/13

Thanks Jeremy!

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Tuesday, April 09, 2013 4:29 PM
To: Hendrickson, Michelle (ECY)
Subject: RE: AY-102 Riser 83 Inspection Results 4/8/13

Thanks Michelle. The primary vent system is operational, the annulus is still down. The annulus system is down in order to replace the vacuum pump as you know, I will have to get back to you in the morning with a scheduled completion date for that fix. We will also be doing an engineering evaluation of the system per the recent requirements from DOH.

From: Hendrickson, Michelle (ECY) [mailto:MICH461@ecy.wa.gov]
Sent: Tuesday, April 09, 2013 3:35 PM
To: Johnson, Jeremy M
Subject: RE: AY-102 Riser 83 Inspection Results 4/8/13

Thanks for the photos Jeremy. I spoke with both Jeff and Cheryl and they understand the technical and logistical reasons to move the Visual Inspections to every other week, rather than once a week.

Cheryl will be talking with our legal staff tomorrow and will ask them this question as well as provide my engineering judgment on the matter.

She did ask more about the condition of the ventilation system...and I could not answer her concerns.

So is the primary tank ventilation back up and running? Is the annulus exhauster back up and running? Has the vacuum pump been replaced?

Thanks,
Michelle

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Tuesday, April 09, 2013 3:04 PM
To: Hendrickson, Michelle (ECY)
Subject: AY-102 Riser 83 Inspection Results 4/8/13

OFFICE OF RIVER PROTECTION
P.O. Box 450, MSIN H6-60
Richland, Washington 99352

13-TF-0010

MAR 20 2013

Ms. Michelle L. Hendrickson, CHMM, PE
Tank System Operations and Closure Engineer
Nuclear Waste Program
Washington State
Department of Ecology
3100 Port of Benton Blvd.
Richland, Washington 99354

Ms. Hendrickson:

THE U. S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) RESPONSE TO WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) LETTER 13-NWP-009, REGARDING TANK AY-102

Reference: Ecology letter from M. L. Hendrickson to K. W. Smith, ORP, "Washington State Department of Ecology (Ecology) Assessment Report for Field Monitoring Activities Conducted December 27, 2012, of the Waste Material Near Riser 83 of the 241-AY-102 Double-Shell Tank (DST)," 11-NWP-009, dated January 25, 2013.

Thank you for your continued support of the AY-102 Integrated Project Team (IPT) and your ongoing field activities related to AY-102. DOE appreciates your input and values the results of your field monitoring activities.

As you stated in your letter, it is undetermined at this time if Double-Shell Tank AY-102 will be repaired or closed. That determination requires Double-Shell Tank AY-102 be inspected, which will require the contents to be emptied. ORP will continue collaborating with Ecology through the IPT, to assess how and when emptying the tank should take place.

Thank you again for your support and input related to this very important issue.

If you have any questions, please contact Ellen M. Mattlin, Tank Farms Programs Division Director, (509) 376-1900.

Kevin W. Smith
Manager

TPD:JMJ

cc:
Administrative Record
Environmental Portal, LMSI

Johnson, Jeremy M

From: Lyon, Jeffery (ECY) <JLYO461@ecy.wa.gov>
Sent: Tuesday, March 12, 2013 11:37 AM
To: Johnson, Jeremy M
Subject: Re: Regulatory letter on AY-102 pumping delay

Thanks

Sent from my iPhone

On Mar 12, 2013, at 11:34 AM, "Johnson, Jeremy M" <Jeremy_M_Johnson@orp.doe.gov> wrote:

> Per Ecology's request, we are still working on getting a date to include in the letter for when we can have a schedule for emptying the tank. We should be ready to send it next week.
>
> Jeremy
>
> **From:** Lyon, Jeffery (ECY) [mailto:JLYO461@ecy.wa.gov]
> **Sent:** Tuesday, March 12, 2013 11:25 AM
> **To:** Killoy, Steven E; Johnson, Jeremy M; Burandt, Mary E
> **Cc:** Miskho, Anthony G; Huffman, Lori A
> **Subject:** Regulatory letter on AY-102 pumping delay
>
> How's it going on getting the letter done? I don't even know who to ask!

Johnson, Jeremy M

From: Whalen, Cheryl (ECY) <CWHA461@ecy.wa.gov>
Sent: Monday, February 25, 2013 12:48 PM
To: Johnson, Jeremy M; Lyon, Jeffery; Hendrickson, Michelle (Washington State Department of Ecology); Wold, Kristi (Washington State Department of Ecology)
Cc: Killoy, Steven E; Miskho, Anthony G
Subject: RE: AY-102 Letter

Please just clarify it in your letter – you're adding water not waste and you're closely monitoring for releases into the secondary containment.

Cheryl Whalen
Cleanup Section Manager
Washington State Department of Ecology
(509) 372-7972

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Monday, February 25, 2013 12:46 PM
To: Lyon, Jeffery (ECY); Hendrickson, Michelle (ECY); Whalen, Cheryl (ECY); Wold, Kristi (ECY)
Cc: Killoy, Steven E; Miskho, Anthony G
Subject: AY-102 Letter

After our meeting last week, we have thought of an activity that will require water addition to the tank. We plan to remove a string of corrosion coupons this year which require decontamination with a limited amount of water as it's removed. We will include this activity in the letter, give me a call if you would like to discuss.

Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

Johnson, Jeremy M

From: Johnson, Jeremy M
Sent: Monday, January 14, 2013 3:43 PM
To: Lyon, Jeffery
Subject: RE: Tomorrows meeting

I believe we will be discussing what the regulatory pathways for closure, repair etc. for AY-102 would look like so that we can present them to the IPT on Thr.

-----Original Message-----
From: Lyon, Jeffery (ECY) [mailto:JLYO461@ecy.wa.gov]
Sent: Monday, January 14, 2013 2:49 PM
To: Johnson, Jeremy M
Subject: Tomorrows meeting

What are we doing and what decisions or outputs will we be making from our meeting?

Sent from my iPhone

Johnson, Jeremy M

From: Lyon, Jeffery (ECY) <JLYO461@ecy.wa.gov>
Sent: Monday, January 07, 2013 11:00 AM
To: Johnson, Jeremy M; Whalen, Cheryl (ECY); Hendrickson, Michelle (Washington State Department of Ecology); Dahl-crumpler, Suzanne L; Wheeler, Isabelle; Irby, Dennis H; Burandt, Mary E
Subject: RE: AY-102 HAB TWC Presentation and Recommendations Paper

I like your presentation, it is brief and pretty clear. Here are my suggestions:

Slide 3 "slow changes" – should you indicate if the changes are "drying" and no new liquids suspected, or there are suspected "additional liquids" being observed?

Slide 4 "Expect to complete spring 2013", this is all 6 right?

Slide 5 "Procedures developed (if equipment is deployed they would require final approvals)" – so this slide seems to be saying that you have plans for both the Annulus and the Primary tank. That seems consistent with what I expect. However the statement that you made about procedures does not clarify your intent. Does USDOE plan to deploy? I had assumed that you were planning to deploy. I would suggest that you add a bullet that follows bullet 2 stating your intent or your plans, including timing.

Slide 6, bullet 2, you may want to indicate that this isn't very quickly, since WRPS and USDOE has not even narrowed down what decade they intent complete the initial deployment or pumping.

I plan to clarify Ecology expectations for this meeting. I will send a separate e-mail for that.

Thanks,

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Monday, January 07, 2013 9:47 AM
To: Lyon, Jeffery (ECY); Whalen, Cheryl (ECY); Hendrickson, Michelle (ECY); Dahl, Suzanne (ECY); Wheeler, Isabelle; Irby, Dennis H; Burandt, Mary E
Subject: AY-102 HAB TWC Presentation and Recommendations Paper

All,

Attached is a presentation I have put together for an update to the HAB Tank Waste Committee on the 9th as well as a paper describing our recommendations we have developed. Please provide me any feedback on the presentation by noon tomorrow as well as any major input on the recommendations paper. I plan to discuss the paper at the next IPT meeting on the 17th but if I'm way off base on anything in it I would like to know before I present to the TWC.

Thanks,

Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

Johnson, Jeremy M

From: Johnson, Jeremy M
Sent: Tuesday, December 11, 2012 11:07 AM
To: Lyon, Jeffery
Subject: RE: Recommendations

Great, no I have not drafted them up yet. I have some summarized bullets if you would like me to email them. Have you had a chance to review the SST Integrity draft change package?

-----Original Message-----
From: Lyon, Jeffery (ECY) [mailto:JLYO461@ecy.wa.gov]
Sent: Tuesday, December 11, 2012 11:03 AM
To: Johnson, Jeremy M
Subject: Re: Recommendations

By the way, I talked to Jane and she supported the 6 points and the schedule.

Sent from my iPhone

On Dec 11, 2012, at 10:59 AM, "Johnson, Jeremy M" <Jeremy_M_Johnson@orp.doe.gov> wrote:

> No Tom had to leave yesterday unexpectedly before I was able to catch him. Tom will not be back until next week so we will not have much to discuss related to Tom/Jane discussions about our recommendations this week.
>
> -----Original Message-----
> From: Lyon, Jeffery (ECY) [mailto:JLYO461@ecy.wa.gov]
> Sent: Tuesday, December 11, 2012 10:56 AM
> To: Johnson, Jeremy M
> Subject: Recommendations
>
> Did you write up our recommendations, discuss them with Tom, and were there any decisions or plans for further actions?
>
> Sent from my iPhone

Johnson, Jeremy M

From: Hendrickson, Michelle (ECY) <MICH461@ecy.wa.gov>
Sent: Tuesday, December 11, 2012 11:09 AM
To: Johnson, Jeremy M; Whalen, Cheryl (ECY); Lyon, Jeffery; Dahl-crumpler, Suzanne L
Subject: RE: AY-102 IPT Meeting 12/14

Jeremy~

As I noted yesterday, Cheryl is out, I will be out, and Suzanne would prefer if we could reschedule.

I suggest we reschedule.

Thanks,
Michelle

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Tuesday, December 11, 2012 9:39 AM
To: Whalen, Cheryl (ECY); Lyon, Jeffery (ECY); Hendrickson, Michelle (ECY); Dahl, Suzanne (ECY)
Subject: AY-102 IPT Meeting 12/14

All,

Please let me know if you can support a 9-11 on Friday 12/14. I'm trying to determine if we will have enough members to hold the IPT or if we need to postpone to next week.

Thanks!

Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

Johnson, Jeremy M

From: Lyon, Jeffery (ECY) <JLYO461@ecy.wa.gov>
Sent: Tuesday, December 11, 2012 11:03 AM
To: Johnson, Jeremy M
Subject: Re: Recommendations

By the way, I talked to Jane and she supported the 6 points and the schedule.

Sent from my iPhone

On Dec 11, 2012, at 10:59 AM, "Johnson, Jeremy M" <Jeremy_M_Johnson@orp.doe.gov> wrote:

> No Tom had to leave yesterday unexpectedly before I was able to catch him. Tom will not be back until next week so we will not have much to discuss related to Tom/Jane discussions about our recommendations this week.
>
> -----Original Message-----
> From: Lyon, Jeffery (ECY) [mailto:JLYO461@ecy.wa.gov]
> Sent: Tuesday, December 11, 2012 10:56 AM
> To: Johnson, Jeremy M
> Subject: Recommendations
>
> Did you write up our recommendations, discuss them with Tom, and were there any decisions or plans for further actions?
>
> Sent from my iPhone

Johnson, Jeremy M

From: Lyon, Jeffery (ECY) <JLYO461@ecy.wa.gov>
Sent: Tuesday, December 11, 2012 11:01 AM
To: Johnson, Jeremy M
Subject: Re: Recommendations

Are they written and are they in our books?

Sent from my iPhone

On Dec 11, 2012, at 10:59 AM, "Johnson, Jeremy M" <Jeremy_M_Johnson@orp.doe.gov> wrote:

> No Tom had to leave yesterday unexpectedly before I was able to catch him. Tom will not be back until next week so we will not have much to discuss related to Tom/Jane discussions about our recommendations this week.
>
> -----Original Message-----
> From: Lyon, Jeffery (ECY) [mailto:JLYO461@ecy.wa.gov]
> Sent: Tuesday, December 11, 2012 10:56 AM
> To: Johnson, Jeremy M
> Subject: Recommendations
>
> Did you write up our recommendations, discuss them with Tom, and were there any decisions or plans for further actions?
>
> Sent from my iPhone

Johnson, Jeremy M

From: Lyon, Jeffery (ECY) <JLYO461@ecy.wa.gov>
Sent: Tuesday, December 11, 2012 10:42 AM
To: Johnson, Jeremy M
Cc: Whalen, Cheryl (ECY); Hendrickson, Michelle (Washington State Department of Ecology); Dahl-crumpler, Suzanne L
Subject: Re: AY-102 IPT Meeting 12/14

Yes

Sent from my iPhone

On Dec 11, 2012, at 9:38 AM, "Johnson, Jeremy M" <Jeremy_M_Johnson@orp.doe.gov> wrote:

> All,
>
> Please let me know if you can support a 9-11 on Friday 12/14. I'm trying to determine if we will have enough members to hold the IPT or if we need to postpone to next week.
>
> Thanks!
>
> Jeremy Johnson
> DOE-ORP
> Programs Division
> 509-376-1866

Johnson, Jeremy M

From: Hendrickson, Michelle (ECY) <MICH461@ecy.wa.gov>
Sent: Monday, December 10, 2012 3:38 PM
To: Johnson, Jeremy M
Subject: RE: IPT Friday AM

Thanks! ☺ I sent a note to Jeff and Suzanne..no response yet, I'll try to get their response tomorrow AM.

Michelle

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Monday, December 10, 2012 3:06 PM
To: Hendrickson, Michelle (ECY)
Subject: RE: IPT Friday AM

We could probably do that. Can you ask if Jeff and Suzanne will be able to attend. I think we said we needed at least 2 members from each agency to make a quorum so maybe we will have to reschedule the meeting. Good luck on the interview!

From: Hendrickson, Michelle (ECY) [mailto:MICH461@ecy.wa.gov]
Sent: Monday, December 10, 2012 2:10 PM
To: Johnson, Jeremy M
Subject: IPT Friday AM

Jeremy~

I have a conflicting appointment (interview for an Ecology Environmental Engineer 5 position in Olympia) on Friday morning and will not be able to attend the IPT.

Cheryl is also out of the office until next Monday and I know she would also like to hear the discussion on the Evaporator.

Could we reschedule that discussion?

Thanks,
Michelle

Johnson, Jeremy M

From: Lyon, Jeffery (ECY) <JLYO461@ecy.wa.gov>
Sent: Thursday, December 06, 2012 11:48 AM
To: Johnson, Jeremy M
Subject: RE: AY-102 IPT
Attachments: AN-102 questions 12-6-2012.docx

Here are some questions that I will ask eventually.

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Monday, December 03, 2012 9:57 AM
To: Burandt, Mary E; Irby, Dennis H; Wheeler, Isabelle; Killoy, Steven E; Little, David B; Gregory, Robert E (Rob); Scott, Delmer; Martell, P John (DOH); Schmidt, John W (DOH); Whalen, Cheryl (ECY); Dahl, Suzanne (ECY); Lyon, Jeffery (ECY); Hendrickson, Michelle (ECY); Schmidt, John W (DOH); Domnoske-Rauch, Lisa A
Subject: AY-102 IPT

Team,

As we discussed at the last meeting, below is a comparison criteria table for you to fill out. This table is specifically related to retrieval technologies for the AY-102 sludge. Please try and complete and get your table to me by COB Wednesday. I will combine our results and we can discuss whether this may be useful for the IPT in evaluating different retrieval methods. Give me a call if you have any questions.

<< File: Pair Comparison Criteria Weighting Table.xlsx >>

Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

I have some questions and comments on the recent presentations:

Page 14 of the Space Management Presentation -

1. From the table, is shows 36 inch of Slurry = ~ 100,000 gallons, and the "Solid gallon" column of the table says 36,000 gallons – this doesn't seem to match, please clarify.
2. How much solids remain at the end of the retrieval?
3. Will you need liquid for cooling and if so how much and when?
   What cools AY-102 for 1/4/2015 through 8/22/2015?
4. For AY-102, that do you do for cooling the sludge for those periods of time without supernatant?
5. Do we have any experience with 1 day transfers of 250,000 of supernatant, with the physical and chemical characteristics of AY-102
6. Why is there a 6 month reansfer from AY-102 (9/? And 100 my scribbling that I can't understand)
7. Have you accelerated your startup readiness preparations for the 242-0A Evaporator? Shouldn't you?
8. Shouldn't you get the AP-tanks prepared early?
9. Did we discuss the impacts of AY-101 receiving this waste in lght of the fact that this tank had more concerns that AY-102?
10. Will AY-101 be able to handle 200,000 gallons of sludfge with enough supernatant to keep it cool?
11. With the High Heat Loading, what is the basis for adding so many additional solids to AY-101?

After looking more closely at the schedule, I have some additional questions:

1. Phase 2 pumping is the primary tank, right? Where is that on the schedule, what tasks?
2. Line 14 (page1), what is this task?
3. Line 18 – what is issue procurments?
4. What are lines 18-27? Are they related to (Page 2) phase 2 primary tank pumping?
5. What are the choices for pumping the Primary tank?

OTHER

1. What is Emergency Space? And if AN-106 leaks where will you put waste?
2. What is the likelihood of tank pump failure- have you performed a statistical analysis?

Requests

1. AN-106 weld history, because of the high heat loading and AY-102 possible failure analysis (based on Retrieval and Waste Compatibility issues).
2. AN-106 leak Response scenario.

Johnson, Jeremy M

From: Lyon, Jeffery (ECY) <JLYO461@ecy.wa.gov>
Sent: Monday, December 03, 2012 9:58 AM
To: Johnson, Jeremy M; Fletcher, Thomas W
Cc: Whalen, Cheryl (ECY); Hendrickson, Michelle (Washington State Department of Ecology)
Subject: Letter 12-TPD-0069, AY-102 Participation

I read the letter that Mr. Samuelson sent to Ms. Hedges. In the second paragraph, the last sentence is not clear.

Ecology believes it is necessary to pump the waste out of the tank.

We are willing to consider alternatives to an immediate action to pump the tank, if USDOE can justify any delay. And. I am not sure what is meant by "safe manner", or "should this become necessary". You are planning the pumping, so it should be safe to do it as the schedule indicates; and it is necessary to pump the tank.

Thanks

Johnson, Jeremy M

From: Whalen, Cheryl (ECY) <CWHA461@ecy.wa.gov>
Sent: Tuesday, November 13, 2012 2:54 PM
To: Johnson, Jeremy M
Subject: RE: AY-102 IPT

Thank you!

Cheryl Whalen
Cleanup Section Manager
Washington State Department of Ecology
(509) 372-7972

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Tuesday, November 13, 2012 2:42 PM
To: Whalen, Cheryl (ECY); Steiling, Jeri L; CR - 2440STVCN/2212A/RCHN; Fletcher, Thomas W; Clark, Wyatt C; Burandt, Mary E; Irby, Dennis H; Wheeler, Isabelle; Killoy, Steven E; Little, David B; Gregory, Robert E (Rob); Scott, Delmer; Hedges, Jane (ECY); Dahl, Suzanne (ECY); Lyon, Jeffery (ECY); Hendrickson, Michelle (ECY); Martell, P John (DOH); Schmidt, John W (DOH); Lyon, Jeffery (ECY); Hart, Patricia M (Patti)
Subject: RE: AY-102 IPT

Let's start at 1:00 and I will update the agenda, that will be in your individual binders by COB today to reflect a 1:00-4:00 duration. The binders will be in my office 2440/2461 until I find a better spot. The draft IPT Charter will also be in your binder so please remember to have comments to me COB tomorrow.

From: Whalen, Cheryl (ECY) [mailto:CWHA461@ecy.wa.gov]
Sent: Tuesday, November 13, 2012 2:19 PM
To: Steiling, Jeri L; CR - 2440STVCN/2212A/RCHN; Fletcher, Thomas W; Clark, Wyatt C; Johnson, Jeremy M; Burandt, Mary E; Irby, Dennis H; Wheeler, Isabelle; Killoy, Steven E; Little, David B; Gregory, Robert E (Rob); Scott, Delmer; Hedges, Jane; Dahl-crumpler, Suzanne L; Lyon, Jeffery; Hendrickson, Michelle (Washington State Department of Ecology); Martell, John; Schmidt, John; Lyon, Jeffery; Hart, Patricia M (Patti)
Subject: RE: AY-102 IPT

Ecology is having our Thanksgiving dinner between 12 and 1. Would you mind starting at 1 or 1:30?

Cheryl Whalen
Cleanup Section Manager
Washington State Department of Ecology
(509) 372-7972

-----Original Appointment-----
From: Steiling, Jeri L
Sent: Tuesday, November 13, 2012 1:02 PM
To: Steiling, Jeri L; CR - 2440STVCN/2212A/RCHN; Fletcher, Thomas W; Clark, Wyatt C; Johnson, Jeremy M; Burandt, Mary E; Irby, Dennis H; Wheeler, Isabelle; Killoy, Steven E; Little, David B; Gregory, Robert E (Rob); Scott, Delmer; Hedges, Jane (ECY); Whalen, Cheryl (ECY); Dahl, Suzanne (ECY); Lyon, Jeffery (ECY); Hendrickson, Michelle (ECY); Martell, P John (DOH); Schmidt, John W (DOH); Lyon, Jeffery (ECY); Hart, Patricia M (Patti)
Subject: AY-102 IPT
When: Thursday, November 15, 2012 12:00 PM-4:00 PM (UTC-08:00) Pacific Time (US & Canada).
Where: CR - 2440STVCN/2212A/RCHN

Johnson, Jeremy M

From: Voogd, Jeffry A
Sent: Wednesday, October 17, 2012 9:59 AM
To: DL - WRPS-NOT-MGMT; DL - WRPS-NOT-WDOH; DL - WRPS-NOT-ORP; Hendrickson, Michelle (Washington State Department of Ecology); Lyon, Jeffery; Wold, Kristi (Washington State Department of Ecology); Johnson, Jeremy M; Sams, Terry L
Subject: Operational Notification - AY-102 Annulus CAM Alarm
Attachments: TOC-ENV-NOT-2012-0109 Operational Notification AY-102 Annulus CAM Alarm.pdf

The 102-AY annulus CAM went into alarm following waste sampling activities at riser 90 on day shift 10/16/12. Preliminary CAM readings were 2930 counts per minute (cpm). The alarm set point is 2000 cpm. There were no ENRAF leak detector alarms. The CAM filter paper has been pulled for counting.

ENVIRONMENTAL OPERATIONAL ACTIVITIES NOTIFICATION

Date: 10/17/2012

TOC-ENV-NOT: 2012-0109

Name: J.A. Voogd

Revision No.: 0

Regulatory Requirement: Air Operating Permit, RCRA

RE: AY-102 CAM Alarm

Notification Information:

The 102-AY annulus CAM went into alarm following waste sampling activities at riser 90 on day shift 10/16/12. Preliminary CAM readings were 2930 counts per minute (cpm). The alarm set point is 2000 cpm. There were no ENRAF leak detector alarms. The CAM filter paper has been pulled for counting.

Distribution of this form shall be completed to the following groups.

Check all applicable distribution lists

- [x] Environmental Records
- [ ] Team Line Management
- [x] Other: WDOH, WDOE, ORP, WRPS Mngt

Attach a copy of original notification email and any applicable information when submitting Environmental Notification to Document Control.

Johnson, Jeremy M

From: Lyon, Jeffery (ECY) <JLYO461@ecy.wa.gov>
Sent: Thursday, August 30, 2012 6:06 PM
To: Johnson, Jeremy M; Mattlin, Ellen M
Subject: FW: report from Jeremy on DST issues

FYI, my notes to Ecology team.

Thanks

From: Lyon, Jeffery (ECY)
Sent: Thursday, August 30, 2012 6:05 PM
To: Hendrickson, Michelle (ECY); Wold, Kristi (ECY); Barnes, Michael (ECY); Becker, David (ECY); Biebesheimer, Joanette (ECY); Whalen, Cheryl (ECY); Mathey, Jared W. (ECY)
Subject: report from Jeremy on DST issues

Here are the bullets from my discussion today.

- Completed first riser inspection Wednesday; they plan to do enough to get a set of videos to cover 100% circumference for the walls, (both Primary external and Secondary internal);
- Accumulating History – Construction, transfers and Chemistry excursions
- USDOE is looking at the Corrosion probes both continuous and they plan to pull the coupon string sometime in the near future
- Sampled floor and have preliminary results that include radionuclide (doubtful they analyzed for Chemicals)
- Planning DQO for crawler sampling event
- USDOE will ensure WRPS considers the D-42 leak assessment process and reporting, as well as the Draft permit conditions, and ensure that they care within those requirements.
- Jeremy and I talked about some method of reporting on the Corrosion control program, and integrity inspections on something like a quarterly basis

Jeremy is gone for 2 weeks, and Ellen will be a good contact while he is gone.

Thanks

Johnson, Jeremy M

From: Lyon, Jeffery (ECY) <JLYO461@ecy.wa.gov>
Sent: Thursday, August 30, 2012 5:55 PM
To: Mattlin, Ellen M; Johnson, Jeremy M
Subject: RE: Additional request for Information on Intrusion at our September meeting

That is provide (not pride)...sorry: We want to be sure that USDOE **~~pride~~ provide** and consider the following information for our next meeting

---

From: Lyon, Jeffery (ECY)
Sent: Thursday, August 30, 2012 5:53 PM
To: Mattlin, Ellen M (ellen.mattlin@rl.doe.gov); Johnson, Jeremy M
Subject: Additional request for Information on Intrusion at our September meeting

We want to be sure that USDOE pride and consider the following information for our next meeting:

a. Past sampling efforts for Rad in annulus (pre July 2012)
b. ENRAF history for AY-102, calibrations, measurements, and maintenance
c. Past in-leakage history
d. Annulus ventilation history, including maintenance, replacements, measurements, variances in flow rates or other tracking and reporting methods to assure ventilation is in service and operating, down time. This includes the time period from construction of the tank.

Thanks

Hildman, Cynthia M

From: Dunning, Dirk A <dirk.a.dunning@state.or.us>
Sent: Friday, September 14, 2012 2:06 PM
To: Fletcher, Thomas W; Gamache, Lori M
Subject: FW: More AY-102 construction photo's
Attachments: IAP-614, PUREX TANK FARM EXPANSION, 200-EAST AREA - STRIPPING DRAINAGE CHANNEL FORMS IN CONCRETE BASE OF TANK NO. 241-AY-101, LOOKING SOUTH 72318.jpg; IAP-614, PUREX TANK FARM EXPANSION, 200-E AREA- STATION 57 71844.jpg; IAP-614, PUREX TANK FARM EXPANSION, 200-E AREA- STATION 153 71829.jpg; IAP-614, PUREX TANK FARM EXPANSION, 200-E AREA- STATION 196 71821.jpg; IAP-614, PUREX TANK FARM EXPANSION, 200-E AREA- TANK 101 CONNECTORS 71866.jpg

Tom,

Here are the others I sent Ken. I have a number of others you might find useful in a larger presentation. (e.g. the thermocouple setup, that shows up in one of the photos you've been sharing).

Dirk Dunning, PE ChE NPE
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OREGON DEPARTMENT OF ENERGY

From: Dunning, Dirk A
Sent: Friday, September 14, 2012 8:37 AM
To: Niles, Ken
Subject: More AY-102 construction photo's

Here are some other photo's of the same work you/they might find useful.

I also have photo's of the tanks wrapped in wool insulation so they can heat treat the tanks using propane, of the secondary leak detection system, and of the steel rebar construction if those might be useful.

Dirk Dunning, PE ChE NPE
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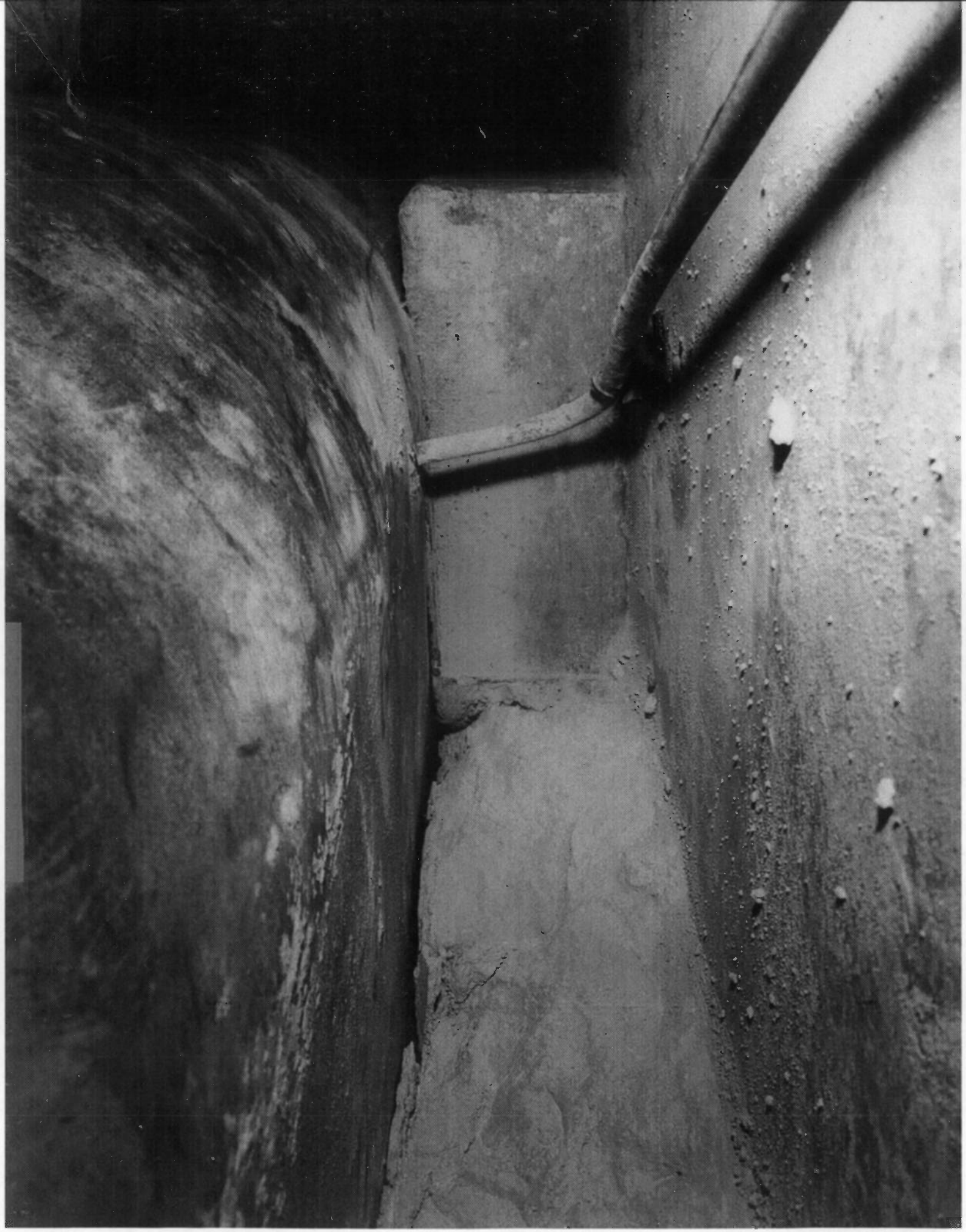

U.S. Department of Energy
Office of River Protection
P.O. Box 450
Richland, Washington 99352

02-REQ-003

FEB 2 5 2002

Mr. Michael A. Wilson, Program Manager
Nuclear Waste Program
State of Washington
Department of Ecology
1315 W. Fourth Avenue
Kennewick, Washington 99336

Dear Mr. Wilson:

COMPLETION OF HANFORD FEDERAL FACILITY AGREEMENT AND CONSENT ORDER (TRI-PARTY AGREEMENT) INTERIM MILESTONE M-45-12-T01, "SUBMISSION OF AN OPTIONS REPORT DOCUMENTING DOE ASSESSMENT OF ACTIONS THAT COULD BE TAKEN TO INCREASE AVAILABLE TANK SPACE FOR SST WASTE RETRIEVAL."

Tri-Party Agreement M-45-12-T01, "Submission of an Options Report Documenting DOE Assessment of Actions that could be taken to Increase Available Tank Space for SST Waste Retrieval," requires that documentation of an assessment of actions that could be taken to increase available tank space for Single-Shell Tank (SST) retrieval. This letter transmits the document prepared in response to this milestone: "Tank Space Options Report," RPP-7702, Revision 0.

This assessment was initiated via a workshop to identify, develop, and categorize options that could increase available tank space. The workshop focused on options that would provide space in the 2007 to 2011 timeframe because this is the timeframe where the existing space would be fully utilized. The workshop participants established basic criteria to evaluate options including technical feasibility, maintainability, operability, risk reduction, schedule, and cost. The team made an initial selection based on these criteria to focus further analysis on the options most likely to help make space between 2007 to 2011. Additional discussion considered options that could help make space after this timeframe. A second workshop was held with the State of Washington Department of Ecology staff and a member of the Hanford Advisory Board to discuss the results of the first workshop and to develop a format and content for the report. This document has been developed based on this input and includes information developed at the two workshops.

The attached Tank Space Options Report presents the results from the analysis of eight options that have the potential to increase available tank space from 2007 to 2011. The options have the potential to increase available tank space by 5 to10 million gallons with initial cost per gallon ranging from less than $1 per gallon to more than $14 per gallon. Construction of new double-shell storage tanks is estimated at approximately $63 per gallon.

FEB 2 5 2002

This report compliments the previous submittals for Tri-Party Agreement Milestones M-45-02F, M-46-00H and M-46-01H, Submission of SST Retrieval Sequence and Double-Shell Tank (DST) Space Evaluation Report. The U.S. Department of Energy, Office of River Protection (ORP) believes that all of the above items are key to evaluating future DST space availability and requirements.

If you have any questions, please contact E. J. Cruz, ORP, (509)-372-2606.

Sincerely,

James E. Rasmussen

James E. Rasmussen, Director
Environmental Management Division

REQ:EJC

Attachment

cc w/attach:
R. Gay, CTUIR
S. Dahl-Crumpler, Ecology
J. Lyons, Ecology
R. F. Stanley, Ecology
D. Bartus, EPA
T. Martin, HAB
P. Sobotta, NPT
K. Niles, Oregon Energy
E. M. Mattlin, RL
R. Jim, YN
TPA Administrative Record

cc w/o attach:
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T. W. Crawford, CHG
R. A. Dodd, CHG
N. W. Kirch, CHG
F. Miera, CHG
M. J. Riess, CHG
R. F. Wood, CHG

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Pages: 159

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ENGINEERING DATA TRANSMITTAL

Page 1 of 1

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Tank Space Options Report

V. C. Boyles et al
CH2M HILL Hanford Group, Inc., Richland, WA 99352
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TANK SPACE OPTIONS REPORT

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EXECUTIVE SUMMARY

A risk-based priority for the retrieval of Hanford Site waste from the 149 single-shell tanks (SSTs) has been adopted as a result of changes to the *Hanford Federal Facility Agreement and Consent Order* (HFFACO) (Ecology et al. 1997) negotiated in 2000. Retrieval of the first three tanks in the retrieval sequence fills available capacity in the double-shell tanks (DSTs) by 2007. As a result, the HFFACO change established a milestone (M-45-12-T01) requiring the determination of options that could increase waste storage capacity for single-shell tank waste retrieval. The information will be considered in future negotiations. This document fulfills the milestone requirement.

This study presents options that were reviewed for the purpose of increasing waste storage capacity. Eight options are identified that have the potential for increasing capacity from 5 to 10 million gallons, thus allowing uninterrupted single-shell tank retrieval until the planned Waste Treatment Plant begins processing substantial volumes of waste from the double-shell tanks in 2009. The cost of implementing these options is estimated to range from less than $1 per gallon to more than $14 per gallon. Construction of new double-shell tanks is estimated to cost about $63 per gallon.

Providing 5 to 10 million gallons of available double-shell tank space could enable early retrieval of 5 to 9 high-risk single-shell tanks beyond those identified for retrieval by 2007. These tanks are A-101, AX-101, AX-103, BY-102, C-107, S-105, S-106, S-108, and S-109 (Garfield et al. 2000). This represents a potential to retrieve approximately 14 million total curies, including 3,200 curies of long-lived mobile radionuclides.

The results of the study reflect qualitative analyses conducted to identify promising options. The estimated costs are rough-order-of magnitude and, therefore, subject to change. Implementing some of the options would represent a departure from the current baseline and may adversely impact the schedule for the Waste Treatment Plant. Some of the options would diminish the operational flexibility inherent in the current baseline and increase the risk of inability to accommodate significant Waste Treatment Plant startup problems, the potential loss of use of a double-shell tank, and other unforeseen events that could require additional tank space beyond that currently assumed necessary. The most promising options require more study to establish feasibility, enhance cost estimates, and understand operations impact of abnormal tank space utilization and need scenarios.

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LIST OF TERMS

CHG	CH2M HILL Hanford Group, Inc.
Ci/L	Curies per liter
DCRT	double-contained receiver tank
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations Office
DST	double-shell tank
Ecology	Washington State Department of Ecology
ft	feet
g/mL	grams per milliliter
gpm	gallons per minute
HFFACO	*Hanford Federal Facility Agreement and Consent Order*
IMUST	inactive miscellaneous underground storage tank
kgal	kilogallons
m	meters
m^3	cubic meters
M	molar
Mgal	million gallons
NEPA	*National Environmental Policy Act* 1969
ORP	U.S. Department of Energy, Office of River Protection
OSD	Operational Specification Document
PFP	Plutonium Finishing Plant
RCRA	*Resource Conservation and Recovery Act*
PUREX	Plutonium-Uranium Extraction
SST	single-shell tank
WTP	Waste Treatment Plant

1.0 INTRODUCTION

The *Hanford Federal Facility Agreement and Consent Order* (HFFACO) (Ecology et al. 1997) established a timetable for the environmental restoration of the Hanford Site. Major milestones include the retrieval of waste from the single-shell tanks (SSTs) by 2018 and subsequent closure of the SSTs. Waste retrieved from the SSTs will be stored in the double-shell tank (DST) system prior to treatment in the planned Waste Treatment Plant (WTP). Projections of waste volumes resulting from the retrieval of SSTs by 2018 show a need for additional operational storage capacity by 2007 (Allen 2001).

Changes to the HFFACO, negotiated in August 2000 and signed on January 23, 2001, accelerate the retrieval of high-risk waste containing large quantities of mobile long-lived radionuclides from SSTs. One consequence of the changes is that available DST space will be utilized by the end of 2007 after three SSTs are retrieved. The changes in the HFFACO were made with full knowledge of this situation. This tank capacity limitation is a significant concern to the negotiators. As a result, the HFFACO change established a new milestone (M-45-12) that includes a target milestone (T01) requiring the assessment of options to increase available storage space for SST retrieval. This document presents the options.

A brief description of the Hanford Site tank farm facilities and the delineation of the tank capacity issue is presented in Section 2.0. The methodology of this study, including a description of the facilitated workshops conducted to identify options and select those for further evaluation, is presented in Section 3.0. The options that appear to have the highest potential to alleviate the projected 2007 - 2011 tank capacity limitations and their further definition and evaluation are presented in Section 4.0.

The workshops identified options less likely to alleviate the near-term tank capacity shortage, but with promise as longer-term solutions. These could reduce the amount of new DST space necessary for retrieval of waste from the SSTs. These options are reviewed and described in Section 5.0. Approximately 130 options were suggested in the early phases of the workshops. Some options were eliminated based on the consensus of workshop participants; however, these options are presented in Section 6.0 for completeness.

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2.0 BACKGROUND

Waste volume projections (Garfield et al. 2000; Strode and Boyles 2000; Allen 2001) are based upon the expected WTP commissioning in 2007 and planned processing rates. After start-up and initial operations, significant volumes of DST waste will be processed by the WTP, beginning in 2009.

Recent modeling projections (Allen 2001) indicate that the available DST space will be utilized after the retrieval of the three tanks identified in the recent M-45 negotiations (S-112, S-102, and C-104). As part of the planning basis, the WTP will provide six low-activity waste feed receipt tanks with a total capacity of 1500 kgal in 2007. These tanks have a combined capacity of 1500 kgal and are to be available in 2007. When these tanks are available, an additional 1500 kgal of combined processing/receipt storage capacity becomes available, which would then be consumed by the next several SST retrievals.

This section includes a brief description of the Hanford Site tank farm facilities and describes the tank space issue.

2.1 EXISTING TANK FARM FACILITIES

Underground tanks comprised of steel and concrete are used for storage of hazardous radioactive waste. The waste is a byproduct of nearly 50 years of nuclear weapon material production from irradiated reactor fuel at the Hanford Site. Storage is provided by 28 double-contained DSTs with a nominal capacity of 1 million gallons each. Twenty-five of these tanks are located in the 200 East Area and three are located in the 200 West Area.

Waste is also stored in older SSTs, tanks with a single steel liner in concrete. There are 149 SSTs located in six tank farms in the 200 East Area and six tank farms in the 200 West Area. Of these tanks, 67 are known or suspected to have leaked.

Tanks deemed subject to potential uncontrolled increases in temperature or pressure because of the nature of their waste content are designated as "Watch List Tanks," as established by the "Wyden Amendment," Public Law 101-510, Section 3137 (1990). These tanks are restricted from receiving additional waste without the written approval of the Secretary of the U.S. Department of Energy (Public Law 101-510, 1990). There are presently 5 DSTs and 19 SSTs in this category. However, this concern is expected to be closed by September 2001.

Fifteen tanks have waste addition restrictions applied (Boston 2000). Significant resources have been expended to characterize these tanks including several that have been subjected to treatabilty studies at the Savannah River Site and Pacific Northwest National Laboratory in preparation for processing by the WTP. These tanks are referred to as "WTP feed source tanks" throughout this report.

2.2 THE TANK CAPACITY ISSUE

The total operating capacity of the 28 DSTs is 31.3 million gallons (Mgal). Figure 2-1 presents the DST space allocations. Current restrictions reduce the amount of waste that can be stored in these tanks by 3.3 Mgal, resulting in an available capacity of 27.4 Mgal. These restrictions include 2280 kilogallons (kgal) of emergency reserve space; 700 kgal of unused space in the remaining Flammable Gas Watch List tanks; and 900 kgal of unused space in WTP feed source tanks.

The DST system currently stores 21 Mgal of waste (Hanlon 2001). Planned interim stabilization of SSTs, retrieval of three SSTs (C-104, S-102, and S-112), and routine operational needs are projected to utilize the remaining available capacity of the DST system. This condition limits further SST retrieval until additional space is made available by WTP operations.

This lack of capacity was recognized during the negotiation of near-term SST retrieval milestones in August 2000. Therefore, the negotiators developed HFFACO milestone M-45-12-T01 due February 28, 2002. This milestone reads as follows:

> "Submit an options report documenting DOE assessment of actions that could be taken to increase available tank space for SST waste retrieval.
>
> This report will evaluate and document options for acquiring additional storage space for SST retrieval in addition to that required under this M-45-00-01A Change Request. Principle (*sic*) actions required to implement each option within a reasonable time will be identified. The principle (*sic*) options will have detailed cost and schedules for implementation."

This report is in response to this milestone. The major driver for making additional DST space available is to reduce the risk of additional leakage to the environment from the SSTs. Figure 2-2 illustrates how the risk from the tanks will be reduced when retrieved in the order planned (Garfield et al. 2000) for optimal risk reduction considering infrastructure availability. The fraction of total constituents of concern inventory in the SSTs and soil is presented as a function of the cumulative number of SSTs retrieved in the retrieval sequence.

Figure 2-1. Double-Shell Tank Present Space Allocation

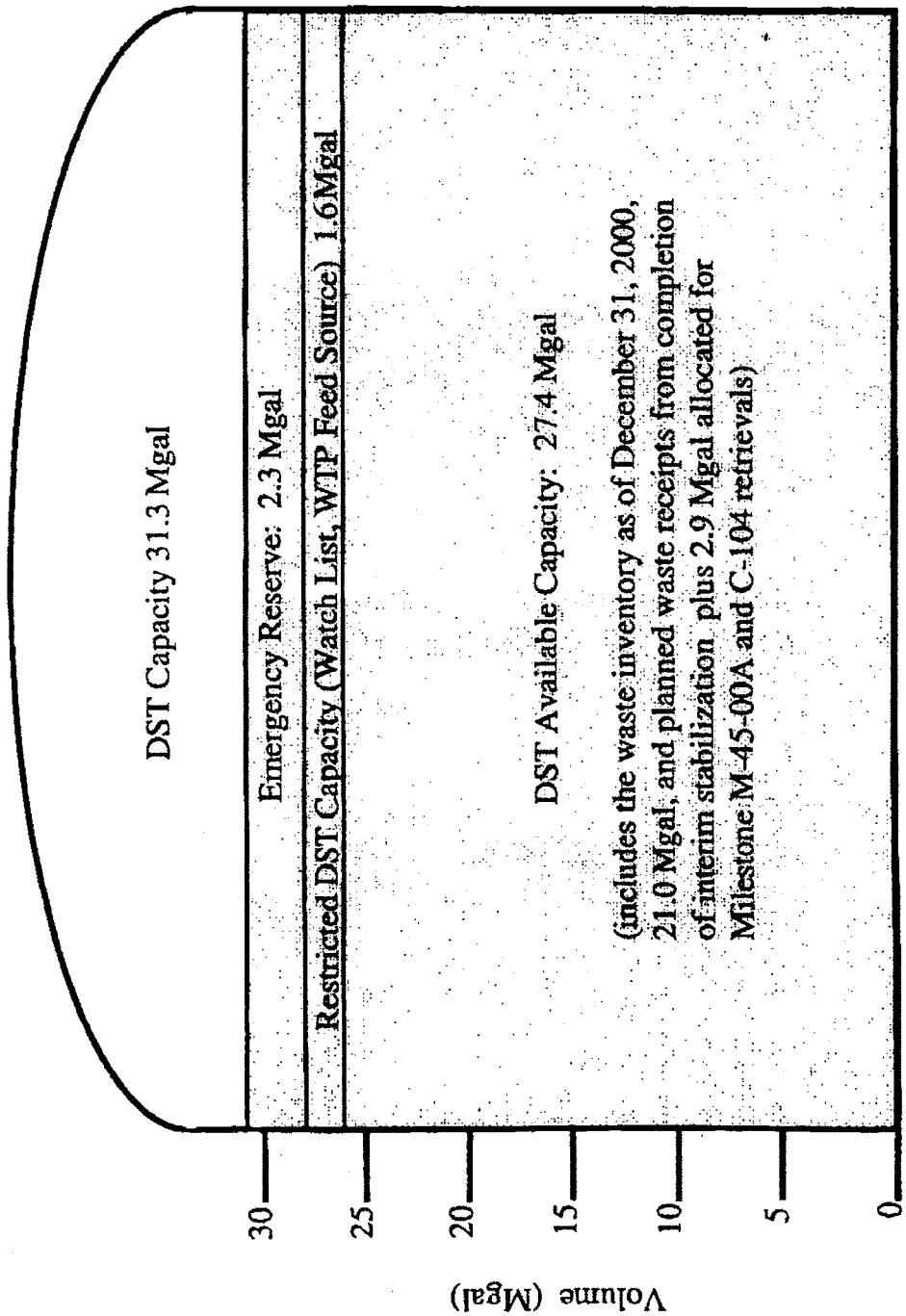
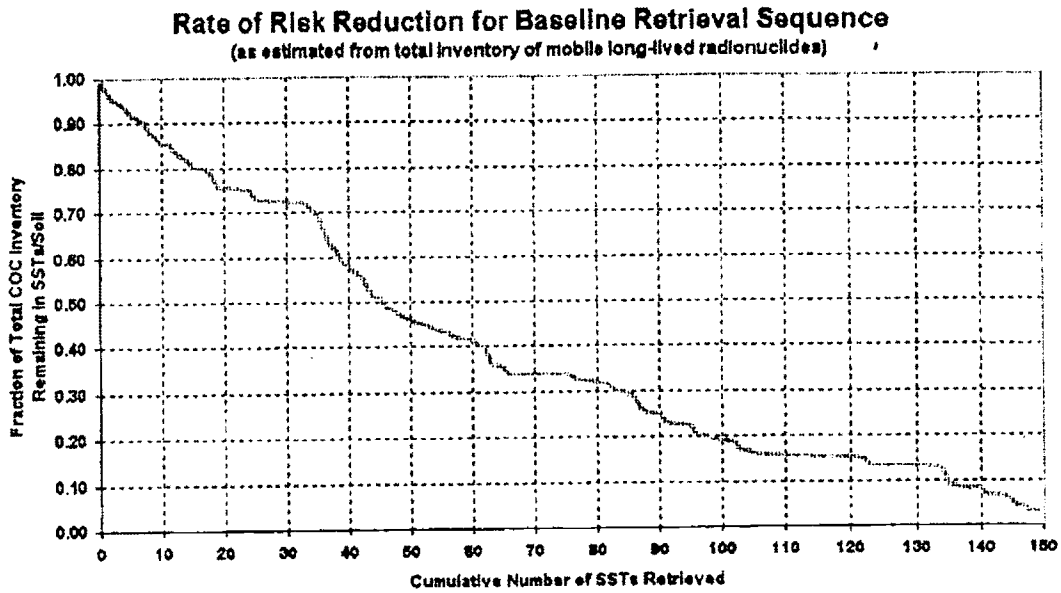


Figure 2-2. Rate of Risk Reduction for Baseline Retrieval Sequence



3.0 METHODOLOGY

The options evaluation and assessment was initiated with a two-day workshop on November 29 - 30, 2000. The participants in the workshop included a cross-section of individuals representing the U.S. Department of Energy, operating contractor, and national laboratory staff. Participants were selected in an effort to provide a cross-section of operations, research, nuclear safety, environmental, programs, and oversight functions. Special emphasis was placed on selecting subject matter experts who would bring a wide experience base for evaluation and assessment of a wide range of options. This workshop focused on identification, development, and categorization of comprehensive lists of options that could increase available tank space.

The workshop began with discussions and presentations to develop a common understanding of the problem, and to ensure that the problem statement was broad enough to not unnecessarily exclude concepts. The workshop participants concluded that the critical time for additional tank space is between 2007 and 2011, when the existing space is fully utilized and the WTP is not fully operational. A half-day brainstorming session was held to identify any potential option that could possibly allow further retrieval of SST wastes after 2007. There was recognition of the longer-term tank space required to support the retrieval of all SSTs by 2018. Additionally, opportunities that require research and development, but are not mature enough to support cost estimate and schedule development were captured for evaluation.

The participants established basic criteria and attributes for option evaluation. These included, but were not limited to, cost effectiveness, technical feasibility, maintainability, operability, risk reduction, and implementation schedule. The participants also grouped and combined options as well as eliminated options after further discussion. The team provided an initial down-selection of the options with the potential of providing additional tank space in the 2007 - 2011 period. Appendix A contains the meeting minutes, charts, list of options and ranking criteria that were developed.

A second workshop was held on January 12, 2001, to present the results of the first workshop to representatives of the Washington State Department of Ecology (Ecology) and the Hanford Advisory Board; to elicit any additional options to be considered; and to propose a format for the report. The specific requirements of the milestone M-45-12-T01 were considered. An annotated report outline was developed addressing content and level of detail. Appendix B contains the meeting minutes, charts, and annotated report outline developed at this meeting. Through the issues development process, and via the workshop outcome efforts, the Hanford Advisory Board subcommittee was apprised of the progress of this task.

Proposed options with the potential of providing additional tank space in the 2007 - 2011 period were evaluated to meet the milestone requirements. Cost estimates and schedules were developed for comparison of the options, in accordance with the level of detail agreed to in the January 12, 2001 workshop. These are initial cost estimates and schedules with the level of detail considered to be necessary by workshop participants. The preliminary schedules of expenditures for each of the multiyear options are not budget grade and require additional review before they can be adopted as a basis for out-year planning. Results are presented in Section 4.0. Long-term solutions identified in the workshops are presented in Section 5.0. Some options were discounted as nonviable. These options are described in Section 6.0.

A diagram of the relationship between the physical options available to increase waste storage space is presented in Figure 3-1.

The results of the study reflect qualitative analyses conducted to identify promising options. The estimated costs are rough-order-of magnitude and, therefore, subject to change. Implementing some of the options would represent a departure from the current baseline and may adversely impact the schedule for the Waste Treatment Plant. Some of the options would diminish the operational flexibility inherent in the current baseline and increase the risk of inability to accommodate significant Waste Treatment Plant startup problems, the potential loss of use of a double-shell tank, and other unforeseen events that could require additional tank space beyond that currently assumed necessary. The most promising options require more study to establish feasibility, enhance cost estimates, and understand operations impact of abnormal tank space utilization and need scenarios.

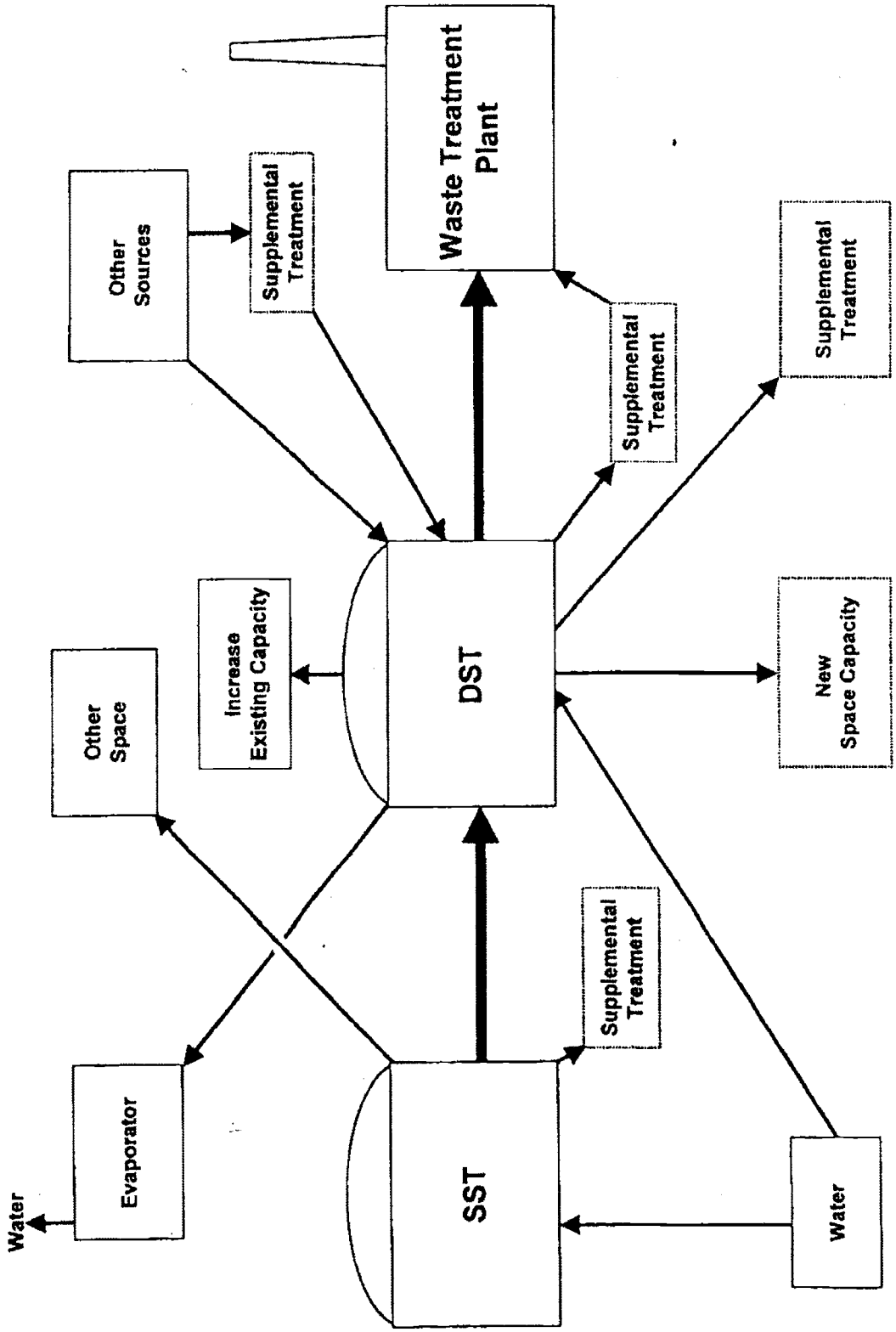


Figure 3-1. Relationship of Physical Tank Space Options Available

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4.0 OPTIONS EVALUATED WITH HIGHEST POTENTIAL TO ALLEVIATE 2007 - 2011 TANK SPACE SHORTAGE

Eight options that encompass the construction of new capacity, modification of current storage practices, and waste treatment alternatives are identified and described in this section. These options were selected for evaluation because they exhibited the potential to provide additional storage space for retrieval of high-risk SST waste during the years 2007 - 2011.

In order to permit future evaluation and comparison, information was developed for each option, including storage capacity provided and the approximate cost estimate and schedule to implement. The cost represents an estimate of the activities necessary to incorporate the capacity into the programmatic planning basis and not life-cycle costs. Most are one-time activities which, when implemented, become part of the baseline. Closure costs were specifically excluded for this comparison because of the uncertainty in closure criteria. Closure costs apply across all options, and as such, should not be a key discriminator between options.

The construction of new double-shell tanks ("new tank" option) is the benchmark for comparison of options. The design has been through extensive review. A detailed cost estimate and schedule were developed in the early 1990s and serve as the basis of the estimate for this report.

A qualitative discussion of other considerations is summarized for each option. Technical feasibility, environmental risk, health and safety risk, maintainability and operability, environmental regulatory impacts, and authorization basis impacts were evaluated. Table 4-1 contains criteria used for the qualitative evaluation.

Table 4-1. Performance Evaluation Feasibility Criteria

Criteria	High Feasibility	Medium Feasibility	Low Feasibility
Technical Feasibility	Work performed previously. Minimal physical change to systems/facilities. Little change to process documents.	Performed previously. Moderate physical change to facilities or systems. Process documents and procedures require change.	Never performed before. Many unknowns. Major physical changes. Research and development required.
Environmental Risk	No new environmental risk identified. Should be bounded by existing permits.	Increased environmental risk. Minor modifications to existing permits.	Requires significant evaluation. New permits required.

Table 4-1. Performance Evaluation Feasibility Criteria

Criteria	High Feasibility	Medium Feasibility	Low Feasibility
Health and Safety Risk	No new or minimal exposure to workers. Should be bounded by current activities.	Possibility of new hazards that require additional precautions.	High industrial, radiation, and construction risk exposure. Risk within industry allowable limits, but requiring special precautions.
Maintainability and Operability	Limited change to existing operations. Simple processes.	New operation similar to existing operation or a major change to an existing operation.	New type facility with complex processes.
Environmental Regulatory Impacts	Changes to existing permits are minor. No impact to HFFACO milestones or consent decree milestones.	Major modifications to existing permits or new permits. Changes or additions expected to be straightforward.	New permits or major modifications to existing permits. Significant public interest and comment expected. Request for variance to regulations required.
Authorization Basis Impacts	Unreviewed Safety Question (USQ) evaluation indicates no changes or minor changes via annual update. No changes to the Technical Safety Requirements.	Updates to the Authorization Basis or controls required. No significant development of new safety analyses.	Significant safety analyses must be prepared to support an Authorization Basis Amendment.

Table 4-2 is a summary of the eight options with the estimated additional capacity, cost, and schedule to implement each option. For this study, the eight options have been considered independently. For example, Option 4.1 is the only option that considers tank space above the 414-inch level. Because of the potential overlap between some options, the tank capacities identified in Table 4-2 cannot be considered additive.

Table 4-2. Summary of Options Most Likely to Provide Additional Capacity in 2007 - 2011 Time Period

Option Title	Additional Capacity (kgal)	Time to Implement (yrs)	Cost per Gallon	Total Cost ($K)
Raise Allowable Waste Levels	1,400	1	$ 0.57	$800
Decrease Dedicated Operational Space	850	0.3	$ 0.22	$190
Use Restricted Tank Capacity	1,300	2	$7.23	$9,900
Combine Aging Waste	980	8	$3.12	$3,060
Utilize Alternate Storage for Emergency Reserves	2,280	4	$2.19 to $4.65	$5,000 to $10,600
Concentrate Waste	2,200	6	$3.98	$8,750
Utilize Double-Contained Surface Storage	1,000	7	$5.75 to $8.80	$5,750 to $8,800
Construct New Double-Shell Tanks	1,200 per tank	7	$62.50	$75,000 per tank

4.1 RAISE ALLOWABLE WASTE LEVELS

4.1.1 Description

This option provides additional storage capacity by increasing the allowable waste levels of the DSTs in AP, AN, AW, and SY-Farms. The current operating capacity for these DSTs used for planning purposes is 1140 kgal (Strode and Boyles 2000), which corresponds to an operating level of 414 inches. This option assumes that the DSTs in these farms are filled to an operating level of 436 inches (1200 kgal).

Tanks in AY and AZ-Farms are excluded from this option based upon the design of the tanks. These tanks are filled from the side and are operated at a maximum level of 356 inches (979 kgal).

4.1.2 Background

The current operating capacity of DSTs is based on filling the tanks to a level of 414 inches, which provides a margin below the historic safety limit of 422 inches. The 422-inch limit was based on seismic calculations performed in the 1980s, and 422 inches was the maximum waste level used in the calculations. The results did not show a "failure or yield" condition. Subsequent analyses (Giller and Weiner 1991) suggest that the fill limit might be raised. The current safety basis for DSTs indicates that tank structural integrity is not challenged due to increased waste levels; therefore, structurally-based level limits are not required in the Authorization Basis (CHG 2000a, CHG 2000b).

In 1998, because of the waste surface level rise in tank SY-101, the maximum waste level in DSTs was readdressed. An evaluation specific to SY-101, *Evaluation of Waste Level Limits in Tank 241-SY-101* (Kirch et al. 1998) identified that a physical constraint on increasing the DST fill limit is the loss of double containment. The loss of double containment occurs where the annulus tank and the primary tank walls meet at approximately 454 inches. The tanks were hydrostatically tested to the 454-inch level prior to use.

For evaluation of this option, a maximum operating level of 436 inches is assumed. The 436-inch level was chosen because, at this level, waste starts to come into contact with in-tank equipment (Kirch et al. 1998) and an 18-inch margin to the level where double-containment ends is maintained.

Technical studies will be required to verify the feasibility of increasing the level, including an updated seismic/structural analysis, a review of the tank wall thickness, and a tank-by-tank review of equipment. The effects of changes in flammable gas concentrations caused by a reduction of headspace volume will require evaluation. The final operating level adopted could be higher or lower as a result of these studies.

The *Resource Conservation and Recovery Act* (RCRA) Part B permit may also need to be revised. Several operating and engineering documents would require revision. No capital equipment is required, but some modification to existing instrumentation would be required; i.e., instrumentation may need to be raised.

4.1.3 Evaluation of Option

4.1.3.1 Additional Capacity (Gallons)

The current waste volume projections use a tank capacity of 1140 kgal (414 inches) for each of the 24 tanks located in AN, AP, AW, and SY-Farms. This option assumes that 23 tanks can be filled to 1200 kgal (436 inches), thereby allowing an additional 60 kgal of waste storage per tank. Because of the need to potentially receive emergency returns from the 242-A Evaporator, the capacity in evaporator feed tank, AW-102, is raised to 1170 kgal. Raising the fill limit for the 24 DSTs will create an additional 1400 kgal of storage space within the existing DSTs.

4.1.3.2 Cost

The cost estimate for this option is presented in Table 4-3 and is based on interviews with subject matter experts.

Table 4-3. Cost Estimate for Raise Allowable Waste Levels Option

Activity Description	Cost ($K)
Conduct Flammable Gas Evaluation	100
Update Structural/Seismic Evaluation	500
Evaluate Minor Equipment Needs	20
Revise RCRA Part B Permit	60
Revise Operating Documents	120
OPTION TOTAL	**$800**

The cost estimate is based on the following assumptions:

- a total of 24 DST tanks will be included in the Flammable Gas Evaluation,
- any required unreviewed safety questions are screened in the flammable gas and structural seismic evaluations (this is for verification of envelope only and not for final certification),
- no further unreviewed safety question resolutions are necessary,
- no additional flammable gas monitors are required,
- no major equipment modifications are required, and
- existing structural and seismic calculations form the basis for new analysis.

The following potential costs are excluded from the estimate:

- waste transfers required to fill the tanks to 436 inches (24 transfers x $130K per transfer = $3,120K);
- re-characterization of 9 WTP feed source tanks (9 tanks x $500K per grab sample per tank = $4,500K);
- compatibility assessments $20K; and
- the DST tank integrity program is using ultrasonic testing to evaluate tank conditions, and it is assumed these tests will be satisfactory for any additional required inspections.

Waste transfer costs are a routine cost, because the tanks can be filled as needed. Re-characterization of the nine feed storage tanks is addressed in Option 4.3.

It is determined that the entire estimated cost would be incurred in one year from start of the activity.

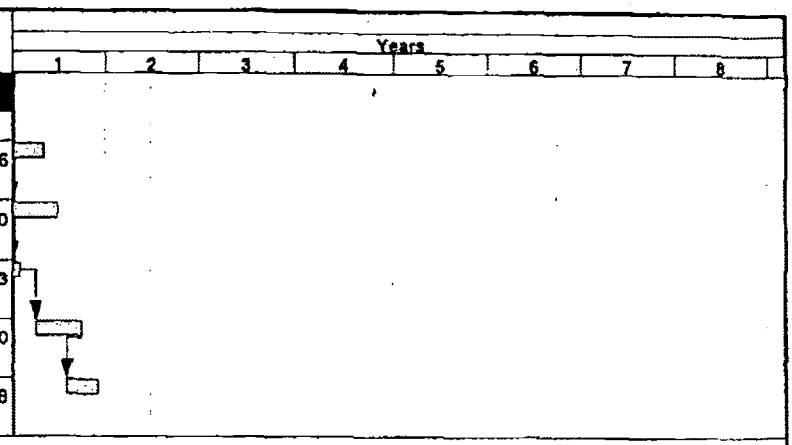
4.1.3.3 Schedule

The schedule for this option is presented in Figure 4-1.

The evaluation of this option and implementation of changes needed to revise engineering and operations documents would take approximately one year to complete. Completion could be accomplished before the 2007 - 2011 need dates. This option can also be implemented on a tank-by-tank or farm-by-farm basis.

Figure 4-1. Schedule for Raise Allowable Waste Levels Option

Activity ID	Activity Description	Orig Dur
OPTION 4.1		
O900100	CONDUCT FLAMMABLE GAS EVALUATION	86
O900200	CONDUCT STRUCTURAL/SEISMIC EVALUATION	130
O900300	EVALUATE MINOR EQUIPMENT NEEDS	23
O900400	REVISE RCRA PART B PERMIT	130
O900500	REVISE OPERATING DOCUMENTS	88



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4.1.3.4 Feasibility Considerations

Additional considerations for the feasibility of raising the allowable waste levels in DSTs are discussed below. Table 4-4 provides the summary assessment of these considerations.

Table 4-4. Feasibility Considerations for Raise Allowable Waste Levels

Criteria	High Feasibility	Medium Feasibility	Low Feasibility
Technical Feasibility	X		
Environmental Risk	X		
Health and Safety Risk	X		
Maintainability and Operability	X		
Environmental Regulatory Impacts	X		
Authorization Basis Impacts		X	

- **Technical Feasibility**

  The currently assumed operating capacity of DSTs has a margin to the maximum capacity. The existing tank structural evaluations indicate that it is probable that tank waste level limits may be raised. The technical uncertainty associated with this option is that existing structural analyses for DSTs may not support a higher waste level or may not meet current standards. If this documentation must be updated extensively, a significant cost and schedule delay would be incurred. The allowable waste level can be increased provided the structural evaluation and the flammable gas review are favorable.

- **Environmental Risk**

  The DSTs meet the requirement of Washington Administrative Code 173-303-640 (4)(e)(iii) that double walled tanks be designed as an integral structure (i.e., an inner tank completely enveloped within an outer shell) and be provided with a built-in continuous leak detection system. Minimal incremental environmental risk is incurred by operating the DSTs at a higher waste level, but below the level of the secondary containment.

- **Health and Safety Risk**

  No additional health and safety risk to the workers or the public are expected from raising the allowable waste level in DSTs.

- **Maintainability/Operability**

  No additional maintenance or operational expense is required to implement this option other than the one-time costs to raise some instrumentation. Actual costs of waste transfers or characterization are not included in this analysis.

- **Environmental Regulatory Impacts**

  A minor change to the RCRA Part B permit may be required because the DST headspace has been reduced.

- **Authorization Basis Impacts**

  Raising the allowable waste levels would require new flammable gas generation rate and ventilation rate studies. These could possibly result in changes to the Limiting Condition for Operation 3.2.1, "DST and AWF Tank Ventilation," (CHG 2000b) surveillance frequency and action statement completion times. The existing waste temperature limits would still apply, and the addition of waste is anticipated to have an insignificant effect on the waste temperature.

4.2 DECREASE DEDICATED OPERATIONAL SPACE

4.2.1 Description

This option provides additional storage capacity by decreasing dedicated operational space requirements within the DSTs. Dedicated operational space is that capacity reserved for specific purposes that support routine tank farm operations.

4.2.2 Background

Current dedicated operational space requirements are presented in Table 4-5.

Table 4-5. Current Dedicated Operational Space

Operation	Tank	Dedicated Volume (kgal)
200 East Area Interim Stabilization Liquid and Dilute Receiver Tanks	Tanks AN-101, AP-108, and AW-105	3,000
200 West Area Interim Stabilization Liquid and Dilute Receiver Tank	Tank SY-102	500
242-A Evaporator Feed Tank	Tank AW-102	1,000
242-A Evaporator Receiver Tank	Tank AW-106	900
Intermediate Feed Staging Tanks	Tanks AN-101, AN-102, AN-105, AP-101, and AP-104	4,900
Dilute Waste Feed Staging Tanks	Tanks AP-106, AP-107, and AN-106	3,300

Not all of the current dedicated operational space will be needed through the time period of 2007 to 2011 and may be made available for other waste storage. A discussion of each operation is included below.

4.2.2.1 Dedicated Operational Space Descriptions

<u>200 East Area Interim Stabilization Liquid and Dilute Receiver Tanks (AN-101, AP-108, and AW-105)</u>

Three tanks have been reserved for receipt of dilute waste in the 200 East Area, tanks AN-101, AP-108, and AW-105. This dilute waste is principally from the interim stabilization of SSTs. Operation of the tanks is described below:

- Tank AN-101 will receive interim stabilization liquid from SSTs A-101 and AX-101 through 2004. After 2004, tank AN-101 will be used as an intermediate feed staging tank. A discussion of feed staging tanks is provided below.
- Tank AP-108 will receive interim stabilization liquid from the BY Tank Farm, waste from tank SY-102, and miscellaneous facility wastes not destined for tank AW-105. After completion of interim stabilization, AP-108 will receive cross-site transfers of SST retrieval waste. As DST capacity is made available for SST retrieval waste, AP-108 is operated as an interim storage tank for transfer of waste from 200 West Area to storage and processing in 200 East Area.
- Tank AW-105 was originally selected to receive 100 Area cleanout waste because the wastes might contain transuranic solids. This tank already contains transuranic solids and will receive approximately 40 kgal of waste from 105-F Basin in 2001. Waste from 105-H Basin will be transferred to tank AW-105 in 2006. Space in tank AW-105 can be made available for SST waste retrieval by using tank AP-108 for receipt of 105-F and 105-H Basin waste. The small volume of waste from 100 Area cleanout can be stored in tank AP-108 without impacting the operation as a cross-site transfer receiver tank.

Elimination of tank AW-105 as a 200 East Area dilute receiver tank would make available approximately 850 kgal for retrieval of high-risk SST waste.

This approach is operationally feasible; however, decreasing the total dilute receiver capacity reduces operational flexibility. By 2005, dilute waste staging tanks will be used for storing concentrated wastes. Only the dilute receiver tanks (AP-108 and AW-105) and the evaporator feed staging tank (AW-102) will be available for receiving, staging, and feeding dilute waste to the evaporator. Once filled, a dilute receiver tank is unavailable for waste receipts for four months while waste characterization is conducted. Without a second dilute waste receiver tank, either the operational strategy will change from a continuous to a batch process or the waste would have to be transferred to tank AW-102 prior to characterization.

200 West Area Interim Stabilization Liquid and Dilute Receiver Tank (SY-102)

At least one DST will be needed in 200 West Area to receive interim stabilization liquid, and waste from the 222-S Laboratory, the Plutonium Finishing Plant (PFP), and SST retrieval. Interim stabilization of 200 West Area tanks will be completed in 2004. Single-shell tank retrieval wastes from tanks S-102 and S-112 are to be stored in tank SY-102 pending transfer to 200 East Area. Tank SY-102 is needed for receipt of SST retrieval waste for subsequent transfer to storage in 200 East Area. Since the bulk of the SST waste and only 3 DSTs are in 200 West Area, SST waste retrieval requires this tank be available.

242-A Evaporator Feed Tank (AW-102)

Prior to evaporation, dilute wastes are transferred into a dilute receiver tank. The waste is staged for four months pending characterization required prior to evaporation. Once it has been determined that the waste is suitable for evaporation, the waste is transferred to the evaporator feed tank, AW-102. Elimination of a dedicated evaporator feed tank would require feeding waste from multiple DSTs, which complicates necessary characterization of dilute waste going to the evaporator and increases cost and operational complexity of running the evaporator. As long as the evaporation of dilute waste is required to reduce waste volume, elimination of the dedicated evaporator feed tank is not considered a viable option.

242-A Evaporator Receiver Tank (AW-106)

After evaporation of approximately 50 percent of the dilute waste volume, the concentrated waste is transferred to the evaporator receiver tank (AW-106). If additional evaporation is required, the waste is transferred back to the evaporator feed tank (AW-102) for re-evaporation.

Elimination of a dedicated evaporator receiver tank would mean that partially evaporated waste would have to be transferred from the evaporator back to the evaporator feed tank (AW-102). This would increase throughput and the length of time required to evaporate dilute waste.

Elimination of a dedicated evaporator receiver tank is not a viable option as long as significant volumes of waste need to be evaporated.

Intermediate Feed Staging Tanks (AN-101, AN-102, AN-105, AP-101, and AP-104)

Projections completed for the last *Operational Waste Volume Projection* (Strode and Boyles 2000) and the *Tank Farm Contractor Operation and Utilization Plan* (Kirkbride et al. 2000) assume that five tanks (AN-101, AN-102, AN-105, AP-101, and AP-104) would be employed as intermediate feed staging tanks for low-activity waste. The tanks are used to stage, dilute, and transfer wastes to the WTP feed tanks. The number of dedicated tanks is determined directly by the WTP feed processing rate. With the exception of tank AN-101, these tanks are currently full and are planned for processing among the initial feeds to the WTP. Once emptied, these tanks are planned to be filled with other waste feed for the WTP.

Dilute Waste Feed Staging Tanks (AN-106, AP-106, and AP-107)

Dilute waste feed staging tanks are used for storage prior to transfer to the evaporator feed tank, AW-102. These tanks are only used when large volumes of dilute interim stabilization wastes are to be evaporated. In the last *Operational Waste Volume Projection* (Strode and Boyles 2000), three tanks, AN-106, AP-106, and AP-107, are identified as dilute waste feed staging tanks. All three are later used to store concentrated waste from interim stabilization of SSTs. In the years 2007 - 2011, these tanks will be full.

4.2.3 Evaluation of Option

4.2.3.1 Additional Capacity (Gallons)

Release of tank AW-105 for other uses would add 850 kgal of capacity.

4.2.3.2 Cost

The cost estimate for this option is presented in Table 4-6 and is based on interviews with subject matter experts.

Table 4-6. Cost Estimate to Decrease Dedicated Operational Space Option

Activity Description	Cost ($K)
Revise Plant Operating Procedures	$40
Perform Compatibility Assessment	$20
Transfer 150 kgal of waste from tank AW-105	$130
OPTION TOTAL	**$ 190**

The cost estimate is based on the following assumption:

- the waste in tank AW-105 (approximately 150 kgal) will be transferred earlier than planned.

The entire estimated cost would be spent within six months of the decision to proceed.

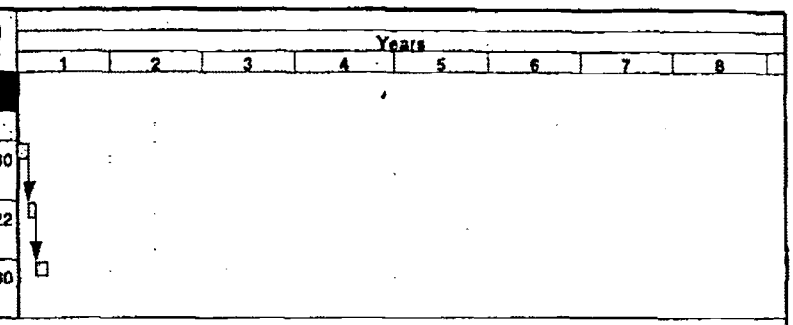
4.2.3.3 Schedule

The schedule for this option is presented in Figure 4-2.

The review and implementation of this option would take approximately six months.

Figure 4-2. Schedule for Decrease Dedicated Operational Space Option

Activity ID	Activity Description	Orig Dur
OPTION 4.2		
O500100	REVISE PLANT OPERATING PROCEDURES	30
O500200	PERFORM COMPATABILITY ASSESSMENT	22
O500300	TRANSFER 150kgal OF WASTE	30



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4.2.3.4 Feasibility Considerations

Additional considerations for the feasibility of decreasing dedicated operational space in DSTs are discussed below. Table 4-7 provides the summary assessment of these considerations.

Table 4-7. Feasibility Considerations for Decrease Dedicated Operational Space Option

Criteria	High Feasibility	Medium Feasibility	Low Feasibility
Technical Feasibility	X		
Environmental Risk	X		
Health and Safety Risk	X		
Maintainability and Operability	X		
Environmental Regulatory Impacts	X		
Authorization Basis Impacts	X		

- **Technical Feasibility**

  No significant technical issues are identified for this option. This option reduces operational flexibility; however, satisfactory changes to current operational strategy are identified.

- **Environmental Risk**

  No incremental environmental risk is incurred by using tank AW-105 for storage of retrieved SST waste.

- **Health and Safety Risk**

  No additional health and safety risk to the workers or the public are expected from using tank AW-105 for storage of retrieved SST waste.

- **Maintainability/Operability**

  This option reduces operational flexibility; however, satisfactory changes to current operational strategy been identified.

- **Environmental Regulatory Impacts**

  No environmental regulatory issues are incurred by using tank AW-105 for storage of retrieved SST waste.

- **Authorization Basis Impacts**

  There is no impact to the Authorization Basis incurred by using tank AW-105 for storage of retrieved SST waste.

4.3 USE RESTRICTED TANK CAPACITY

4.3.1 Description

Currently, not all DSTs are allowed to be filled to the maximum allowable level. Tanks on the Flammable Gas Watch List are restricted from receiving additional waste transfers without the approval of the Secretary of the U.S. Department of Energy (Public Law 101-510, 1990). Fourteen DSTs, including the DSTs on the Watch List, have been characterized for WTP feed and cannot receive additional waste without Office of River Protection approval (Boston 2000). This option increases the allowable stored waste volume in restricted DSTs to the 436-inch current operating level discussed in Section 4.1.

The potential additional storage capacity of each of the restricted tanks is shown in Table 4-8. *Waste Tank Summary Report for Month Ending December 31, 2000* (Hanlon 2001) was used as the basis of the current volume, modified to account for planned operational activities such as caustic addition and waste transfers through 2001. The available volume in AY-101 has been reduced to account for retrieval of tank C-104.

Table 4-8. Watch List and Waste Treatment Plant Feed Source Tanks

Tank	Current Volume (kgal)	Available Volume (kgal)	Watch List	WTP Feed Source
AN-102	1052	~30		X
AN-103	956	184	X	X
AN-104	1052	88	X	X
AN-105	1128	12	X	X
AN-107	1041	~40		X
AP-101	1114	26		X
AP-104	1109	31		X
AY-101	199	~400		X
AY-102	646	334		X
AZ-101	917	63		X
AZ-102	997	0		X
AW-101	1127	13	X	X
SY-103	742	398	X	X
AW-103	509	0		X

These tanks contain approximately 1600 kgal of unutilized capacity. With the exceptions of the AY and AZ tanks, each of these has a potential additional 60-kgal capacity by raising the operating level as detailed in Section 4.1. Tank AY-101 is currently undergoing a tank integrity evaluation. The results of the evaluation may impact its capacity.

4.3.2 Background

Currently, no waste can be added to Watch List tanks without the written approval of the Secretary of the U.S. Department of Energy (Public Law 101-510, 1990). The flammable gas issue is expected to be resolved in 2001. Removal of the tanks from the Watch List should occur by the end of 2001.

Tanks with a high concentration of settled solids have exhibited a tendency for flammable gas retention and release behavior. The tank with the most hazardous gas releases, SY-101, was remediated by dilution with water to dissolve solids and subsequently, was removed from the Watch List. Similar action for the remaining five Flammable Gas Watch List DSTs is not required for resolution of the Flammable Gas Safety Issue. Removal of the remaining tanks from the Watch List is planned for 2001. Addition of water to dilute these DSTs would consume approximately 1000 kgal of existing waste storage capacity.

The WTP waste feed source tanks have been characterized, and waste treatability studies are ongoing. The characterization and treatability studies represent a sunk cost for the River Protection Project. All waste fed to the WTP must be re-characterized within one year of transfer to the WTP. Permission from the U.S. Department of Energy, Office of River Protection (ORP) (Boston 2000) is required to add waste to these tanks. Combination of the wastes without re-characterization would require an evaluation of the effect on the waste treatment process and approval from ORP.

4.3.3 Evaluation of Option

4.3.3.1 Additional Capacity (Gallons)

The maximum capacity that could be realized with this option is 1400 to 1600 kgal. Several significant technical issues require resolution for implementation of the option. Four tanks, AN-103, AY-101, AY-102, and SY-103, have a combined additional capacity of 1300 kgal and were considered for cost and schedule analysis.

4.3.3.2 Cost

The cost estimate for this option is presented in Table 4-9 and is based on interviews with subject matter experts. Costs would be a small fraction of this estimate if characterization or treatability studies specific to the addition of waste are unnecessary.

Table 4-9. Cost Estimate for Use Restricted Tank Capacity Option

Activity Description	Cost ($K)
Sampling and Analysis	4,400
WTP Treatability Studies	5,000
OPTION TOTAL	**9,900**

The cost estimate for this option is based on the following assumptions:

- tanks under evaluation are contained in Table 4-8;
- tanks AN-103, AY-101, AY-102, and SY-103 contain usable available capacity;
- the cost of sampling and analysis for tanks AY-101 and SY-103 are considered elsewhere or beyond the timeline of this study;
- tanks AN-103 and AY-102 may require re-evaluation for WTP waste acceptance and treatability, and are costed;
- Full sampling, analysis, and treatability costs are assumed and may not be required;
- tanks AZ-102 and AW-103 are considered full and are not costed;
- tanks AN-102, AN-104, AN-105, AN-107, AP-101, AP-104, AW-101, and AZ-101 provide minimal additional capacity at less than 100 kgal per tank and are not costed;
- sampling and analysis costs are $2.2M per tank;
- WTP treatability studies are $2.5M per tank; and
- no equipment including pumps, pits, and transfer lines required upgrade to support utilization of tank space.

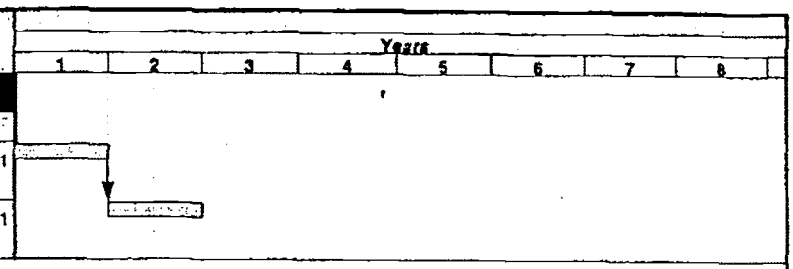
The preliminary expenditure schedule is based on one year to sample and analyze the waste in <u>each</u> tank ($2,200K) followed by one year to perform treatability studies ($2,500K).

4.3.3.3 Schedule

The schedule for this option is presented in Figure 4-3. This schedule represents the timeline for one tank.

Figure 4-3. Schedule for Use Restricted Tank Capacity Option

Activity ID	Activity Description	Orig Dur
OPTION 4.3		
O400100	SAMPLE & ANALYSIS	261
O400200	PERFORM WTP TREATABILITY STUDIES	261



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4.3.3.4 Feasibility Considerations

Additional considerations for the feasibility of using restricted tank capacity in DSTs are discussed below. Table 4-10 provides the summary assessment of these considerations.

Table 4-10. Feasibility Considerations for Use Restricted Tank Capacity Option

Criteria	High Feasibility	Medium Feasibility	Low Feasibility
Technical Feasibility	X		
Environmental Risk	X		
Health and Safety Risk	X		
Maintainability and Operability	X		
Environmental Regulatory Impacts	X		
Authorization Basis Impacts		X	

- **Technical Feasibility**

  No significant technical issues are identified for the use of restricted capacity in DSTs. The use of capacity in Flammable Gas Watch List tanks requires removal of these tanks from the Watch List, planned for 2001 and flammable gas evaluations in accordance with existing Authorization Basis controls(CHG 2000a, CHG 2000b). The use of capacity in WTP feed source tanks require approval of Office of River Protection and an evaluation that the new waste added to the tank is compatible with the existing waste.

  Technical issues associated with decreasing the restricted capacity of the tanks include compatibility of wastes with the WTP feed source tanks and the evaluation of transfers relative to Authorization Basis requirements (CHG 2000a, CHG 2000b).

  The use of currently restricted capacity in DST presents no technical issues. The currently assumed operating capacity of DSTs has a margin to the maximum capacity. The tank structural evaluations indicate that it is likely that individual tank level limits may be raised. The technical uncertainty associated with this option is that existing structural analyses for DSTs may not show a higher waste level is acceptable or may not meet current standards. If this documentation must be updated extensively, a significant cost and schedule delay would be incurred. The allowable waste level can be increased provided the structural evaluation and the flammable gas review are favorable.

- **Environmental Risk**

  No incremental environmental risk is incurred by the use of restricted capacity in DSTs.

- **Health and Safety Risk**

  No additional health and safety risk to the workers or the public are expected by the use of restricted capacity in DSTs.

- **Maintainability/Operability**

  No maintainability or operability issues are expected by the use of restricted capacity in DSTs.

- **Environmental Regulatory Impacts**

  No environmental regulatory issues are incurred by the use of restricted capacity in DSTs.

- **Authorization Basis Impacts**

  Assuming the subject tanks are taken off of the Watch List, transfers can be made given compliance with Administrative Control 5.9, "Flammability Controls," and Administrative Control 5.12, "Transfer Controls." Transfer of additional waste into the DST would require new flammable gas generation rate/ventilation rate studies. These could possibly result in changes to the Limiting Condition for Operation 3.2.1, "DST and AWF Tank Ventilation," (CHG 2000b) surveillance frequency and action statement completion times.

4.4 COMBINE AGING WASTE

4.4.1 Description

Currently, two tanks in the AZ Tank Farm store waste from the Plutonium-Uranium Extraction (PUREX) Plant that is referred to as "aging waste." This option increases tank capacity by combining, concentrating, or moving these wastes. This consolidation will release aging waste capacity for storage of SST retrieval waste. Depending on the process chosen for storing the existing aging waste, the additional tank capacity made available ranges from 700 kgal to 1,000 kgal.

4.4.2 Background

Waste that came directly from the PUREX Plant and had high concentrations of radionuclides is known as aging waste. The radionuclides generated heat that the ventilation systems in AY and AZ Tank Farms were designed to control. All aging waste is currently stored in AZ Tank Farm.

During peak production, it was considered adequate to "age" the waste for five years before it could be transferred out of the aging waste facility to other DSTs. The currently stored waste has aged for more than 15 years. The radioactivity and heat load are much less than when the waste was generated. The primary heat sources are cesium-137 and strontium-90, each of which has a half-life of about 30 years.

The volume of aging waste is not static. Water evaporates from the waste due to the heat load, condenses, and returns to the tanks. Because the condensate return is a batch process, the volume tends to rapidly increase and then gradually decrease. As a result, the sodium concentration varies in these tanks. To prevent solids from forming in the tank, the concentration of the aging waste is limited to a maximum sodium concentration of 5 to 5.5 gram-moles per liter (M).

4.4.3 Evaluation of Option

4.4.3.1 Additional Capacity (Gallons)

Adding low radioactive concentration waste to the AZ tanks and allowing the waste to evaporate until the sodium concentration reaches the current *Operating Specifications for Aging Waste Operations in 241-AY-and 241-AZ* (OSD) (CHG 2000c) limits of 5 M sodium for tank AZ-102 and 5.5 M sodium for tank AZ-101 is one option. The most viable concept involves combining waste from both AZ tanks into one single aging waste tank and allowing the sodium concentration to exceed 5 M. A third concept involves removing the liquid waste from the aging waste tanks and blending it throughout the DST system. The liquid waste would then be concentrated up to a density of 1.41 g/mL in the other tanks.

Table 4-11 shows the liquid volumes requiring storage for the various process alternatives. The waste volume decreases with increasing waste concentration measured as sodium molarity. A description of each process alternative is provided.

Table 4-11. Summary of Liquid Volumes under Various Process Alternatives

Tank	PROCESS ALTERNATIVES							
	Current Conditions		Self-Concentrate and Add Other Waste		Combine Aging Waste and Concentrate		Remove Liquid Waste	
	Current Liquid Volume (kgal)	Current Sodium (M)	At OSD[1] Limits (kgal)	OSD Limit Sodium (M)	Storage Volume (kgal)	Sodium (M)	Storage Volume (kgal)	Sodium (M)
AZ-101	873	4.8	701	5.5	551	7	453	8.5
AZ-102	908	2.4	413	5	295	7	243	8.5

Notes: [1]CHG (2000c)

- **Self-Concentrate and Add Other Waste**

The two AZ tanks have an operating capacity of 980 kgal each or 1960 kgal total and a variable inventory as water evaporates and is replaced. Table 4-11 shows that tanks currently store 1781 kgal of liquid waste at a concentration below that permitted by the OSD (CHG 2000c). Allowing the waste to self-concentrate to the OSD limits would reduce the stored volume by 550 kgal thereby allowing an additional 712 kgal to be added to the two tanks to reach the current operating capacity of 1960 kgal.

- **Combine Aging Waste and Concentrate**

Raising the current concentration limits to 7 M sodium would allow all of the aging waste, including solids to be stored in a single tank. This would produce 980 kgal in available capacity. This could be accomplished using the existing mixer pump in tank AZ-101 to slurry the solids. The process would allow self-concentration in tank AZ-102 by sending the condensate to other tanks then mixing tank AZ-101 to suspend solids. The waste in tank AZ-101 would be transferred to tank AZ-102. Several repetitions of self-concentration and transfer would be required.

One concern with transferring all of the aging waste to one tank is an increase in the radionuclide concentration. Increasing to 7 M sodium could produce cesium-137 concentrations as high as 2.4 Ci/L. One alternative would be to leave the waste in the tanks and add other waste, with low activity, to these tanks prior to self-concentration of the waste to 7 M sodium. The cesium-137 concentrations would remain relatively constant in this approach.

- **Remove Liquid Waste**

Removal of the liquid fraction from aging waste tanks and concentration in the 242-A Evaporator would free the AZ-Farm tanks for additional waste storage. To increase the concentration of the waste, the aging waste would need to be blended with waste from several other tanks. If the waste were subsequently concentrated to a density of 1.41 g/mL, additional capacity could be realized. This step would require a number of transfers from the AZ-Farm to other farms. This would leave the sludge in AZ-Farm. The total volume saved would be 1133 kgal when other waste is brought back in to completely back fill the aging waste tanks.

4.4.3.2 Cost

The cost estimate for this option is presented in Table 4-12 and is based on the combine waste tanks and concentrate option. This option transfers slurried waste from tank AZ-101 to tank AZ-102. Four (4) transfers will be required.

Table 4-12. Cost Estimate for Combining Aging Waste Option

Activity Description	Cost ($K)
Conduct Thermal Studies	200
Prepare Procedures	60
Perform Compatibility Assessments	80
Perform Waste Transfers (4 each)	520
Sample and Analyses	2,200
OPTION TOTAL	**$ 3,060**

The cost estimate is based on the following assumptions:

- all equipment including pumps, pits and transfer lines do not require additional upgrade,
- tank Farm Models or databases do not need to be changed,
- costs reflect that the thermal studies will verify that the Authorization Basis waste temperature limits are not exceeded (CHG 2000a, CHG 2000b),
- condensate (boil-off) and subsequent transfer to the evaporator for processing is not part of this scope,
- four transfers are performed, including jumper changes, at a cost of $130K per transfer, and
- characterization of the combined waste for WTP feed is required at a cost of $2,200K.

The preliminary expenditure schedule includes thermal studies and procedure preparation in the first year at a cost of $260K followed by compatibility assessment and waste transfer during the first year for $150K. Three additional transfers in the fourth, sixth, and eighth years are estimated at $150K each.

The following potential costs are excluded from the estimate:

- if the alternative to continuously add more waste to both AZ tanks and concentrate the waste in-tank is implemented, 9 additional transfers are needed. An incremental cost of $1,200K would be incurred;
- if the alternative to remove the liquid waste and distribute to other tanks is implemented, additional transfers and evaporator operations are required. The total cost of this alternative would be $6,800K; and
- if the thermal studies show that the waste temperature limits are exceeded, then a change to the Authorization Basis (CHG 2000a, CHG 2000b) will be required.

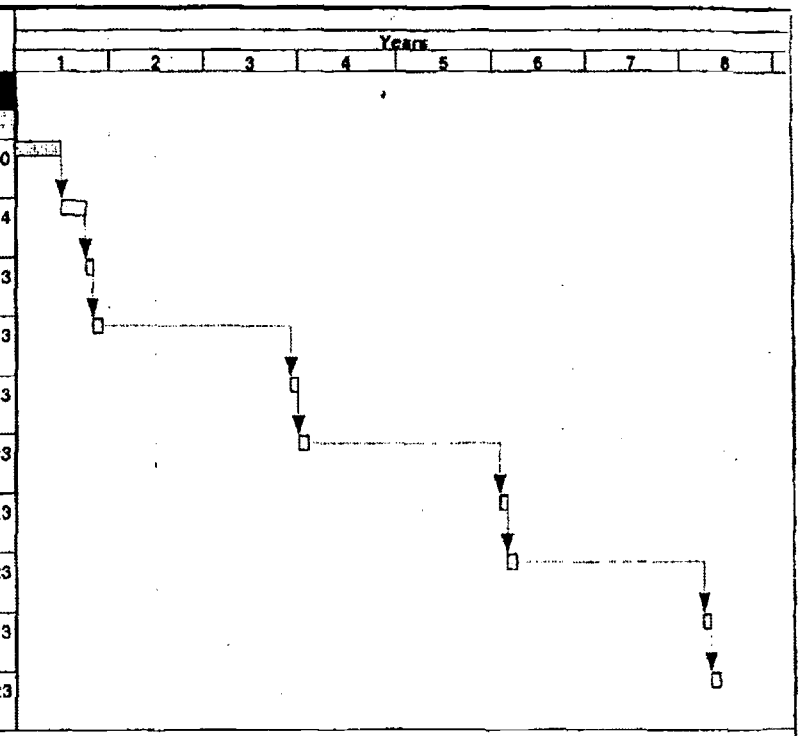
4.4.3.3 Schedule

The schedule for this option is presented in Figure 4-4.

This option relies on the combining aging waste and concentration option. The rate of evaporation from each of these tanks is less than 100 kgal per year. At that rate of evaporation, it would take eight years to complete this option. Acceleration opportunities exist. For example, ventilation rates could be increased, which will increase evaporation rates. Review of the potential to emit radionuclides at accelerated evaporation rates would be required.

Figure 4-4. Schedule for Combine Aging Waste Option

Activity ID	Activity Description	Orig Dur
OPTION 4.4		
O300100	CONDUCT THERMAL STUDIES	130
O300200	INITIATE PROCEDURE PREPERATIONS	64
O300300	PERFORM COMPATABILITY ASSESSMENT	23
O300400	PERFORM WASTE TRANSFERS	23
O300500	PERFORM COMPATABILITY ASSESSMENT	23
O300600	PERFORM WASTE TRANSFER	23
O300700	PERFORM COMPATABILITY ASSESSMENT	23
O300800	PERFORM WASTE TRANSFER	23
O300900	PERFORM COMPATABILITY ASSESSMENT	23
O301000	PERFORM WASTE TRANSFER	23



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4.4.3.4 Feasibility Considerations

Additional considerations for the feasibility of combining aging waste are discussed below. Table 4-13 provides the summary assessment of these considerations.

Table 4-13. Feasibility Considerations for Combine Aging Waste Option

Criteria	High Feasibility	Medium Feasibility	Low Feasibility
Technical Feasibility		X	
Environmental Risk	X		
Health and Safety Risk	X		
Maintainability and Operability		X	
Environmental Regulatory Impacts	X		
Authorization Basis Impacts		X	

- **Technical Feasibility**

  Combination of the waste from the two aging waste tanks into one tank or the storage of additional waste in these tanks is technically feasible. Technical issues that require resolution include evaluation of the resulting waste temperatures and waste source term. The waste temperature must be controlled per Limiting Condition for Operation 3.3.2, "DST and AWF Tank WASTE Temperature Controls" (CHG 2000b). Additional annulus ventilation flow may be required if the thermal evaluation predicts waste temperatures outside the control limits. The resulting waste radionuclide concentration will require evaluation per Administrative Control 5.8, "Source Term Controls," (CHG 2000b).

  The combination of the two aging waste tanks in one tank would require evaluation against Administrative Control 5.15, "Chemistry Control Program." It is anticipated that a higher hydroxide concentration would exist in the resulting waste; therefore, no significant issues are anticipated with this control.

  There may be an added benefit to the WTP resulting from blending of aging waste with other wastes. The radionuclide concentration would be diluted, which may positively affect pretreatment operations. The aging waste also contains high levels of sulfate and fluoride, which are detrimental to the vitrification process and could be reduced by waste blending.

- **Environmental Risk**

  No incremental environmental risk is incurred by the combination of aging waste.

- **Health and Safety Risk**

  Minimal additional health and safety risk to the workers or the public are expected by the combination of aging waste. An increase in the radionuclide concentration of the waste would require appropriate radiological controls during operations associated with the tank.

- **Maintainability/Operability**

  The combination of aging waste requires the use of transfer equipment that has not been operated in several years. Additional maintenance on aging waste tank transfer systems is probable. The ventilation system for the AZ tank farm was replaced in the 1990s, and no new maintenance or operations issues are expected from this option.

- **Environmental Regulatory Impacts**

  The effect of combining aging waste will require evaluation against the radioactive air emissions notice of construction for aging waste tank ventilation system. A minor change to this regulatory document may be required.

- **Authorization Basis Impacts**

  Combining or blending aging waste may require revisions to Limiting Condition for Operation 3.3.2, "DST and AWF Tank WASTE Temperature Controls" and Administrative Control 5.8, "Source Term Controls," (CHG 2000b).

4.5 UTILIZE ALTERNATE STORAGE FOR EMERGENCY RESERVES

4.5.1 Description

Currently, a total of 2280 kgal of capacity is reserved in the DST system. A volume equivalent to one DST is reserved for emergency storage in the event of failure of a DST; a second tank volume is reserved for emergency return of off-specification waste from the WTP. This study considers other emergency storage capacity outside of the DST system. Five options are considered:

- combine DST emergency reserve with WTP emergency return reserve;
- utilize two of the four empty Grout vaults (218-E16-104 and 218-E16-105);
- utilize two of the four empty Grout vaults, modified to install primary containment tanks or bladders inside the vaults;
- utilize double-contained receiver tanks (DCRTs); and
- utilize a large (~500 kgal) storage tank near the PUREX facility.

Combine Emergency Reserve Capacity

Currently, a total of 2,280 kgal of DST capacity is reserved for emergency storage in the event of a DST failure and for return of off-specification waste feed from the WTP. The probability of a DST failure and a WTP emergency return occurring simultaneously is low. Little risk is incurred by revising the WTP feed staging strategy to reduce this emergency reserve requirement to 1,140 kgal. Capacity is made available in WTP feed source tanks as the waste is transferred to the WTP. If the emptied feed tank is not refilled until the WTP feed is accepted, the capacity is available for waste return should the feed be determined to be out-of-specification. A letter of guidance from the ORP would be required to implement this change.

Grout Vaults without Modification

Five underground vaults were constructed for the purpose of disposal of grouted low-level tank waste. One was filled with grouted waste. The remaining four are empty and do not have an identified mission. Each vault has a total capacity of 1600 kgal, with a practical operating capacity of 1400 kgal.

The regulatory strategy for the Grout program in the 1990s was to operate each vault as a surface impoundment and close as a landfill after the grout had solidified. Primary containment was provided by the asphalt liner and concrete vault. Secondary containment was provided by the lined catch basin with a leachate collection sump.

The U.S. Environmental Protection Agency (EPA) considers storage of hazardous wastes in a surface impoundment to be disposal. Therefore, only wastes meeting Land Disposal Restrictions (LDR) treatment standards may be stored in an impoundment (Elsevier 1999). The tank waste does not meet LDR for several reasons. Tank waste is classified as corrosive unless treated. In addition, the chromium concentration and the concentrations of several underlying hazardous constituents typically exceed the LDR criteria. Therefore, the vaults could not be operated as surface impoundments for routine tank waste storage.

The Grout vaults could be operated as tanks for emergency backup to tank storage. The concrete tank with sprayed asphalt liner (approximately 60 mils thick) could be considered a tank for emergency storage purposes. If the sprayed liner failed, the waste could migrate through the concrete vault, down the drainage net, and along the high-density polyethylene layer located between the concrete and the 1-m thick external asphalt barrier down to the lined, gravel-filled catch basin, which provides secondary containment.

A significant issue requiring resolution is whether the 1-meter thick asphalt barrier would be considered secondary containment. The asphalt barrier surrounding the catch basin and concrete vault was designed to prevent water vapor from migrating from the soil to the grout monolith. It is clear that the asphalt barrier would divert any liquid waste leaking from the vault into the lined catch basin. However, the asphalt barrier would not typically be considered secondary containment. Design aspects that might allow waste to escape the asphalt barrier require evaluation. If the existing design is approved through the permitting process, or if a waiver to design requirements is granted, then credit could be taken for the asphalt barrier as secondary containment.

If credit cannot be taken for the asphalt barrier, then only the gravel filled, high-density polyethylene-lined catch basin would provide secondary containment. The current structure could be considered double-contained with a capacity of approximately 50,000 gallons.

Grout Vaults with Modification

If additional containment were necessary, an inner tank or bladder could be constructed inside of the vault. In this case, the sprayed asphalt liner and concrete vault would constitute secondary containment. The sprayed asphalt liner is fragile, and it would be a challenge to protect it from the rigors of construction.

The vaults have a rectangular cross section with interior dimensions of 123.5 feet x 50.5 feet and a height of 34 feet. If a rectangular cross section is chosen for an inner tank, then a volume of approximately 1000 kgal is conceivable. Another concept suggested would be to arrange prefabricated steel tanks inside a vault. One example is a tank used in the petroleum industry, commonly referred to as a Baker® tank. These tanks are 21 kgal tanks with a rectangular cross section of 8 feet by approximately 37 feet. About 15 of these tanks could be placed in a single vault, for a total capacity of 315 kgal.

4.5.2 Background

The Grout vault sprayed asphalt liners were applied in 1991. The available vaults have been hydrotested. Further testing may be required to ensure that the liners still retain their integrity. Vaults 218-E16-104 and 218-E16-105 are the suggested choices. Vault 102 is more complex operationally, and the asphalt liner in vault 103 has been patched after the hydrotest (Wisness 1992).

From the 1950s through the late 1970s, several DCRTs were constructed. The purpose of these facilities was to support uranium and fission product recovery from SST waste. Later the DCRTs were used as part of the interim stabilization program for consolidation of SST liquid prior to pumping to DSTs. The 244-A, 244-BX, 244-CR, 244-S and 244-TX were all used for these purposes. The 244-U DCRT has never been activated.

4.5.3 Evaluation of Option

4.5.3.1 Additional Capacity (Gallons)

- Using two Grout vaults, as currently configured, for emergency reserve capacity could release 2280 kgal of reserved space within the DST system.
- Using two modified Grout vaults for emergency reserve capacity could release 2280 kgal of reserved space within the DST system.
- Use of DCRTs creates minimal emergency reserve capacity.

This option evaluation is based on utilization of two existing Grout vaults. Both as-is and modified approaches are presented. Modification consists of removal of the vault cover, installation of internal storage tank and necessary support systems and equipment. Start-up, testing, and turnover will be performed.

4.5.3.2 Cost

The cost estimate for the modified Grout vault option is presented in Table 4-15 and is based on the conceptual design report, HNF-1975, *Immobilized Low-Activity Waste Interim Storage Facility Project W-465* (Pickett 1998).

Table 4-15. Cost Estimate for Alternate Storage for Emergency Reserves Option - Grout Vaults with Modification

Activity Description	Cost ($K)
Obtain permitting and regulatory documentation	2000
Conduct Design	2800
Perform Construction	4800
Perform Start-Up and Testing	1000
OPTION TOTAL	**$ 10,600**

The cost estimate was based on the following assumptions:

- a bladder-style liner will be installed in both vaults;
- a RCRA Part A and Part B Permit, Notice of Construction, and Authorization Basis revision are required;
- design includes preliminary, conceptual, and detailed design activities;
- construction includes site work/excavation, vault entry, and installation of primary containment and auxiliaries;
- start-up and testing will consist of a Readiness Review, procedure writing, and training;
- approximately 2500 linear feet of hose-in-hose transfer lines will be used;
- no new transfer pumps are required;
- a new leachate sump pump is required;
- capital modifications will not be required;
- existing portable exhauster will be used;
- existing Infrastructure will be adequate; and
- no decontamination or decommissioning of existing facilities will be required.

The estimated spread of costs is as follows:

Year	Annual Total
1	$1,000K
2	$5,700K
3	$2,900K
4	$500K
5	$500K

This is a preliminary estimate and schedule of expenditures and is not of budget grade, but is for scoping purposes only.

The cost estimate for the unmodified Grout vault option is presented in Table 4-16 and is based on the modified Grout vault estimate.

Table 4-16. Cost Estimate for Alternate Storage for Emergency Reserves Option - Grout Vaults without Modification

Activity Description	Cost ($K)
Obtain permitting and regulatory documentation	1000
Conduct Design	1000
Perform Construction	2000
Perform Start-Up and Testing	1000
OPTION TOTAL	**$ 5,000**

The cost estimate for the unmodified or as-is Grout vaults was based on the following assumptions:

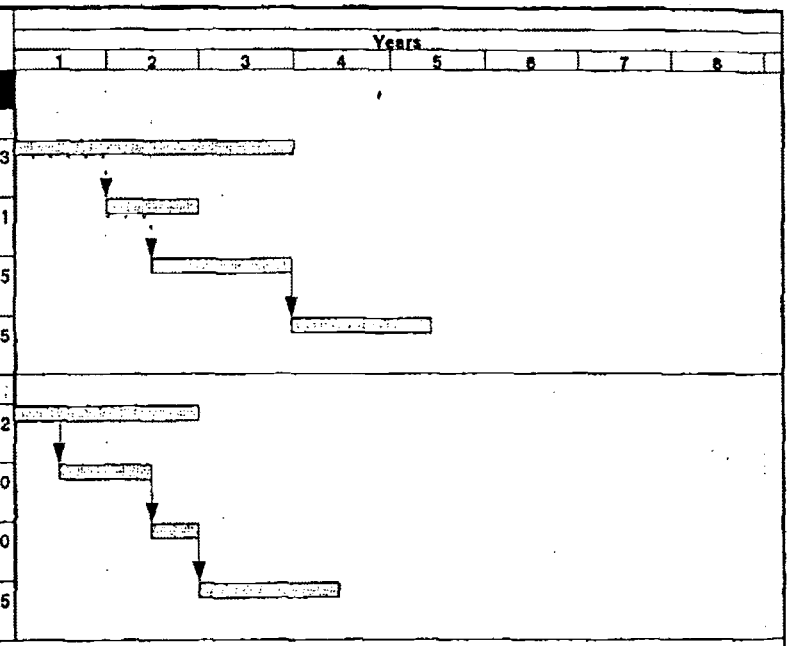
- cost estimate reductions are associated with the elimination of storage tank bladder and associated systems; and
- changes to the Authorization Basis make the cost higher than would be expected.

4.5.3.3 Schedule

The schedule for this option is presented in Figure 4-5.

Figure 4-5. Schedule for Alternate Storage for Emergency Reserves Option - Grout Vaults with Modification and without Modification

Activity ID	Activity Description	Orig Dur
OPTION 4.5		
USE MODIFIED GROUT VAULT WITH BLADDER		
P000100	OBTAIN PERMITTING & REGULATORY DOCUMENTATION	783
P000200	CONDUCT DESIGN OF BLADDER	261
P000300	PERFORM CONSTRUCTION	385
P000400	CONDUCT STARTUP & TESTING	385
USE 4 GROUT VAULTS AS IS		
P001500	OBTAIN PERMITTING & REGULATORY DOCUMENTATION	522
P001600	CONDUCT DESIGN OF GROUT VAULTS	260
P001700	PERFORM CONSTRUCTION	130
P001800	CONDUCT STARTUP & TESTING	385



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4.5.3.4 Feasibility Considerations

Additional considerations for the feasibility of alternate storage for emergency reserves are discussed below. Table 4-17 provides the summary assessment of these considerations.

Table 4-17. Feasibility Considerations for Utilize Alternate Storage for Emergency Reserves Option

Criteria	High Feasibility	Medium Feasibility	Low Feasibility
Technical Feasibility		X	
Environmental Risk	X		
Health and Safety Risk	X		
Maintainability and Operability		X	
Environmental Regulatory Impacts		X	
Authorization Basis Impacts			X

- **Technical Feasibility**

  Use of the Grout vaults in their current configuration does not pose a significant technical challenge. The principal long-lead activities would be environmental regulatory permitting and Authorization Basis amendment. The main pipelines exist, but several jumpers would need to be fabricated. In addition, emergency procedures would have to be developed.

  If tanks must be installed within the Grout vaults, then significant technical issues must be addressed. These include, but are not limited to the following:

  - excavation of the soil, 1-m thick asphalt barrier, concrete topping, and pre-stressed concrete cover panels,
  - construction of a new vault liner or protection of the integrity of the current 60-mil asphalt spray liner,
  - design, fabrication, and installation of a primary tank, and
  - replacement of cover panels and overburden.

  Dunford (1999) briefly discusses the bladder concept for SSTs. This approach would require technology development. Issues to be resolved include, but are not limited to the following:

  - fitting the bladder with a compliant leak detection system,
  - hydrostatic loads from approximately 25 feet of tank waste,
  - chemical compatibility with the waste at the storage temperature, and
  - radiation resistance of the bladder.

Dunford (1999) assumed that an off-the-shelf material with these characteristics likely does not exist, and that a research and development program would have to be funded to develop the bladder material.

- **Environmental Risk**

Presently, 2280 kgal of DST capacity is reserved in the event a DST fails or the WTP has an emergency. This reserve prevents removal of high-risk waste from SSTs that have leaked or have the significant potential to leak in the future, because there is insufficient DST capacity after retrieval of three SSTs. Designating the Grout vaults as emergency reserve capacity would provide the opportunity for retrieval of 2280 kgal of SST waste ahead of current plans. The designation of the Grout vaults for emergency reserve capacity should be for the time period after the initial "filling" of DSTs (approximately 2007) until the WTP operations free up DST space (approximately 2009 - 2011). Therefore, the Grout vaults would be backup emergency reserve for a period of only two to four years.

- **Health and Safety Risk**

Minimal additional health and safety risk to the workers or the public are expected by use of alternate storage for emergency reserves. If the modified Grout vault option is chosen, a worker confined space hazard must be addressed during modification activities.

- **Maintainability/Operability**

As the Grout vaults are not currently in use, operating the vaults as an emergency backup waste storage facility would result in increased maintenance and operations expense for the period used. If the Grout vaults must be used for waste storage, then the vaults would incur closure costs. If the need for emergency waste storage did not occur in the critical 2 to 4 year time period, there would be no incremental closure costs for the vaults.

- **Environmental Regulatory Impacts**

A significant activity required for the use of alternate storage for emergency reserves is the environmental regulatory permitting.

- **Authorization Basis Impacts**

The Grout vaults are currently inactive facilities. Utilizing the Grout vaults for waste storage would require a review of the safety analysis for the vaults, WHC-SD-WM-SSP-005, *Grout Facilities Standby Plan* (WHC 1994), and a revision to the Authorization Basis (CHG 2000a; CHG 2000b) to return the facilities to operational status. This would include facility design and operations descriptions of the alternate storage facilities and associated hazard and accident analyses.

4.6 CONCENTRATE WASTE

4.6.1 Description

A concentration limit is established for DSTs to prevent the accumulation and release of flammable gas. The current operating practice is to operate the 242-A Evaporator with a margin below the approved concentration limit to ensure that the limit is not exceeded. If the limit were raised, further concentration of the waste is possible. There are two phases to this option. The first concentrates the waste to the current limit; the second establishes a new limit and concentrates the waste to that limit.

4.6.2 Background

The 242-A Evaporator is used to reduce waste volume by removing water from tank waste up to a concentration limit. Concentration of the waste is currently limited to a density of less than 1.41 g/mL (Fowler 2000). This limit is based on the observation that the tanks with a density greater than 1.41 g/mL exhibited gas release events (Reynolds 1994, Estey and Guthrie 1996). Tanks SY-101, SY-103, AN-103, AN-104, AN-105, and AW-101 exceed a density of 1.41 g/mL and exhibited this behavior. These tanks were placed on the Flammable Gas Watch List. Tanks that are not the Flammable Gas Watch List all have densities less than 1.41 g/mL.

While all tanks on the Flammable Gas Watch List generate and retain gas, only tank SY-101 released the gas in volumes large enough for the headspace to reach flammable limits. It may be possible to concentrate the waste beyond the 1.41 g/mL density limit, but to a concentration less than tank SY-101. This option examines concentrating the waste to three different end points above the 1.41 g/mL limit thereby providing a range of additional capacity gained by further waste concentration.

Recently, another criterion has been suggested based on physical mechanisms required to accumulate and release gas from the waste. Scientists have identified four conditions that exacerbate gas retention and increase the probability of a large buoyant displacement gas release event (Meyer and Stewart 2000):

- a layer of supernatant liquid more than one to two meters deep,
- a layer of settled solids more than one to two meters thick,
- a small density difference between liquid and settled solid layers, and
- a high gas generation rate.

Although the relationship between these conditions and gas release events has been evaluated, raising the waste concentration limit would result in an increase in the risk of large buoyant displacement gas release events. A technical basis for a new concentration limit would be required.

4.6.3 Evaluation of Option

4.6.3.1 Additional Capacity (Gallons)

Increasing waste densities to the current 1.41 g/mL limit would result in an increase in tank availability of 2200 kgal. Further concentration could produce an additional 1700 kgal. Additional evaporator campaigns with accompanying transfers would be required. All operations are technically feasible. Increasing waste density to 1.41 g/mL would not require a change to safety documentation. Revisions to the Authorization Basis (CHG 2000a, CHG 2000b) are required above this level.

Table 4-18 shows those tanks that have the potential for increased capacity resulting from concentration of waste. The following tanks were eliminated from consideration:

- the 200 West Area DSTs (SY-Farm) because of the distance to the 242-A Evaporator,
- aging waste tanks discussed in Section 4.4,
- complexant tanks AN-102 and AN-107 because the waste density is near the 1.41 g/mL limit and in the past, complexants have effected the transfer properties of concentrated waste,
- Flammable Gas Watch List tanks due to existing concentrations,
- tanks containing less than 100 kgal of liquid, because these tanks are planned for additional waste storage with subsequent concentration, and
- tanks previously identified for concentration in Strode and Boyles (2000).

The current liquid volume is taken from *Waste Tank Summary Report for Month Ending December 31, 2000* (Hanlon 2001). However, Table 4-18 accounts for the recent AP-107 to AW-102 transfer.

Table 4-18. Summary of Liquid Volume Based on Further Concentration

Tank	Average Density (g/mL)	Volume (kgal)	Volume at 1.41 g/mL (kgal)	Volume at 10 M Na (kgal)	Volume at 12.5 M Na (kgal)	Volume at 15 M Na (kgal)
241-AP-101	1.31	1114	842	716	573	477
241-AP-102	1.20	1089	531	452	361	301
241-AP-103	1.08	282	55	47	37	31
241-AP-104	1.30	1109	811	690	552	460
241-AP-105	1.31	1068	808	686	549	458
241-AW-103	1.06	146	21	18	15	12
241-AW-105	1.03	172	13	11	9	7
241-AY-102	1.13	395	125	106	85	71

Concentration of the existing waste identified in Table 4-18 to the current 1.41 g/mL density limit gains 2200 kgal of waste storage volume. Further concentration would create more storage capacity but would also create potential operational concerns. Two cases are evaluated. One case is concentration to 12.5 gram-moles per liter (M) sodium, which approximates double-shell slurry feed, the waste type in some of the current Flammable Gas Watch List tanks. The second case is concentration to 15 M sodium, which approximates double-shell slurry, the waste type that was stored in tank SY-101. The maximum amount that could be saved through the creation of double-shell slurry waste could be as high as 3500 kgal.

Concentration of waste to the 1.41 g/mL density limit will be performed by the 242-A Evaporator. A total of approximately 6000 kgal will be processed over a six-year period. This would add one evaporator campaign per year to the current planning base. Two evaporator campaigns per year are scheduled through 2003. An evaporator outage is planned for all of 2004.

4.6.3.2 Cost

The cost estimate for concentration of waste to the 1.41 g/mL density limit is presented in Table 4-19.

Table 4-19. Cost Estimate for Concentrate Waste Option

Activity Description	Cost ($K)
Sample and Analyze Tanks	4000
Perform Compatibility Assessments	280
Revise Procedures	150
Perform Transfers to AW-102	1040
Perform Evaporator Campaigns above existing baseline	2500
Perform Transfers from AW-106 to DSTs	780
OPTION TOTAL	**$ 8,750**

The cost estimate is based on the following assumptions:

- waste is concentrated to a density of 1.41 g/mL,
- current evaporator operating costs are prorated by processed waste volume,
- waste from eight tanks will be processed in six evaporator campaigns,
- eight grab samples are collected and analyzed per evaporator waste acceptance criteria at $500K each,
- fourteen compatibility assessments are performed at $20K each, and
- eight transfers to the evaporator feed tank and six transfers from evaporator receiver tank are performed at $130K each.

A preliminary schedule of expenditures for each additional evaporator campaign follows:

- perform all activities for single feed tank campaign in less than one year each, $1,245K, and
- perform all activities for two feed tanks per campaign in less than one year each, $1,885K.

The following potential costs are excluded from the estimate:

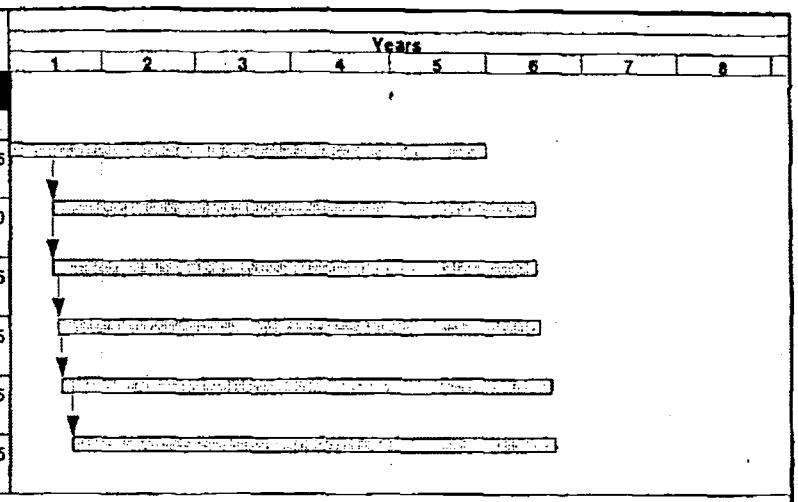
- feasibility studies and safety analyses for concentrating waste above 1.41 g/mL,
- processing waste to densities above 1.41 g/mL,
- modifications to Tank Farm facilities for safe storage of waste processed to density grater than 1.41 g/mL, and
- evaporator upgrades and maintenance.

4.6.3.3 Schedule

The schedule for this option is presented in Figure 4-6 and is based on one additional evaporator campaign per year. The review and complete implementation of this option would take approximately six years. Some additional capacity would be realized on an annual basis. The schedule could be compressed to three years by running two additional campaigns per year instead of one.

Figure 4-6. Schedule for Concentrate Waste Option

Activity ID	Activity Description	Orig Dur
OPTION 4.6		
O100100	SAMPLE & ANALYZE TANKS	1,305
O100200	PERFORM COMPATABILITY ASSESSMENTS	1,320
O100300	REVISE PROCEDURES	1,325
O100400	PERFORM TRANSFERS TO AW-102	1,315
O100500	PERFORM EVAPORATOR CAMPAIGNS	1,335
O100600	PERFORM TRANSEFRS FROM AW-106 TO DST'S	1,315



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4.6.3.4 Feasibility Considerations

Additional considerations for the feasibility of concentration of the waste in DSTs are discussed below. Table 4-20 provides the summary assessment of these considerations based on concentrating waste up to the 1.41 g/mL density limit.

Table 4-20. Feasibility Considerations for Concentrate Waste Option

Criteria	High Feasibility	Medium Feasibility	Low Feasibility
Technical Feasibility	X		
Environmental Risk	X		
Health and Safety Risk	X		
Maintainability and Operability	X		
Environmental Regulatory Impacts	X		
Authorization Basis Impacts	X		

- **Technical Feasibility**

  Minimal technical feasibility issues are identified for the concentration of DST waste to a density of 1.41 g/mL. The activities that are necessary to concentrate the waste are standard operations at the Hanford Site and no new technology would be required. The waste chemistry and potential for significant solids precipitation would be evaluated prior to concentration of waste to the 1.41 g/mL density limit. However, concentrating waste beyond a density of 1.41 g/mL is not currently allowed in the tank farm Authorization Basis (CHG 2000a, CHG 2000b) and DST facility modifications for the safe storage of wastes concentrated to a higher density are probable. The 242-A Evaporator Authorization Basis (Campbell 1998) would need to be evaluated for constraints on additional waste concentration. A cost benefit analysis is needed to determine if concentration beyond a 1.41 g/mL density should be pursued.

- **Environmental Risk**

  No incremental environmental risk is incurred by concentration of DST waste.

- **Health and Safety Risk**

  Concentration of waste to 1.41 g/mL has been fully evaluated and does not pose additional worker and safety risks. Concentration of tank waste to a density greater than 1.41 g/mL increases the potential that the waste will generate and retain flammable gas (Reynolds 1994, Estey and Guthrie 1996). This presents a safety concern that requires technical evaluation.

- **Maintainability/Operability**

  No maintainability or operability issues are expected by concentration of DST waste. Concentration of tank waste to a density greater than 1.41 g/mL is likely to require DST facility modifications for the safe storage of wastes, thereby increasing operations activities and maintenance.

- **Environmental Regulatory Impacts**

  No environmental regulatory issues are incurred by concentration of DST waste.

- **Authorization Basis Impacts**

  The tank farm Authorization Basis (CHG 2000a, CHG 2000b) currently allows concentration up to 1.41 g/mL. No amendment would be required for concentration up to this limit. An amendment would be required for concentration in excess of this limit. The 242-A Evaporator Authorization Basis (Campbell 1998) would need to be evaluated for constraints on additional waste concentration beyond 1.41 g/mL.

4.7 UTILIZE DOUBLE-CONTAINED SURFACE STORAGE

4.7.1 Description

Alternatives to the construction of new DSTs have been proposed as potential methods for increasing waste storage capacity. Two alternatives for double-contained surface storage evaluated in this option are as follows:

- use a compliant bladder in a lined basin similar to Liquid Effluent Retention Facility for interim storage, and
- expand capacity of planned Waste Receiving Facilities.

4.7.2 Background

This option presents two alternatives to traditional buried underground storage tanks for increasing waste storage capacity. Potentially cost-effective alternatives to construction of new DSTs are presented here.

Option 4.7A - Compliant Bladder in a Lined Basin

This alternative would store tank waste in a regulatory compliant bladder within a lined open-air basin with leak detection. A bladder would be installed inside a Liquid Effluent Retention Facility style basin and would be the primary containment. The secondary containment would be the lined basin. This system would require a feed with low radioactive content to minimize shielding requirements and radiation damage to the bladder. To reduce radioactive content, the SST waste would have to be treated at a Waste Receiving Facility that has been modified to separate cesium from the waste. The feed could not contain solids because retrieving solids from a bladder is not typically performed. The cost estimate for this alternative includes upgrades to the planned Waste Receiving Facilities to separate cesium and solids from tank waste.

Option 4.7B - Waste Receiving Facilities

Three Waste Receiving Facilities will be constructed to support retrieval of SSTs (Garfield et al. 2000). Waste Receiving Facilities, which are similar in function to the existing DCRTs, are planned to be operational near B-Farm, T-Farm, and U-Farm in 2014. These facilities with a planned total capacity of 2500 kgal could be used to store tank waste. Expanding the capacity of the Waste Receiving Facilities tanks is feasible at this time since their design has not been started.

Presently, the design concept is to have two to six small 150-kgal tanks constructed in a concrete vault. There are three such facilities planned, for a total of 14 small tanks. The mission of the

tanks is staging retrieved SST waste prior to sending the waste to DSTs. There are a number of options for expanding the Waste Receiving Facilities capacity including increasing the size of the planned tanks from 150 kgal to 300 kgal or adding additional 150-kgal tanks. However, these facilities are not scheduled to be available in the 2007 - 2011 time period. Implementation of this option would also require acceleration of the project schedule.

4.7.3 Evaluation of Option

4.7.3.1 Capacity

Option 4.7A - Compliant Bladder in a Lined Basin

Each Liquid Effluent Retention Facility-style basin with a compliant bladder would add 1000 kgal of waste capacity beyond that available in the DST system.

Option 4.7B - Waste Receiving Facilities

If the Waste Receiving Facilities design was expanded by two additional tanks for each of the three Waste Receiving Facilities, 900 kgal of waste storage capacity would be created beyond that available in the DST system (150 kgal x 2 x 3 = 900 kgal).

4.7.3.2 Cost

Option 4.7A - Compliant Bladder in a Lined Basin

Installation of a double-containment surface storage basin and modification to an associated Waste Receiving Facility were costed. A double-containment surface storage basin will be designed, constructed, tested, and turned over to tank farm operations for beneficial use. The double-containment surface storage will consist of a bladder-type tank located inside a lined earthen basin. The configuration of the basin is similar to the basin that forms part of the existing Liquid Effluent Retention Facility located in the 200 East Area. The storage capacity and size of the bladder tank will be 1 million gallons. In order to utilize a bladder-type tank within an earthen basin for waste storage, cesium and solids must be removed from the waste. The modifications to the Waste Retrieving Facilities will consist of expanding the size of the vault to enable the installation of two new process lines that will remove the cesium and solids. The new process equipment will need to be shielded because of high radiation levels and operated remotely. The cost for these relatively complex equipment are not included in the following cost estimate.

The cost estimate for this option is presented in Table 4-21 and is based on process system cost based on interviews with subject matter experts.

Table 4-21. Cost Estimate for Option 4.7A - Compliant Bladder in a Lined Basin

Activity Description	Cost ($K)
Obtain Permitting and Regulatory Approval	1000
Prepare Bladder/Basin Design	800
Perform Bladder/Basin Procurement and Construction	2000
Perform Design, Procurement, Installation, and Testing of Waste Receiving Facilities Modifications *	4000
Conduct Start-Up and Testing	1000
OPTION TOTAL	**$ 8,800**

*The costs for this activity reflect a delta or "additional" cost for only the expanded scope. The expanded scope includes specifying two new separation process systems and modifying the facility to accept and operate these systems. The costs for the cesium and liquids removal process equipment are not included in the cost estimate.

The baseline cost of $127,400K for a six-tank Waste Receiving Facility would need to be accelerated by three to seven years to support this option. The Waste Receiving Facility would need to be completed between 2007 and 2011 to alleviate tank space shortage in that time period.

The cost estimate is based on the following assumptions:

- a single Bladder/Basin will be located adjacent to a Waste Receiving Facility;
- the location of the single Bladder/Basin/Waste Receiving Facility will be sufficient service for all tank farms;
- the scope of this option will become part of the original design requirements document for the Waste Receiving Facility and will result in minimal cost increase to the project.; and
- the project is of medium complexity based on using standard technologies for the Bladder/Basin, ion exchange, and filtration systems in a radioactive/hazardous environment.

Option 4.7B - Waste Receiving Facilities

The modifications to the Waste Receiving Facilities will consist of expanding the size of the building to enable the installation of additional storage capacity. Two additional 150-kgal storage tanks will be added to each of three Waste Receiving Facilities. The net result will be an additional 900 kgal of storage.

The cost estimate for this option is presented in Table 4-22.

Table 4-22. Cost Estimate for Option 4.7B - Waste Receiving Facilities

Activity Description	Cost ($K)
Obtain Permitting and Regulatory Approval	1000
Prepare Waste Receiving Facilities design	500
Perform Waste Receiving Facilities Procurement and Construction*	4000
Conduct Start-Up and Testing	250
OPTION TOTAL	**$ 5,750**

*The costs for this activity reflect a delta or "additional" cost for only the expanded scope. The expanded scope for each Waste Receiving Facility includes specifying two new 150 kgal storage tanks and modifying the facility to accept and operate these tanks.

The River Protection Project baseline presently include $313,000K to design and construct three Waste Receiving Facilities starting in 2008 with completion in 2014. To implement Option 4.7B, budget to construct the three facilities would need to be accelerated three to seven years to make them available between 2007 and 2011.

The cost estimate is based on the following assumptions:

- the scope of this option will become part of the original design requirements document for the Waste Receiving Facilities that will result in a minimal cost increase to the project;
- the original Waste Receiving Facilities requirements, other than volume, are sufficient for this option;
- the project is of medium complexity based on using standard technologies for the storage tank in a radioactive/hazardous environment; and

A preliminary schedule of expenditures is as follows:

Year	Annual Total
1	$250K
2	$375K
3	$1,625K
4	$1,625K
5	$1,775K
6	$100K

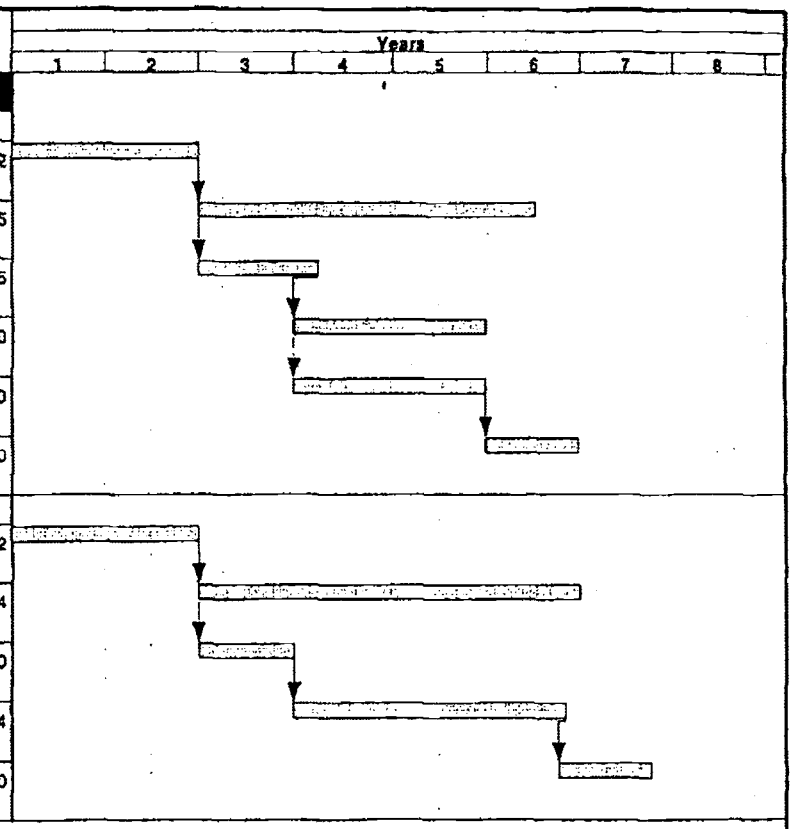
This preliminary schedule of expenditures is not budget grade, but is for scoping purposes only.

4.7.3.3 Schedule

The schedule for this option is presented in Figure 4-7.

Figure 4-7. Schedule for Utilize Double-Contained Surface Storage Options

Activity ID	Activity Description	Orig Dur
OPTION 4.7A & 4.7B		
USE LERF FOR INTERIM STORAGE		
P100100	AQUIRE FUNDING	522
P100200	OBTAIN PERMITTING & REGULATORY APPROVAL	915
P100300	PREPARE BLADDER/BASIN DESIGN	325
P100400	PERFORM BLADDER/BASIN PROCUREMENT & CONSTRUCTION	520
P100500	DESIGN, PROCURE, INSTALL & TEST WRF MODIFICATION	520
P100600	CONDUCT STARTUP & TESTING	260
EXPAND CAPACITY OF WASTE RECEIVING FACILITIES		
P100700	AQUIRE FUNDING	522
P100800	OBTAIN PERMITTING & REGULATORY APPROVAL	1,044
P100900	PREPARE WASTE RECEIVING FACILITIES DESIGN	260
P101000	PERFORM WRF PROCUREMENT & CONSTRUCTION	744
P101100	CONDUCT STARTUP & TESTING	260



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4.7.3.4 Feasibility Considerations

Additional considerations for the feasibility of utilization of double-contained surface storage are discussed below. Tables 4-23 and 4-24 provide summary assessments for the use of a compliant bladder in a lined basin and Waste Retrieving Facilities.

Table 4-23. Feasibility Considerations for Option 4.7A - Compliant Bladder in a Lined Basin

Criteria	High Feasibility	Medium Feasibility	Low Feasibility
Technical Feasibility			X
Environmental Risk		X	
Health and Safety Risk		X	
Maintainability and Operability			X
Environmental Regulatory Impacts		X	
Authorization Basis Impacts		X	

Table 4-24. Feasibility Considerations for Option 4.7B - Waste Receiving Facilities

Criteria	High Feasibility	Medium Feasibility	Low Feasibility
Technical Feasibility		X	
Environmental Risk	X		
Health and Safety Risk	X		
Maintainability and Operability	X		
Environmental Regulatory Impacts	X		
Authorization Basis Impacts	X		

- **Technical Feasibility**

  For Option 4.7A to be viable, it will be necessary to combine a compliant bladder in a lined basin with another concept to remove cesium and solids from the tank waste. Two new processes to remove cesium and solids will need significant shielding and also be operated remotely. While these operations have been performed previously at the Hanford Site and elsewhere, they are relatively complex and are expensive compared to tank waste storage. The combined impact of two new systems decreases the technical feasibility of this option. The bladder material may also require development to meet the waste storage needs, which may require several years of development to meet waste storage needs.

  Option 4.7B is technically feasible because the Waste Receiving Facilities are planned for future use during SST retrieval but have not yet been designed or built. The designs are based on DCRTs and do not require new technologies. The design concepts are based on DCRTs and do not require new technology.

- **Environmental Risk**

  There will be some inherent increase in environmental risk due to the open-air nature of the secondary containment on Option 4.7A, even with the cesium-137 removed from the waste. Even though the cesium-137 would have been removed, the transuranic and strontium-90 contents of the exposed waste would contribute significant risks due to dispersal of the waste.

  There are no new environmental risks introduced by expanding the size of the planned facilities in Option 4.7B.

- **Health and Safety Risk**

  Storing tank wastes at a Liquid Effluent Retention Facility style basin with a compliant bladder should not pose any additional concerns for worker safety and health. However, only low dose, low solids content supernatant that has been treated at the Waste Receiving Facilities to remove cesium-137 could be stored. The operation of the cesium-137 removal system could add new health and safety risks due to the expected dose of the initially retrieved wastes.

  Expanding tank waste storage at Waste Receiving Facilities will not pose any additional concerns for worker safety and health.

- **Maintenance and Operability**

  A Liquid Effluent Retention Facility style basin with compliant bladder option will be more difficult to maintain and operate than the Liquid Effluent Retention Facility. There would be additional equipment required to transfer the waste back to DSTs. Decontamination and decommissioning of the bladder will be difficult. Adding cesium removal to the Waste Receiving Facilities to support Option 4.7A will increase operational complexity.

  Option 4.7B should be no more difficult to operate than the current plans for operating the Waste Receiving Facilities and should be very similar to present DCRT operations.

- **Environmental Regulatory Impacts**

  Storing tank wastes at a Liquid Effluent Retention Facility style basin with a compliant bladder would be covered by a new permit due to the required initial treatment of the waste.

  Storing tank wastes at Waste Receiving Facilities would require minor modification to the existing tank storage permit or perhaps a new permit. However, there would be no increase in the permitting effort to achieve the increased storage capacity.

- **Authorization Basis Impacts**

  Authorization Basis amendments will be needed to implement Option 4.7A, because of the relatively complex cesium and solids removal processes and bladder storage.

  Authorization Basis amendments would also be required for Option 4.7B. However, there would be no new functions beyond present DCRT operations, and therefore, the amendments may be accomplished as part of the annual update.

4.8 CONSTRUCT NEW DOUBLE-SHELL TANKS

4.8.1 Description

This option would create additional waste storage capacity by construction of DSTs similar to the existing design. These new tanks will meet state and federal regulations and will have a 50-year design life. Each additional DST would increase available capacity by 1200 kgal.

4.8.2 Background

This option is consistent with current program strategy of moving SST wastes to compliant DST storage. The tanks will be designed using lessons learned from the Waste Tank Safety Program, the Multi-Function Waste Tank Facility design (WHC 1995), and the AQ and AT Tank Farm designs. Additional waste storage capacity could be available for use in the 2007 - 2011 time frame. The funding process is expected to take approximately two years; design and construction are expected to take five years. It is expected that savings would be obtained if a tank farm were built instead of individual tanks. The costs were based on a design that contained four tanks.

4.8.3 Evaluation of Option

4.8.3.1 Additional Capacity (Gallons)

Construction of each new DST will create 1200 kgal of additional capacity using an existing design.

4.8.3.2 Cost

The cost estimate for this option is presented in Table 4-25.

Table 4-25. Cost Estimate for Construct New Double-Shell Tanks Option (Based on Each One of at Least Four Tanks)

Activity Description	Cost ($K)
Obtain Permitting and Regulatory Approval	1000
Design	7000
Procurement and Construction	66000
Start-Up and Testing	1000
OPTION TOTAL	**$ 75,000**

The cost estimate is based on the following assumptions:

- adjustments were made to the $360M Advanced Conceptual Design cost estimate of Project W-236A, "Multi-Function Waste Tank Facility," a four-tank facility (WHC 1995);
- the Project W-236A estimate is used as a basis without detailed evaluation;
- an escalation factor of 3% per year was used to calculate past cost to present cost;
- weather enclosure for the tank farm was deleted from the Project W-236A estimate;
- mixer pumps are not used and were deleted from the Project W-236A estimate;
- tanks are constructed of carbon steel instead of 304L stainless steel;
- modification of the Environmental Impact Statement is required; and
- a tank farm containing four tanks, the same as Project W-236A was used as the basis for the cost of one tank. Additions of less than four tanks are likely to cost more per unit of volume.

An annual estimate of expenditures per tank in groups of four is as follows:

Year	Annual Total
1	$250K
2	$250K
3	$6,100K
4	$18,100K
5	$17,100K
6	$16,100K
7	$17,100K

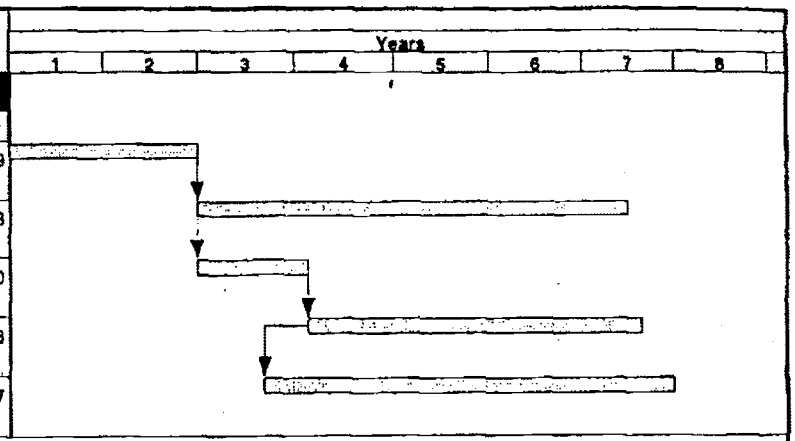
This preliminary schedule of expenditures is not budget grade, but is for scoping purposes only.

4.8.3.3 Schedule

The schedule for this option is presented in Figure 4-8.

Figure 4-8. Schedule for Construct New Double-Shell Tanks Option

Activity ID	Activity Description	Orig Dur
OPTION 4.8		
P200100	ACQUIRE FUNDING	519
P200200	OBTAIN PERMITTING & REGULATORY APPROVAL	1,173
P200300	DESIGN	300
P200400	PROCUREMENT & CONSTRUCTION	918
P200500	STARTUP & TESTING	1,127



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4.8.3.4 *Feasibility Considerations*

Additional considerations for the feasibility of constructing new DSTs are discussed below. Table 4-26 provides the summary assessment of these considerations.

Table 4-26. Feasibility Considerations for Construct New Double-Shell Tanks Option

Criteria	High Feasibility	Medium Feasibility	Low Feasibility
Technical Feasibility	X		
Environmental Risk	X		
Health and Safety Risk		X	
Maintainability and Operability		X	
Environmental Regulatory Impacts			X
Authorization Basis Impacts		X	

- **Technical Feasibility**

  Construction of new DSTs is technically feasible based upon previous engineering, construction, and operations experience. Detailed analysis of previous conceptual design estimates for DST construction is warranted and has the potential to reduce the cost per gallon derived from cost estimates for the Multi-Function Waste Tank Facility. For example, the River Protection Project plans to build 1500 kgal of low-activity waste feed storage capacity at the WTP for $43M.

- **Environmental Risk**

  New DSTs would be constructed per the requirements of Washington Administrative Code 173-303-640 (4)(c)(iii) that double walled tanks be designed as an integral structure (i.e., an inner tank completely enveloped within an outer shell) and be provided with a built-in continuous leak detection system. Operation of new DSTs would incur minimal incremental environmental risk; however, additional DSTs will result in an increase in closure costs for the Hanford Site.

- **Health and Safety Risk**

  The construction of new DSTs is a major construction activity that presents industrial safety hazards commensurate with other projects of this magnitude. No additional health risk to the public is expected from construction of new DSTs.

- **Maintainability/Operability**

  Additional maintenance or operational expense is incurred for the routine operation of additional DSTs. The maintenance and operational activities are similar current activities, although the newer DSTs are likely to be subject to fewer equipment failures.

- **Environmental Regulatory Impacts**

  Construction of new DSTs would require a change to the RCRA Part B permit to incorporate the new facilities. In addition, supplemental *National Environmental Policy Act* (NEPA) documentation would be needed. Significant public comment would be expected.

- **Authorization Basis Impacts**

  Construction of new DSTs would require an amendment to the tank farm Authorization Basis (CHG 2000a, CHG 2000b) to incorporate the new facilities. However, this would not involve new processes.

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5.0 OPTIONS EVALUATED LESS LIKELY TO ALLEVIATE 2007 - 2011 TANK SPACE SHORTAGE

In addition to the eight options considered likely to increase waste storage capacity during 2007 - 2011, several options were identified for evaluation that have the potential of increasing storage capacity in the longer term. Although these options require longer to develop and implement, successful deployment would reduce the need for additional DSTs. Given the implementation time and the greater uncertainties associated with these options, cost estimates and schedules were not developed.

The long-term options are categorized as follows:

- options that save or add to existing waste storage capacity,
- options for enhanced treatment alternatives at the WTP,
- options to store and/or treat waste outside the present system, or
- options that were evaluated and determined to be nonviable.

5.1 LONG TERM OPTIONS THAT SAVE OR ADD TO EXISTING WASTE STORAGE CAPACITY

These options increase existing waste storage capacity by utilizing alternate operating strategies to retrieve SST waste. The following alternatives are presented in this section:

- reduce or eliminate water added to retrieve SSTs, and
- retrieve and transport SST waste as solids.

5.1.1 Reduce or Eliminate water added to retrieve SSTs

Description

The planning basis for SST waste retrieval assumes that facility process water is used to mobilize solids to enable pumping of the waste. This option evaluates four SST retrieval approaches that reduce or eliminate water addition.

Background

Liquid in SSTs is being removed as part of the interim stabilization program to reduce the risk of leaks to the environment. The waste is diluted prior to transport to DSTs to prevent pipeline plugging. This waste is then pumped to the DST system, consuming extra DST capacity until it is evaporated. It would be possible to conserve DST space by modifying interim stabilization operations to segregate SST liquid in a DST that is planned for storage of SST retrieval waste. Interim stabilization will be completed in 2004, but the liquid could be used as an alternate retrieval fluid to reduce water addition. This will indirectly increase DST waste storage capacity available for SST retrieval.

Evaluation

Past-practice sluicing was used to retrieve SST C-106 waste to DST AY-102. This method used a liquid stream to mobilize solids in C-106 for transport to AY-102. The retrieval system recycled supernatant liquid from AY-102 to provide the carrier fluid for this operation. Future SST retrieval could use interim stabilization liquid as a carrier fluid for SST retrieval, thus reducing the amount of process water added for retrieval. This would reduce the final waste volume requiring DST storage. However, past-practice sluicing is not presently planned for any future SST retrieval.

A second approach is remote vehicular-deployed confined sluicing. This process is similar to past-practice sluicing in that a water stream is used to mobilize and transport solids from an SST to a DST receiver tank. However, the confined sluicer removes the water immediately after it is added. This method is more attractive than past-practice sluicing because much less water is added to the SST, reducing the potential for leaks. The mobilization liquid and the transfer dilution liquid could both use interim stabilization liquid, thereby reducing the volume of process water required to retrieve the SST waste. This method, utilizing process water, is being demonstrated in tank C-104 in response to HFFACO M-45-03I (Ecology et al. 1997). Development of a system using interim stabilization waste as the carrier fluid is required.

A third approach is fluidic mixing, a technology that mixes and pumps solids with no moving parts. For this retrieval method, a small amount of water is injected into the SST and vacuumed into a reservoir. The reservoir is then pressurized and the water jetted back into the tank. The process is repeated until sufficient mixing has occurred. The mixture is then pumped to a DST. This technology has been used successfully at the Oak Ridge National Laboratory to retrieve waste from an underground tank. This method is being evaluated for retrieval of tank S-102 waste in response to HFFACO M-45-05A (Ecology et al. 1997). The carrier fluid used to mobilize sludge could be interim stabilization liquid, thereby reducing the total retrieved waste volume. Development of a system using interim stabilization waste as the carrier fluid is required.

Background

Liquid in SSTs is being removed as part of the interim stabilization program to reduce the risk of leaks to the environment. The waste is diluted prior to transport to DSTs to prevent pipeline plugging. This waste is then pumped to the DST system, consuming extra DST capacity until it is evaporated. It would be possible to conserve DST space by modifying interim stabilization operations to segregate SST liquid in a DST that is planned for storage of SST retrieval waste. Interim stabilization will be completed in 2004, but the liquid could be used as an alternate retrieval fluid to reduce water addition. This will indirectly increase DST waste storage capacity available for SST retrieval.

Evaluation

Past-practice sluicing was used to retrieve SST C-106 waste to DST AY-102. This method used a liquid stream to mobilize solids in C-106 for transport to AY-102. The retrieval system recycled supernatant liquid from AY-102 to provide the carrier fluid for this operation. Future SST retrieval could use interim stabilization liquid as a carrier fluid for SST retrieval, thus reducing the amount of process water added for retrieval. This would reduce the final waste volume requiring DST storage. However, past-practice sluicing is not presently planned for any future SST retrieval.

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Saltcake dissolution is being developed for retrieval of tank S-112 in response to HFFACO M-45-03C (Ecology et al. 1997). In saltcake dissolution, water is sprayed over the surface of the waste to dissolve the salts. The waste is then pumped to a DST. The use of interim stabilization liquid for dissolution of saltcake is not feasible because the interim stabilization liquid is already saturated at ambient temperatures.

Water additions would eventually be evaporated; therefore, the evaluation will need to weigh the time and cost of additional evaporator runs versus the cost and increased operational complexity of using dilute waste to support retrieval.

5.1.2 Dry Retrieval and Transport of Solids

Description

The planning basis for SST waste retrieval assumes that facility process water is used to mobilize solids to enable pumping of the waste. This option evaluates the use of dry methods to retrieve and transport SST waste.

Background

The use of dry methods to retrieve and transport SST waste has been under consideration since 1969 (Krieg 1990). Early concepts adapted commercial earth moving equipment. For example, clamshells, backhoes, and jack hammers were to be operated through an opening in the top of the tank to remove the waste for transport in a dry conveyance system. In 1980, these efforts culminated in the design of a dry retrieval system that consisted of a large bridge structure that straddled the SST. Earth moving equipment was manipulated in the tank by a massive arm. The waste was to be placed in barrels for transport to a storage or treatment facility. The concept was never pursued based on cost and limited retrieval efficiency.

In 1992, the Retrieval Technical Working Group was formed to bring together a diverse body of technical experts to formulate a strategy for retrieval of SST and DST wastes. Wet and dry retrieval and transport methods were evaluated and none were recommended (DOE-RL 1992).

In 1995, the Acquire Commercial Technology for Retrieval (ACTR) program solicited private industry for proposals for retrieval systems for Hanford Site waste. The Hanford Tanks Initiative (HTI) project completed four demonstrations of proposed wet and dry retrieval systems from the ACTR program. No dry solid retrieval or transport technologies were considered viable.

Evaluation

Dry solids retrieval and transport approaches have developed and tested in previous retrieval program initiatives. None of the deployments were viable.

5.2 LONG TERM OPTIONS FOR ENHANCED TREATMENT ALTERNATIVES AT THE WASTE TREATMENT PLANT

These options increase available waste storage capacity by utilizing enhanced treatment strategies at the Waste Treatment Plant by optimizing the waste treatment sequence. The following options are presented in this section:

- pre-concentrate prior to transfer to the WTP,
- blend DST feed, and
- blend retrieved SST waste with WTP feed.

5.2.1 Pre-Concentrate Feed Prior Transfer to the Waste Treatment Plant

Description

This alternative considers pre-concentration of the WTP feed prior to transfer of the waste in order to increase existing DST capacity.

Background

Pre-concentration of the waste to the current limit of 1.41 g/mL prior to transfer to the WTP would remove water contained in the waste and reduce the total waste volume. This option is similar to the concentration of waste option presented in Section 4.6. However this idea was focused on the ability to transfer more concentrated waste to the WTP. The purpose was to increase storage space in the WTP low-activity feed tanks. Pre-concentration would effectively increase the receiving available space above that in the current planning baseline. Waste would be diluted at the WTP for processing.

Evaluation

This option is a restatement of the *Concentrate Waste Option* presented in Section 4.6 presented from the WTP operations perspective rather than the Tank Farms operations perspective. See Section 4.6 for the evaluation. Slurry transport issues have not been resolved. Transfer of concentrated WTP feed increases the time between feed deliveries.

5.2.2 Blend Double-Shell Tank Feed to the Waste Treatment Plant

Description

This alternative considers blending of WTP feed source tanks to improve WTP processing rates thereby making additional capacity available for SST retrieval.

Background

The concept involves blending WTP feed sources to reduce the variability of feed compositions. Specifically, the blending has the potential to increase WTP operational efficiency by reducing the peak concentration of waste constituents detrimental to the WTP process. For example, blending to reduce the peak sulfate concentration in WTP feeds could reduce glass formulation complexity and associated costs. The potential exists to increase WTP processing rates by optimizing the amount of constituents that limit waste loading. Increased WTP processing rates will empty DSTs more quickly, making additional capacity available for SST waste retrieval.

Blending feed prior to transfer to the WTP would be performed for cases where the volume of glass would remain constant or could be reduced. If enough waste can be blended and the tanks filled to the maximum working volume, additional storage capacity would be made available. Blending of waste may also provide an opportunity to increase the concentration of the waste and thereby reduce storage volume requirements.

Evaluation

Preliminary evaluation of WTP feed blending indicates that blending of low-activity feeds could benefit WTP by providing a more uniform feed. The preliminary evaluation considered the use of the AP tank farm for blending of waste streams and feeding waste to WTP. Although, the preliminary evaluation indicated that blending appeared promising, the ability of feed blending to provide additional waste storage capacity was not considered and would require further evaluation.

Blending will affect both DSTs and the WTP operations. Flow sheet evaluations, waste volume projections, and transfer evaluations will be required to identify specific blend candidates. Initial scoping work would require 6 to12 months to identify potential blending strategies. Additional detailed follow-up is required to confirm specifics and quantify advantages. This effort will require a modification of the modeling activities in the existing program. Requirements and safety analyses in the tank farms and the WTP could be affected.

5.2.3 Blending Retrieved Single-Shell Tank Material with Waste Treatment Plant Feed

Description

This option is a variation of the ideas discussed in Section 5.2.2.

Background

The waste retrieved from SSTs provides a broader spectrum of waste types for potential blending than the waste currently stored in the DSTs. By considering the use of the SST wastes as potential WTP feed earlier in the disposal process, potentially optimal WTP feeds can be obtained.

Evaluation

As discussed in Section 5.2.2, a preliminary evaluation of low-activity waste feeds indicated that blending appeared promising; however, the ability of feed blending to provide additional waste storage capacity was not considered and would require further evaluation. Although the preliminary evaluation did not consider SST waste, it is likely that appropriate SST waste could be blended with WTP feed sources with beneficial results.

The blending of retrieved SST waste with WTP feed sources is a change in the WTP feed delivery strategy and would require integration of SST retrieval plans, DST waste feed delivery plans and WTP operating plans. An alternatives generation and analysis would be required to assess the benefits of SST waste blending and the cost of implementation.

5.3 LONG TERM OPTIONS TO STORE AND/OR TREAT OUTSIDE PRESENT SYSTEM

These options increase available waste storage capacity through storage and/or treatment in facilities outside the current DST and WTP system. Options considered include:

- separate non-hazardous, non-radioactive fractions,
- Grout vaults with better waste form,
- use evaporators for chemical reactor space, and
- deploy low volume capacity processing units.

5.3.1 Separate Non-Hazardous, Non-Radioactive Waste Fractions

5.3.1.1 Separate Non-Radioactive Salt from the Waste

Description

The option considers the use of modular ex-tank processing units to remove a significant volume of non-radioactive salt from SST or DST waste. The salt stream would then be converted into a material suitable for disposal or aboveground interim storage, thereby creating available DST space.

Background

Waste storage capacity is created in the DST system by extracting a large volume of non-radioactive salts, considered low-activity waste. The salts would be converted into a non-hazardous material and/or immobilized into a non-hazardous material for disposal. Removal of the non-radioactive, non-hazardous materials from SSTs results in a smaller volume of waste requiring transfer to the DST system.

The unique merit of this concept is that non-radioactive chemicals comprise the majority of the high-level waste volume in the DSTs and SSTs. Direct extraction of the non-radioactive species would create useable DST space. The approach is effectively a pretreatment process, but differs significantly from the baseline pretreatment in that it selectively removes target radionuclides. In this concept, the non-radioactive salts are selectively removed in a manner conceptually similar to the waste evaporation to reduce waste volume.

Evaluation

The removed salt must be declared incidental waste, that is, no longer high-level waste requiring storage in a deep geologic repository for successful deployment of this option. A clearly defined disposal pathway must be defined that meets regulatory requirements and achieves stakeholder

acceptance. The extracted salt stream must have sufficiently low levels of radionuclides and will need to be converted into an acceptable non-hazardous material to allow disposal.

Candidate technologies to extract the salt with negligible radionuclides have been investigated. These technologies can be broadly grouped under the topics of crystallization, electrochemical separation (salt splitting for example), and solvent extraction. Both the crystallization and electrochemical technologies have had significant development and have been proven at the laboratory bench scale with actual waste, but technical issues for operational implementation remain. The solvent extraction approach for this specific purpose is relatively new.

One issue with the crystallization technology involves the fate of sulfate, which is the chemical species limiting the low-activity waste glass waste loading. Previous crystallization studies focused on acidifying waste and then conducting crystallization because testing showed much better radionuclide separation with acidified waste. The formation of gels with alkaline waste was also avoided. However, it may be necessary or preferable to do crystallization with alkaline wastes to additionally crystallize sulfate salts. The ability to achieve necessary radionuclide removal and avoid gelling will require development.

This approach is an alternate treatment, storage, and/or disposal option for some of the low-activity waste fraction. Accordingly, the regulatory requirements, issues, and drivers are the same as those that apply to the current baseline for low-activity waste glass. The current baseline employs ex-tank pretreatment in a facility to separate high-level waste feed into a high-level waste stream containing essentially all of the radioactivity and a low activity fraction that has key radionuclides removed.

Finally, the waste is a listed hazardous waste, as defined by RCRA, and will need to be delisted, which will require that the waste be rendered non-hazardous and meet land disposal restrictions.

5.3.1.2 Separate Low-Activity Waste from High-Activity Waste

Description

In this concept, the SST wastes would be retrieved from the tanks and would be treated in low capacity systems to separate the wastes. A low-activity waste stream would be stabilized for interim storage or disposal; and a low-volume, high-activity waste stream would be transferred to the DST system for future vitrification. This differs from the option in 5.3.1.1, which only removes non-radioactive components. In this option, the removed stream contains low activity radionuclides, as well as non radioactive components.

Background

Saltcake, composed primarily of sodium nitrate and sodium hydroxide, would be dissolved and the aqueous solution would be sent to a separation process where the sodium and nitrate would be removed. Several technologies are being developed that could be used including:

- steam reforming to destroy the nitrate via reduction. The sodium is tied with clay that is added to the process resulting in an inert solid and a clean salt. Both resulting wastes should be suitable for low-level waste disposal;
- electrochemical nitrate destruction followed by electrochemical/membrane technology for sodium removal;
- electrochemical nitrate destruction followed by sodium removal using solvent extraction; or
- Clean Salt, a precipitation process.

Sludges, undissolved solids, and the residual waste stream after nitrate and sodium removal would be sent to the DSTs. The recovered sodium could be converted to a form for use later as a processing chemical (such as sodium hydroxide), for storage as a stabilized low-activity waste for future immobilization, or for immediate disposal as a glass, grout, or clay mineral. The removed sodium would still be contaminated and would need to be managed as a radioactive and possibly hazardous waste.

Evaluation

The technologies for removing the sodium and nitrate from the wastes are at various stages of development and would need additional development and demonstration before implementation. The forms selected for management of the wastes would need to be selected and qualified as appropriate. New facilities would need to be designed, constructed, and permitted.

In concept, this is very similar to the project baseline strategy, but could use small "packaged" treatment units, to create alternate low-activity waste forms of much of the waste volume, while following the same pathway for the high-level waste fraction. The environmental and regulatory activities would need to be further developed.

5.3.2 Grout Vaults with Better Waste Form

Description

The objective of this concept is to use the existing Grout vaults as a facility to dispose a substantial volume of low-activity waste and thereby create useable DST space. To be successful, the immobilized waste form combined with the containment provided by the Grout vault would need to meet regulatory requirements and achieve stakeholder acceptance.

Background

In the early 1990s, the strategy for low-activity tank waste disposal changed from immobilization as grout for disposal in vaults to immobilization in glass and packaging in individual stainless steel containers for near surface disposal. The current pretreatment plant removes radionuclides to a lower level than the low-activity waste that was originally planned for the Grout facility and improved waste forms have since been developed.

Use of the vaults for disposal of low-activity waste could be considered if improved pretreatment, immobilized waste form and waste packaging gained DOE, regulator, and stakeholder acceptance. Additionally, the approach must process tank waste sooner than the baseline plan of vitrification to be considered viable.

Waste volume can be removed from the DST system by extracting a low-activity waste stream via pretreatment of high-level waste and then immobilizing and disposing of the low-activity waste in the Grout facility. Rather than focusing on all low-activity waste streams, those that would be most compatible with the Grout facility could be used.

Evaluation

The key technical issues for this option are the selection of technologies that will achieve the necessary radionuclide removal and then the selection of an immobilization technology that will meet regulations and achieve stakeholder acceptance. There are a number of near term possibilities. For example, the WTP pretreatment facility will be designed to provide 60 metric tons per day of feed for low-activity waste glass, which is twice the capacity of the initial low-activity waste immobilization plant. This extra pretreatment capacity can enable a two-fold low-activity waste glassification expansion without expanding the pretreatment facility. The decision to expand the low-activity waste immobilization capacity is scheduled to occur in the 2009 - 2011 period, and hot processing to begin in 2018 if the decision is made to construct a second low-activity waste immobilization facility.

The lengthy time period between the 2007 hot start and the full pretreatment capacity being utilized in 2018 is an opportunity to use the pretreatment plant to process additional waste for immobilization in the grout facility. An additional processing step is required to transform the treated liquid waste coming from the pretreatment facility into acceptable waste form for the grout vaults.

A second option would be to conduct extensive in-tank separations to provide a sufficiently cleaned low-activity waste stream for immobilization and disposal in the grout facility. Again, the separations and waste form would need to be superior to what was considered in the early 1990s and has since been abandoned. This approach would present a number of technical issues in radiochemical and solid/liquid separations and waste form development that require resolution.

This option is an alternate disposal strategy for a low-activity waste fraction. Accordingly, the regulatory requirements, issues, and drivers are the same as those that apply to the current baseline for low-activity waste. Resolution of these issues and deployment of different low-activity waste disposal strategy sooner than the current baseline presents significant challenges.

5.3.3 Use Evaporators For Chemical Reactor Space

Description

This alternative considers the use of existing containment facilities to avoid building new facilities.

One obstacle to the use of small scale processing to reduce the volume of retrieved waste and the volume of waste ultimately converted into glass or waste form is the cost of construction of new containment for radioactive waste processing facilities.

Background

Evaporators were built inside suitable containment buildings. Use of the 242-S Evaporator building or unused space in the operational 242-A Evaporator could be used for small-scale waste processing facilities.

During site operations, evaporator facilities were built to reduce the volume of waste placed into storage. In the 200 East Area, the 242-A Evaporator is operational. In the 200 West Area, the 242-S Evaporator is idle and likely will not be operated as an evaporator again. The building is intact and ventilation is operational.

Successful use of existing available evaporator building space for small scale processing of retrieved waste could facilitate the reduction of waste volume, thereby making the existing DST capacity capable of accommodating a greater percentage of retrieved waste.

Evaluation

There are a number of technical issues that affect the use of evaporator buildings to contain chemical reactors. These include, but are not limited to, the following:

- the installation of processes in 242-A Evaporator would need to be planned so as not to interrupt evaporator operations,
- access to evaporator building containment areas is typically limited to cover blocks on the roof,
- existing lines into and out of the 242-S Evaporator are likely to be unusable, requiring replacement for connection to the tank farms, and

- the ventilation system acceptable for the idle 242-S Evaporator facility would require refurbishment to increase reliability.

Changes to the 242-A Evaporator or use of the 242-S Evaporator building require regulatory treatment permits, possible upgrades to ventilation and monitoring systems, and updates to the existing Authorization Basis (CHG 2000a, CHG 2000b).

5.3.4 Deploy Low Volume Capacity Processing Units

This option is the deployment of a skid mounted low-volume-capacity processing unit to treat tank waste thereby creating the opportunity for additional SST waste retrieval. The unit could be deployed to process DST waste for volume reduction or to process SST waste as it is retrieved. Two processes that could be deployed on small skid mounted units include, but are not limited to:

- separation of non-hazardous non-radioactive fractions from the waste, and
- waste vitrification.

5.3.4.1 Separation of Non-Hazardous Non-Radioactive Fractions

Description

This option involves separation of non-hazardous non-radioactive fractions from the SST waste. The volume of the remaining hazardous radioactive waste to be stored and vitrified could be significantly reduced. The Tank Focus Area is supporting development of skid-mounted systems capable of removing or recycling the sodium and nitrate in dissolved saltcake streams to significantly reduce the volume of waste to be sent to the DST tanks. This has a potential large cost saving because:

- the DST tank capacity required to handle the waste would be minimized,
- low-level waste vitrification costs could be reduced if a fraction of the waste can be separated for disposal as low-level waste, and
- disposal costs could be reduced further if supernate can be cleaned up sufficiently for disposal through the Liquid Effluent Retention Facility/Effluent Treatment Facility.

Background

The Tank Focus Area, a U.S. Department of Energy (DOE) sponsored technology development program, has been investigating potential waste treatment technologies for the past decade. Processes that have been identified as potentially viable for deployment as a small operating unit include:

- electrochemical nitrate destruction followed by electrochemical caustic recycle, as demonstrated the Savannah River Technology Center (SRTC) and by Pacific Northwest National Laboratory,
- electrochemical nitrate destruction followed by caustic recycle using solvent extraction,
- Clean Salt, a precipitation process developed at the Hanford Site, and
- Studsvik™ steam reforming to destroy the nitrate via reduction.

The electrochemical nitrate destruction has been demonstrated at Savannah River Technology Center in large-scale equipment, and this cell is available for Hanford use. In discussions with a private company, Electrosynthesis™, and Savannah River Technology Center, a skid-mounted process was proposed. A project outline was been drafted by Tank Focus Area and studies continue. There is a potential problem with the caustic recycle because the technology requires a membrane that complicates the maintenance requirements for this process.

When nitrate is destroyed via electrochemical system, a large volume of caustic is generated. This byproduct can be recovered and used for caustic addition to tanks or used for sludge washing. The stream also could be treated directly with a grout former to make a low-level waste form.

Electrochemical nitrate destruction followed by solvent extraction is a promising technology. The process maintains low reagent inventory, and is easy to flush for maintenance. The solvent extraction process appears promising, but has not yet been demonstrated.

Addition of the Clean Salt Process to the baseline operating plan would divert most of the low-activity waste stream to a new stream, non-radioactive salt. The Clean Salt Process does not address the high-level waste stream, which is low in sodium. It deals only with the low-activity waste stream, either before or after cesium ion exchange, where sodium salts account for over 90 percent of the estimated 200,000 metric tons of waste (dry weight basis).

The low-activity waste stream is acidified with nitric acid to pH 2. The acid solution is filtered to remove traces of insoluble solids, which are routed to the high-level waste. The clarified solution is evaporated until sodium nitrate ($NaNO_3$) crystals form. The $NaNO_3$ slurry is filtered. The filtrate, which contains the radionuclides, becomes the new salt-depleted low-activity waste stream. The $NaNO_3$ solids are washed with water or clean $NaNO_3$ solution to remove contaminated interstitial liquid. The wash liquid is recycled to the evaporator, and the washed solids are recrystallized from water as often as required to reach the desired level of decontamination.

The Studsvik™ process is a complete process to treat the tank wastes. Low-level waste (LLW) supernate is reacted with steam, a carbon source (a reducing agent and a fuel to keep bed temperature acceptable), and clay to tie up the sodium. The process operates at 550 to 650 °C. All of the anions are either destroyed (nitrate, oxylates, carbonates) or are scrubbed in the off gas (sulfates, chlorides, fluorides). The sodium is tied as sodium aluminasilicate, a solid

nonleachable material suitable for disposal. The water is evaporated. The solids are collected as sodium aluminum silicate ($NaAlSiO_4$), and as a clean salt composed primarily of sodium sulfate (Na_2SO_4). This salt can be sent to a low-level waste disposal facility. The process is operated at temperatures below that of an incinerator. Large volumes of gas are evolved which must be processed.

All of these technologies perform better with cesium-137 removal before processing. Removal of cesium-137 from has been demonstrated at the 1-gpm rate at Oak Ridge National Laboratory (ORNL), and three processes are being demonstrated in a rigorous evaluation of competing technologies at the Savannah River Site. The most mature process is ion exchange. A column 4-ft tall, 2 ft in diameter, with a backup guard column will be sufficient to handle the Hanford low volume capacity processing unit requirements. This configuration is appropriate because it can fit in a shielded cask. It may also be possible to remove cesium in the Waste Receiving Facilities (see Section 4.7).

Evaluation

The technology for separation of the non-hazardous, non-radioactive fraction from tank waste has been demonstrated on an experimental scale and would require significant additional development to be implemented in the proposed manner.

This alternative will add to maintenance or operational expense. Start-up of new technology will present maintenance and operational challenges including an infrastructure for control, feed staging and handling, waste stream storage and recycle, and off-gas treatment. This option will be slightly more difficult to operate than the current option used. The units are small but since they are experimental, they will require operational supervision.

Assuming five years of operation, low volume capacity processing units such as described in this section would make approximately 1,000 kgal of existing DST capacity available. A 1-gpm low volume capacity processing unit operating at 50 percent efficiency for 5 years would remove approximately 1,000 kgal from the DSTs.

These technologies are experimental, but have been successfully demonstrated experimentally on low-level waste; therefore, the safety issues should be understood. There is an environmental risk due to the experimental nature of this technology. Installation of a low volume capacity-processing unit will require permitting, and because these technologies are experimental, the permitting issues may not be completely understood. Changes to the Authorization Basis (CHG 2000a, CHG 2000b) will also be required.

5.3.4.2 Small Mobile Vitrification Plant

Description

Vitrification is a waste treatment process that turns mixed waste into glass. It provides a stable, non-leaching waste glass product suitable for long-term storage. Vitrification also reduces the volume of waste by evaporating water, oxidizing organics into harmless gases, and consolidating metals and other contaminants into non-porous solids. Issues with vitrification include transporting waste to vitrification facilities that increase the risk of worker exposure and waste-related transportation incidents. Additionally, vitrification facilities can be expensive to construct.

Background

One possible solution to issues associated with vitrification for some of the waste streams is a modular, transportable vitrification system for mixed waste called the Transportable Vitrification System, which costs less than $5 million. The Transportable Vitrification System was designed and fabricated by Envitco, Inc. of Toledo, Ohio, which has an U.S. patent pending. The Transportable Vitrification System was built to be moved from site to site to treat some of the U.S. Department of Energy's low-level mixed waste streams.

The first process step in the Transportable Vitrification System is mixing wastes with additives, such as sand, soda ash, borax, lime, or alumina, to promote the formation of a stable glass product. The mixture enters the Joule-heated melter, where currents passing between electrodes transform the waste mixture into a molten state. This process decomposes and dissolves inorganics and locks radioactive materials into the glass melt. The melter's off-gas system treats any vapors evolved from the melt. The molten material is poured into steel containers as it is produced. After cooling, the containers of glass are stored for eventual disposal.

Moving the Transportable Vitrification System requires about 12 tractor-trailers for its modules including feed preparation, melter, off-gas, control and services, and process laboratory. Transport and reassembly of the transportable vitrification system takes about six weeks. The Transportable Vitrification System is designed to produce 300 pounds of glass per hour (depending on the type of waste) and to process wet, dry, and slurried waste.

Evaluation

This technology would have to be used in conjunction with a cesium-137 removal process to provide low-level waste to the melter. The cesium-137 would be sent to the WTP. This option is not a replacement to the WTP, because the Transportable Vitrification System could not handle the high-level waste fractions nor does it have enough throughput capacity.

Assuming five years of operation, the Transportable Vitrification System, a 1-gpm unit operating at 50 percent efficiency for 5 years would remove approximately 1,000 kgal from the DSTs or from SSTs (via waste receiver tanks). It, therefore, would make approximately 1000 kgal of existing DST capacity available.

The mobile vitrification process unit would require a significant development program to implement. The technology is experimental but has been successfully demonstrated on low-level waste; therefore, the safety issues should be understood. There is a possible new environmental risk due to the experimental nature of this technology. The process will require permitting. Because these technologies are experimental, the permitting issues may not be completely understood. Installing the processing unit will also require changes to the Authorization Basis (CHG 2000a, CHG 2000b).

This alternative will add to maintenance and operational expense. Start-up of new technology will present maintenance and operational challenges including an infrastructure for control, feed staging and handling, waste stream storage and recycle, and off-gas treatment.

5.4 OPTIONS EVALUATED WHICH WERE DETERMINED TO BE NONVIABLE

Several options were identified in the workshops as having potential to increase available tank capacity. After evaluation, the following options were determined to be nonviable:

- consolidate SST Waste in the SST system,
- place liners in SSTs,
- delay caustic addition to the DSTs,
- postpone deactivation of facilities, and
- use existing facilities at Energy Northwest.

5.4.1 Consolidate Single-Shell Tank Waste in Single-Shell Tank System

Description

This option considers consolidation of SST wastes in the SST system.

Background

Many of the SSTs are considered sound. If these noncompliant storage tanks can be used for storage pending treatment, then the need for additional DST storage capacity would be reduced.

Sound tanks exist in the S-Farm in the 200 West Area and BX and BY Farms in the 200 East Area that could be used in lieu of DSTs to consolidate retrieval waste from other SSTs until compliant capacity becomes available. These specific farms are located in close proximity to active DSTs and to the cross-site transfer system. Total available sound SST capacity in the BX and BY Farms is approximately 5600 kgal. There are eight sound tanks in S-Farm that could be used with over 2,900 kgal of capacity.

Evaluation

The SSTs do not meet RCRA standards for waste storage based on a lack of double containment. In addition, all SSTs are beyond or very close to their design life. Every SST farm contains tanks that are known to have leaked. Storing large volumes of liquid in SSTs presents an environmental risk of future leaks. Appropriate leak detection and monitoring and leak mitigation strategies would reduce risk. In most cases, it would also mean adding liquefied waste to SSTs that have already been interim stabilized to remove as much liquid as practical.

Analyses of the potential for hazardous gas retention and release would be required. The relative benefits and risks of storing only dilute interim stabilization liquid, retrieving both solids and liquids from other SSTs, or reducing volume by staging liquids through the 242-A Evaporator would require assessment. Solids consolidation, as proposed for DSTs, could also be considered

at the risk of making future retrieval more costly. Satisfactory resolution of regulatory issues is an essential part of application of this option. At this time, satisfactory resolution would be very challenging and is not expected to be successful.

5.4.2 Place Liners In Single-Shell Tanks

Description

This option considers deployment of liners in SSTs in order to provide double containment of the waste.

Background

The SSTs were built with a single primary steel tank that is surrounded with concrete. Leaks to the environment have resulted from failed steel liners. Installation of at least one liner in the sound tanks and two liners in the failed tanks would restore SSTs to a sound condition for waste storage, provide double containment, and meet the underlying requirement that waste be stored in RCRA compliant tanks. Liners based on a bladder design could be deployed through a tank riser.

Evaluation

There are serious technical issues that limit the feasibility of this option. The tanks would need to be emptied of waste in order to install the liner. Radiation levels and confined space concerns will require a remote installation approach.

Many of the SSTs contain significant equipment, either hanging from the risers or dropped into the waste in the tank during operations. Items that would obstruct remote installation of liner would have to be removed before the liner is installed. In addition, the liner would have to be lightweight because of the overall size of the liner and be flexible enough to be remotely installed. No lightweight, flexible material has been identified that can withstand the elevated radiation fields for an extended period. Successful deployment of this option would require a research and development program to select and test the appropriate liner material.

Installation of leak detection, monitoring, and mitigation capability would need to meet the surveillance requirements for stored waste. Permitting for such a hybrid tank would be difficult.

5.4.3 Caustic Addition Alternative

Description

This option considers deferral of caustic addition to the DSTs required to maintain tank chemistry to avoid corrosion.

Background

Current practice for prevention of DST corrosion is the addition of caustic solution as required to comply with operating specifications. One alternative to avoid adding caustic is the use of an electrochemical cell to generate hydroxide from tank contents (Hobbs 1998; Kurath et al. 1997; DeMuth and Kurath 1998). This technology has been commercialized for the pulp and paper industry. However, it is not known if the unit will be suitable for use in radioactive systems. .

Evaluation

Four DSTs are currently outside of the chemistry specification for control of corrosion (CHG 2000a, CHG 2000b), AN-102, AN-107, AY-101, and AY-102. Caustic additions to tanks AY-101 and AY-102 have been completed to bring them within specification. Caustic additions to tanks AN-102 and AN-107 are planned in 2001. Deferral of these caustic additions would add minimal DST waste storage capacity and would result in a Technical Safety Requirement violation, placing operations outside of the Authorization Basis (CHG 2000a, CHG 2000b). There are minimal direct savings of existing capacity, approximately 120 kgal, with deferral of planned caustic addition.

5.4.4 Postpone Deactivation Of Facilities

Description

This option considers elimination or postponement of the receipt of waste resulting from deactivation of Hanford Site facilities, thereby allowing DST capacity to be redirected to storage of retrieved SST waste.

Background

Deactivation of Hanford facilities will generate liquid waste either directly from cleanup activities or from removal of stored waste. The deactivation of the B-Plant and PUREX facilities has been completed. The deactivation of PUREX resulted in the transfer of 469 kgal of dilute waste to DSTs during 1995 and 1996. Deactivation of B-Plant resulted in the transfer of 103 kgal of dilute waste to DSTs between 1996 and 1998.

The remaining Hanford facilities planned for deactivation that require transfer of wastes to DSTs are the PFP, the 105-F and 105-H Basins, and the inactive miscellaneous underground storage tanks (IMUSTs). Table 5-1 provides the projected deactivation date, waste volume, and waste volume reduction factor for each tank. The waste volume reduction factor is defined as the percent of water (by volume) that can be removed from a waste stream to achieve a concentrated interim waste form such as double-shell slurry feed.

Table 5-1. Facility Deactivation Waste Volume Projections

Facility	Deactivation Date	Deactivation Volume As Received (kgal)	Waste Volume Reduction Factor (%)	Stored Waste Volume (kgal)
PFP	2000-2012	33	81	8
105-F Basin	2001	40	99	1
105-H Basin	2006	200	99	3

Evaluation

Deactivation of PFP, 105-F Basin, and 105-H Basin consumes minimal DST storage capacity when waste concentration using the 242-A Evaporator is included in the waste volume projections. Deactivation of these facilities is necessary to prevent liquid wastes from leaking to the environment and extending site cleanup.

5.4.5 Use Grout Vaults for Long-Term Storage of Liquid Tank Waste

Description

This option considers the use of the unutilized Grout vaults for the long-term storage of liquid tank waste.

Background

The Grout vaults were built to accommodate low-activity waste immobilized in grout especially formulated for the purpose. The project was cancelled after four of the vaults were built for several reasons. These vaults were built to meet the requirements of existing laws for grout storage. Use of the Grout vaults to store retrieved waste during site cleanup and closure could be an economical alternative to the construction of new DSTs.

Evaluation

The provisions for use of the Grout vaults for emergency storage in Section 4.5 would apply to this option, including the technical issues presented. If only one of the four Grout vaults were dedicated to emergency storage requirements, the remaining three 1600-kgal vaults with a total of 4800 kgal could be available to provide additional storage for SST retrieval. In addition to the actions required in Section 4.5, the impact of long-term storage of liquids in a facility not originally designed to contain liquids would have to be addressed. In Section 4.5, the vaults were evaluated as emergency backup storage during the 2007 - 2011 period. This option would require storage of liquids for up to 15 years. A more robust transfer and control system than that specified in the emergency storage option would be required in order for tank waste to be added and removed from the vaults on a routine basis.

5.4.6 Use Existing Facilities at Energy Northwest

Description

This option would utilize existing facilities at Energy Northwest to store tank waste as an alternative to traditional buried underground storage tanks for increasing waste storage capacity.

Background

Two partially completed nuclear power plants, WNP-1 and WNP-4, are located on the Hanford Site near the Columbia Generating Station of Energy Northwest. It was suggested in the workshops that tank waste could be stored in these existing structures.

Evaluation

There are no large compliant storage facilities available.

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6.0 OPTIONS ALSO CONSIDERED

During the initial workshop (see Appendix A), a brainstorming session was held to elicit the participants' ideas to increase available DST space for storage of retrieved SST waste. Initially, only a brief description was requested. The ideas were reviewed to remove duplicates and combine alternatives. As part of the process, a number of options identified during brainstorming were eliminated because they did not meet required attributes. These ideas are summarized below as a record of the possibilities explored.

1. **Separate aluminum to concentrate.** Compounds of aluminum can create situations where concentrated solutions of tank waste crystallize and cannot be pumped. Removal of aluminum salts would increase the allowable specific gravity. The expected cost of treatment before the aluminum could be removed is thought to be quite high.

2. **Release retained gas.** Typical steps to release retained gas include dilution with water or operation of large mixer pumps. In the case of dilution, the resulting waste volume is greater than the initial volume.

3. **Concentrate all DST waste to solids and remove all supernate.** This would add volume but would increase costs and could result in safety problems (e.g., SY-101).

4. **Cool waste until it contracts.** This would require constant cooling and provide little additional capacity.

5. **Heat tanks until they expand.** This would cause structural damage and again provide little additional capacity.

6. **Fill the DST annulus.** This defeats the purpose of putting the waste into compliant storage, and provides little additional capacity.

7. **Put barriers around SSTs (add double containment).** The possibility of damage to the SSTs, the radiation exposure to workers when the tanks are excavated, and the probable costs make this an unlikely approach.

8. **De-list tank waste.** The amount of known hazardous constituents in the tank wastes makes this improbable.

9. **Drill lateral drywells under the SSTs.** This could provide an alternate method for leak detection; by itself, it does not provide additional tank capacity.

10. **In-situ vitrification in SSTs.** The waste would be immobilized but most likely would not meet land disposal restrictions. Control of offgases during the process could create additional waste management issues.

11. **Allow the SSTs to leak.** This is unacceptable.

12. **Account for released gas in SST.** Accounting for released gas does not create additional tank space.

13. **Evaporate dissolved ammonia in DSTs.** Evaporating dissolved ammonia is not expected to yield significant additional tank capacity.

14. **Pack particles closer together.** This idea assumes that solids in the tanks are loosely packed and that there is a feasible way to cause them to take up less volume after retrieval. Packing is not likely to be the source of significant additional volume and a technique for doing this with the diverse forms of waste on site is not known.

15. **Relax 99 Percent Retrieval Constraint.** This does little to change the need for tank capacity for the bulk of SST waste.

16. **Use 244-AR or 244-CR Vault Tanks.** There is a small storage volume available in these tanks. The tanks are old and are slated for decommissioning.

17. **Store waste in inactive transfer lines.** Small volume to be gained; the lines are inactive for compliance and reliability reasons.

18. **Do not flush active cross-site transfer lines.** The flush water is removed when waste is run through the evaporator. In addition, the flush water is necessary to prevent line plugging, corrosion, and to maintain lower radiation levels in piping systems.

19. **Grout and fill existing inactive buildings, e.g., Canyon Buildings, old reactors, old evaporators.** These old facilities were not designed for disposal. Contamination and potential worker dose complicate any use of these facilities.

20. **Put bladders in canyon building.** This would be a subset of the previous item. This or addition of new tanks would be an integral part of use of any canyon facility for temporary waste storage. High dose areas in canyons make this idea impractical.

21. **Fleet of rail cars.** This idea is potentially costly because of acquisition of rail cars. Multiple problems with radiation control exist whether new doubled walled or older modified rail cars are used.

22. **Retrieve low volume tanks first.** This approach defers the capacity problem creating a larger problem later in the project. Additionally, this idea does not reduce risk near-term.

23. **Reconnect and fill the Inactive Miscellaneous Underground Storage Tanks (IMUSTs).** The miscellaneous underground storage tanks have not been characterized. Each has small capacity. None meet RCRA standards.

24. **Line and fill abandoned catch and fill boxes (i.e., diversion boxes).** Diversion boxes are not normally double-contained. Radiation conditions would cause most lining operations to be remote, and would be very expensive.

25. **Fuel storage basins.** The K Basins are too close to the river and are believed to have leaked in the past.

26. **Market millions of milligram samples.** This is not a viable option.

27. **Use old tank farm designs.** Tank farm facility designs were prepared in the 1980s (e.g., AQ Farm). They were not designed to be RCRA-compliant. The Multifunction Waste Tank Facility (W-236) is a newer design that was RCRA compliant. (see Section 4.8)

28. **Ship waste to Defense Waste Processing Facility (DWPF) or West Valley Processing Facility.** Shielding during shipping would make this very costly even if Savannah River could take the waste.

29. **Build multiple vitrification plants.** Processing at dispersed regular vitrification plants is likely to be impractical and loses the economy of scale provided by the WTP.

30. **Ship liquid waste to the High-Level Repository at Yucca Mountain, Nevada.** Liquid waste is not an approved waste form for shipping or receipt.

31. **Use abandoned Basalt Waste Isolation Project (BWIP) tunnels.** Canister storage in BWIP facility was not approved. The tunnels have been filled in.

32. **Bladders in burial boxes.** This is a costly retrieval option. Significant shielding is required.

33. **Delist waste and ship to Waste Isolation Pilot Plant (WIPP).** This is an unlikely option given the permitting and Environmental Impact Statement for WIPP and the present designation of tank waste.

34. **Solidify and drum.** This option would produce high radiation levels from untreated waste.

35. **Fill submarine vaults.** The submarine reactor compartments have already been carefully sealed for disposal.

36. **Dry waste form in canister barrels and put back in SSTs for later retrieval.** This idea is similar to some options presented in Section 5.0. However, this approach has an added complication of adding drums to old structures with little access and limits the ability to perform routine inspections.

37. **Melt and pour directly into emptied SST.** High temperatures could damage the concrete structures of the SST.

38. **Evaporate low aluminum containing waste only/first.** Selective retrieval sequence will account for waste content.

39. **Postpone deactivation of IMUSTs.** IMUST deactivation is scheduled after 2011.

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APPENDIX A

NOVEMBER 29-30, 2000 WORKSHOP NOTES

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TANK SPACE STRATEGIC PLANNING SESSION

November 29-30, 2000

Hanford Training Center, Willamette Falls

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CONTENTS

- Scope Statement Sheet, Agenda, Guidelines and Expectations
  - Opening Remarks

- Evaluation/Creative Phase
  - Criteria/Categories
  - Brainstormed Ideas
  - Three Questions/Functions Brainstormed

- Information Phase
  - What is Known
  - Parking Lot Information Sheets/

- Conclusions/Actions and Options for Further Study

SCOPE

- Tank Space and/or system needs to facilitate SST closure
  - TPAs M-45-00, M-45-00-01A, and M-45-12-T01
  - OWVP 2000 report
  - SST Retrieval Sequence FY 2000 Update (RPP-7087)
  - Tank Waste Treatment (TWT) Project
  - DST Space Trade Study (TWR-4654, 6/99)

OBJECTIVES

- Define the problem to be solved
  - Identify what is known (TPA, OWVP, FY 2000 Sequence, TWT Project, and DST Space Trade)
  - Identify what is not known
  - Develop problem statement

- Determine potential options and select preferred approaches
  - Brainstorm potential options
  - Define evaluation criteria for ranking options
  - Evaluate and select preferred approaches for further study

- Identify supporting information (enabling assumptions, key requirements, issues/concerns, etc.)

- Develop path forward for TPA completion
  - Identify actions required to facilitate follow-on efforts with Ecology, future studies needed, and formal response commitments

- Obtain consensus and build team

DELIVERABLES

- The problem defined
- Preferred options to solve the problem
- Path forward implementation plan

TANK SPACE STRATEGIC PLANNING WORKSHOP
HTC, Willamette Falls Room
November 29-30, 2000

AGENDA

Day 1, 11/29/00

7:30 - Welcome, Introductions, and Agenda
- Review Scope Statement Sheet, Guidelines and Expectations
- Opening Remarks

8:15 - Identify What is Known and What is Not
- Review/Clarify TPAs M-45-00, M-45-00-01A, and M-45-12-T01
- Utilize parking lot sheets, as required

9:30 - **BREAK**

9:45 - Continue What is Known and What is Not
- OWVP, FY 2000 Sequence, TWT Project, and DST Space Trade Study

11:30 - **LUNCH**

12:30 - Define the Problem to be Solved
- Answer three questions
  1. What's the problem?
  2. Why is that a problem?
  3. What are the consequences if the problem is not solved?

1:45 - Brainstorm Potential Options to Solve the Problem

2:30 - **BREAK**

2:45 - Continue Brainstorm of Potential Options
- Identify opportunities and new ideas

3:15 - Evaluate Potential Options
- Define and rank evaluation criteria
- Evaluate options to eliminate the possible, but improbable

4:30 - Finish Day 1 with a review of status and day 2 agenda

TANK SPACE STRATEGIC PLANNING WORKSHOP
HTC, Willamette Falls Room
November 29-30, 2000

AGENDA

Day 2, 11/30/00

7:30 - Review Agenda, Scope Statement Sheet, and Status from Day 1

7:45 - Continue Options Evaluation
- Identify opportunities/innovations (including cost/schedule)
- Select the preferred options for future study

9:30 - **BREAK**

9:45 - Develop Path Forward for TPA completion
- Review/Validate parking-lot information sheets
- Identify needs and team members for the December 5, 2000 Ecology meeting, and future study needs
- Identify Actions to proceed

12:00 - Finish Session with a Round-Robin Closeout
- Last minute items
- Meeting utility

PROJECT SCOPE STATEMENT SHEET

Project Title: Tank Space Strategic Planning Workshop **No.** 001
Location of Workshop: Hanford Training Center, Willamette Falls , **Dates:** 11/29-30/00

TEAM MEMBERS

NAME	DISCIPLINE	CO.
C. (Cherri) DeFigh-Price (TL)	SST Interim Closure Prog.	CHG
R. R. (Rex) Thompson	SST Interim Closure Prog.	CHG
N. W. (Nick) Kirch	Process Control	CHG
J. N. (Jim) Strode	Inventory Control & Model	CHG
J. A. (John) Garfield	Retrieval Engineering	NHC
D. T. (Dave) Vladimiroff	Interim Stabilization	CHG
J. P. (John) Harris	Nuclear Licensing	CHG
J. B. (Joel) Hebdon	Environmental	CHG
J. P. (Pete) Sederburg	DST Program	CHG
G. W. (George) Reddick	Strategic Planning	CHG
K. R. (Kevin) Sandgren	Nuclear Licensing	CHG
P. A. (Perry) Meyer	SST Science Team	PNNL
C. W. (Chuck) Stewart	Fluid Dynamics	PNNL
P. A. (Phil) Gauglitz	PGO	PNNL
C. C. (Colin) Henderson	Risk Performance Evaluation	JACOB
R. W. (Bob) Lober	Strategic Planning	ORP
E. J. (Joe) Cruz	Project Requirements	ORP

Team Leader (TL)

AD HOC MEMBERS

J. W. (Joe) Brothers	SST Science	PNNL
T. D. (Dave) Taylor	PGO	CHG
R. G. (Russ) Harwood	Operations Support	ORP

FACILITATORS

NAME	DISCIPLINE	CO.
R. A. (Richard) Harrington, CVS	SST	CHG
R. E. (Robin) Kummer	SST	CHG

GUIDELINES AND EXPECTATIONS

- Open and honest communications
  - Active listening
  - Courage and consideration
- Be succinct → make your point
  - Lot of ground to cover
  - Be proactive with input
  - Identify facts vs. perceptions
- This is a technical project management session
  - Wear two hats
    1. Your role/technical (engineering and science)
    2. Project management/leadership
- A lot of Good is done, remember our purpose and deliverables
  - Evaluation to select top choices
  - Don't design; level of engineering
- Use of flipcharts
- Roles: Facilitators and you
  Process versus content
- Keys to success
  - Communication/teamwork
  - Rise to the occasion
  - Make a difference and have some fun!

OPENING REMARKS

- 8/00 negotiations
  - Enforceable milestones
  - Directors determinations that could result in court dates (e.g., 2/15/01)
    - We negotiated M-45-01 for between now and 2006
      - Focus was on high-risk tanks
      - Agreed on risk definition
      - Limited tank space was a concern
        - Interfaced with the modeling group
        - "Signed up" for C-104 preparation and space for (S-112 and S-102) 2 million gallons in addition
      - Ecology wants to know how many DSTs are going to be built
  - M-45-12 submit options report to increase tank space for waste storage by 2/28/02
  - M-45-01
  - HAB is also evaluating tank space needs and the options
  - The state really does not want to build 84 more tanks
  - State does think we need to build some new tanks
    - Key is that M-45-012 report must document all the credible options; identify the preferred options; and path forward
  - Will brief the state in early December and conduct a workshop in January with State, HAB, etc.
  - The VIT plant schedule is a major risk item to available tank space
  - A lot of good options identified to date, are there others
  - The options study will be a PI due March 31, 2001
  - The state would like to retrieve tanks (~10 vs. 35) between 2007-2011

    The state would like us to look at 6-pack DST designs

EVALUATION PHASE

- **Round 1**
  - Read all items
  - Keep or toss
  - One keeper keeps, move on
  - No discussions
  - Eliminate the possible, but improbable

- **Round 2**
  - Develop/rank and use criteria
  - Limit discussions to what the idea is; don't guess, identify author
  - Keep or toss
  - Reduce the list, include memories
  - Eliminate redundancies
  - Apply criteria

- **Round 3**
  - Assign numeric identifiers on keepers (e.g., 1, 1.1, 2, 2.1, 3, 4, 5, ...)
  - Combine attributes of same ideas
  - Criss/cross combinations
  - Define/use categories, as appropriate
  - Keep or toss

EVALUATION CRITERIA (RANGE)

7 Cost effective	5%
• Cost per gallon obtained (e.g., <$76/gallon)	
1 Technical feasibility	25%
• Likelihood of success	
• Robustness	
• How fast to develop/deploy	
5 Meet schedule	10%
• Develop/deploy/operate	
8 Ease of operations	5%
• Number of operators	
• Level of training	
6 Maintenance/operability	5%
• RAM	
2 Environmental risk reduction	20%
• Compared to today	
4 Supports mission requirements	10%
• Compatibility to high-level goals	
• Volume recovery	
3 Worker Health and Safety	20%
	100%

CATEGORIES

A = Saves/adds to existing space (within 31.3)
B = Adds new space (beyond 31.3)
C = Treatment alternatives at Vit
D = CHG retrieve and store or treat elsewhere

S = Strategy to consider
SA = Stand-alone action
F = Follow on recommendation to accommodate waste Post 2011

BRAINSTORMING

ACCOMMODATE (IN-TANK) WASTE

A1 Concentrate to DSSF and accept small gas releases
B1 Raise allowable liquid levels
A2 Combine currently segregated waste
A1.1 Concentrate to max and separate supernate and solids
~~— Separate aluminum to concentrate~~
A3/D1.1 Separate nonhazardous non-rad fractions ~~(After 2007-2011)~~
D1 Low volume capacity process unit
A4 Combine aging waste
A5 Reduce reserve requirements
A5.1 Utilize watch-list tanks
A5.2 Utilize feed source/staging tank head space
B2 Utilize compliant alternative storage for emergency reserves (Grout vaults)
~~— Release retained gas~~
~~— Concentrate 1.5 reduction~~
~~— Concentrate to solids and remove all supernate~~
A1.2 Create a dry/solids tank
~~— Cool waste until it contracts~~
~~— Heat tanks until they expand~~
B.2.1 Use current emergency DST space by designating temporary tanks as emergency space
~~— Fill the annulus~~
B3 Put liners in SSTs
~~— Put barriers around SST (double containment)~~
~~— De-list tank waste~~
~~— Drill lateral drywells under SSTs~~
B4 Consolidate SST waste in SST system
~~— In-situ vitrification~~
~~— Allow it to leak~~
C1.2 Blend feed to vit plant

BRAINSTORMING

ACCOMMODATE (IN-TANK) WASTE

C1.1 Pre-concentrate to the vit plant
A6 Decrease operational space
- ~~Account for released gas in SST~~
- ~~Implement clean salt removal system~~
- ~~Use other salt removal systems (e.g., diagnosis, membrane, ion exchange, etc.)~~
- ~~Evaporate dissolved ammonia in DSTs~~

A7 Postpone deactivation of facilities (e.g., PFP)
A8 Postpone watch list tank dilution
C1 Optimize the waste treatment sequence (low aluminum first)
A1.3 Look at SPG limits in tank
- ~~Pack particles closer together~~
- ~~Consolidate all non-clearing C tanks~~
- ~~Relax 99% retrieval constraint~~

BRAINSTORMING

ACCOMMODATE (IN-SYSTEM) WASTE

B2.2 Use DCRTs

- Consider emergency storage

~~- Use 244-AR vault~~

~~- Use 244-CR vault~~

~~- Line Grout facility~~

~~- Inactive cross site transfer lines~~

~~- Don't flush active cross site transfer lines~~

B5.1 Use LERF for interim storage

D1.2 Move vit plant pre-treatment processes between DSTs and SSTs

~~- Grout and fill 242T and 242S~~

C2 Use vit plant processing tank early

~~- Fill PUREX tanks~~

~~- Fill B-Plant~~

~~- Fill canyon bldgs~~

~~- Fill Redox~~

~~- Fill T-Plant~~

~~- Fill U-Plant~~

~~- Put bladders in canyon bldg~~

S1 Convert waste to dry-form and interim storage

B5 Fleet of double-contained ~~tanker trucks~~ surface storage (e.g., tanker trucks, rail cars, LERF)

~~- Fleet of double contained rail cars~~

~~- Use existing rail cars~~

~~- Bladders for existing rail road cars~~

~~- Close easy tank bite elephant from other end~~

~~- Fill abandoned pipe systems~~

~~- I am not familiar~~

~~- Fill up DCRTs~~

~~- Fill up abandoned pipe annular spaces~~

~~- I'm running out~~

BRAINSTORMING

ACCOMMODATE (IN-SYSTEM) WASTE

- ~~Reconnect and fill the IMUSTs~~
- ~~Line and fill abandoned catch and fill boxes (i.e., diversion boxes)~~
- ~~Seal and fill DCRT vaults~~

BRAINSTORMING

ACCOMMODATE (OTHER) WASTE

B6 Use grout vaults

~~- Fill FFTF~~

~~- Fill HAMMER~~

B5.2 WNP 1 and 4

~~- FMEF~~

~~- Build LERF equivalent facilities~~

~~- Field storage basins~~

~~- Fuel storage basins~~

~~- Market millions of milligram sample~~

B7 Build DST (new)

- Use old design, MWTF, AQ, AT

B5.3 Build inexpensive DST kind

B5.4 Compliant open air above ground bladders

D1.3 Use low volume capacity unit (in-coming waste)

~~- Use old tank farm designs~~

D2 Use Grout vaults with better waste form than grout

~~- Process waste direct out of SST (post 2007)~~

~~- Fill cocooned reactors~~

~~- Ship waste to DWPF~~

S2 Reduce volume of new waste at sources

S3 Build full-size vit plant

~~- Build many vit plants~~

~~- Build mini-vit plants~~

D1.4 Small mobile vit plant

C3 Accelerate vit plant commissioning

~~- Ship liquid waste to Yucca~~

~~- Use abandoned BWIP tunnels~~

~~- Bladders in burial boxes~~

~~- Delist waste and ship to WIPP~~

BRAINSTORMING

ACCOMMODATE (OTHER) WASTE

- ~~Get Yucca to accept waste as is~~
- ~~Ship waste to West Valley~~
- ~~Solidify and drum~~
- ~~Ship to former USSR in compliant barges~~
- ~~Fill submarine vaults~~

BRAINSTORMING

SHOTGUN COMBINATIONS

A9 Eliminate saltwell pumping until retrieval

A1.4 Concentrate to the max, and install mixer pump (group/concentrate)

A9.1 Use saltwell liquor from one tank to retrieve another

- ~~Small on tank clean salt routed into high integrity containers~~
- ~~Insert mini-vit plant between salt and high integrity containers~~
- ~~Dry waste form in canister barrels and put back in SSTs for later retrieval~~
- ~~Put containerized waste in grout vaults~~

C1.3 Blending retrieved SST material with Vit plant feed

C4 Use guts, feathers, and all for Vit plant (i.e., blend and vitrify)

C4.1 Vortec melter via above

- ~~Melt and pour directly into emptied SST~~

A9.2 Investigate lower dilution ratio retrieval methods (save water)

A9.3 Retrieve as solids

A9.4 Transport as solids

F1 Excavate SST farm and convert to above ground storage

F1.1 Seek Part B hazardous waste permit

- ~~Solidify waste and fill canyon facilities~~

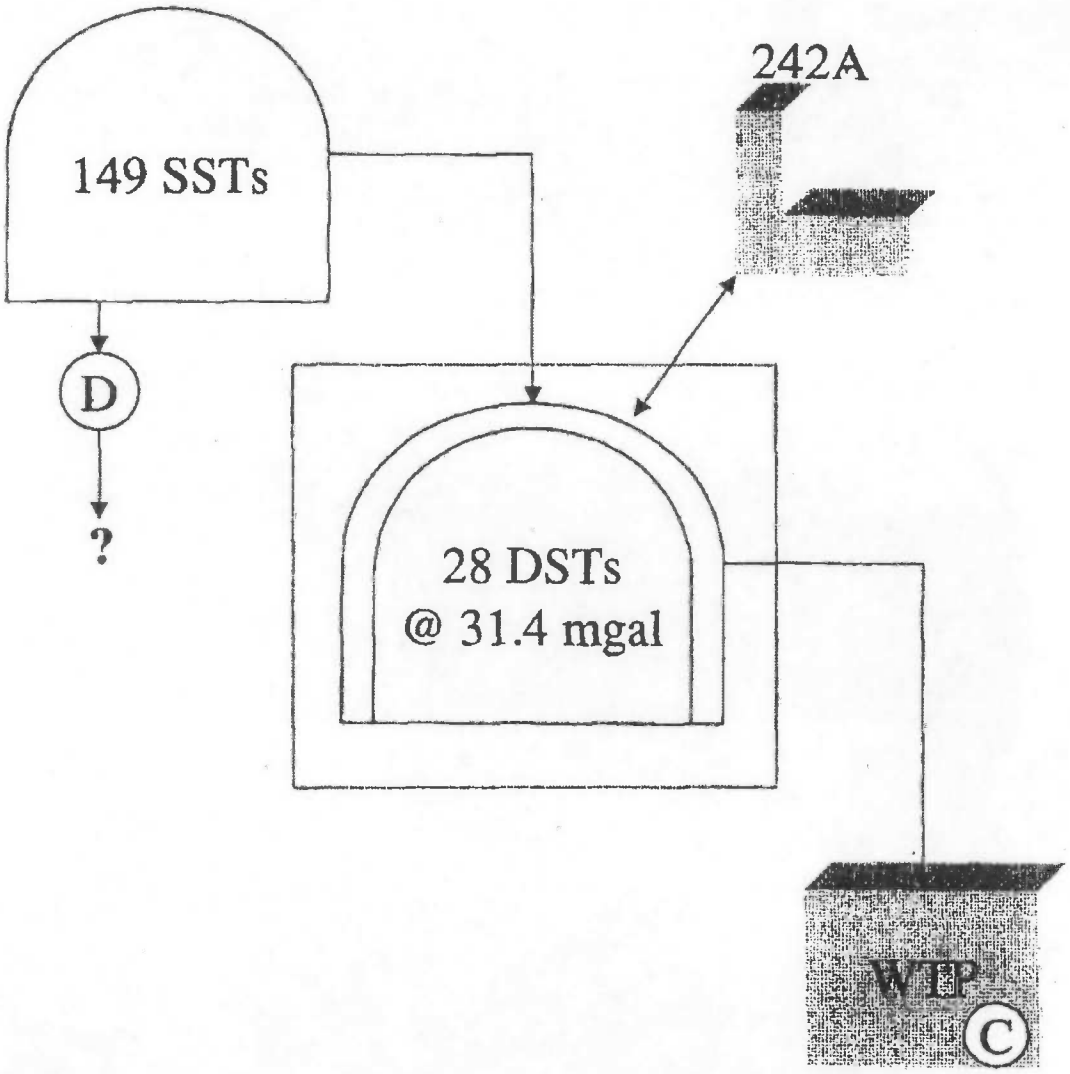
D3.1 Dry, pelletize waste form for interim storage

- ~~Use "just in time" processing (small units) to expand as needed~~

D3 Stabilize (kitty litter), interim treat (encapsulate) to store in above-ground piles

- ~~Evaporate low aluminum containing waste only/first~~

S4 Redefine high level waste to a nuclide activity basis


149 SSTs
242A
D
?
28 DSTs
@ 31.4 mgal
WIP
C

THREE QUESTIONS

1. What's the problem to be solved?

   Run out of SST retrieval space by 2007 (i.e., accommodate waste)

2. Why is that a problem?

   Need to demonstrate compliant SST retrieval progress through 2011

3. What are the consequences if the problem is not solved?

   Increase the risk of exposure to the environment and people including:

   - May require undeveloped retrieval technology
   - Significant cost increase
   - Missed TPA milestones

FUNCTIONS BRAINSTORMED

1. Accommodate (in-tank) waste
2. Accommodate (in-system) waste
3. Accommodate (other [tank/system]) waste
4. Combinations and/or shotgun (i.e., criss/cross)

WHAT IS KNOWN

- **TPA M-45-00** (Current)
  - By 2018, we will retrieve waste from all of the 149 SSTs
    - Defines heel as 360 cubic feet per tank (~1 inch of waste or ~2750 gals of residual waste)
    - Does cover additional scope items such as vadose zone, leak detection, etc.

- **TPA Change M-45-00-01A**
  - We will prepare three tanks for retrieval (C-104, S-112, and S-102) by 2006 and complete retrieval by 2007
    - S-112 retrieval by 9/05
    - S-102 retrieval by 9/06
    - C-104 start by 9/06 (end date to be negotiated; perhaps 2008)
  - Establishes renegotiation dates via Vit plant schedules, etc. (i.e., 2002 if there is a slip; 2004 if not)
  - Create M-45-012

- **TPA M-45-012-T01** (Resulting from M-45-00 and 01A)
  - Submit Options report documenting DOE assessment of actions that could be taken to increase available *tank space for SST waste retrieval
    - Evaluate/document options for additional space beyond the three tanks in 01A with principal required and detailed cost and schedule for implementation
    - Due date is Feb. 2002

- **PI 4.5.1,** Item/Requirement 3
  - Complete/submit Options report on *tank space (i.e., M-45-012-T01) by March 31, 2001

  *Compliant and/or compliance

WHAT IS KNOWN

- **OWVP Rev. 26A**
  - Current Vit plant schedule will not free up sufficient tank space to support M-45-00 by 2018 (~ 87 DSTs short)
  - Three cases identified as potential options to deal with space needs
    1. Retrieve smallest volumes first you will exceed DST space by 2010; therefore, build 87 new DSTs by 2018 for ~$6.6 billion
    2. Retrieve waste slower than Case 1, complete SST retrieval by 2033. Requires 15 new tanks (7 by 2013, 8 more by 2018) for ~$1.2 billion
    3. Run Vit plant at 5X (760% of design capacity) to accelerate schedule completion in FY 2024, requires 4 new DST at ~$500 million
       - Assumes a super fast melter (i.e., something >12 melters)
    - Case(s) Assumption

    <u>All Cases</u>
    - 2 plans have been built
    - High sodium loading
    - Interim stabilization and other waste receipts stay on schedule
    - Lose 1 DST every five years, starting in 2017
    - Vit starts in 2007
    - Case 1 and 2 operates Vit at 150%

    <u>Case 1</u>
    - SST retrieval completed by 2018
    - Meets all TPA milestones

    <u>Case 2</u>
    - Completes retrieval by 2033

    <u>Case 3</u>
    - Super Vit, completes retrieval by 2024
    - Page 84-85 identified 26 space saving alternatives
    - OWVP addresses a subset of the tank space problem/issue/concern

WHAT IS KNOWN

- **FY2000 Sequence**
  - OWVP issued in August
  - TPA negotiation finished in August
  - FY 2000 sequence was updated in September
  - Identifies that 15 tanks can be retrieved by 2018, balance by 2033
  - Identifies the tank retrieval sequence based on a 2007 Vit start and ramp up of capacity
  - Assumptions:
    - No new tanks
    - Basic upgrade of case 2 in the OWVP document. The difference is time and sequence

MEMORIES

- ✓ Identify who will lead/manage correction of the Options Study report
- ✓ Not retrieving waste will not be an option to this effort
- ✓ Alternate processes (e.g., grout, etc.) will not be excluded
- ✓ Seven year delay to get DST doesn't fit with a four TPA re-negotiation
- ✓ Need PIO guidance
- ✓ Identify options to run on the model
- ✓ Don't eliminate ideas that have long term value

ISSUES/CONCERNS

- ✓ Current Vit plant design will not support a 2018 date via space needs (i.e., M-60 says build a Vit plant to handle 25% of activity and 10% of volume)
  - We have a volume imbalance
- ✓ The technical community determined tank space shortage/needs as early as 1991
- ✓ Retrieving13 tanks a year after 2018
- ✓ Linking technical thoughts, and mass balance with the budget
- ✓ Ramifications of mass balance has not been defined on any schedule
  -

CONCLUSIONS/ACTIONS

1. The team to complete the formal Options Study report by 3/31/01

   Lead - TBD in Process Control by 12/15/00
   Action: Cherri DeFigh-Price/Rex Thompson

   "Key" Players:
   DST Programs: TBD
   Inventory Flow sheet Inventory Engineering: John Garfield
   Environmental: Joel Hebdon
   Waste Treatment Plant: TBD
   SST Science Support Team: TBD
   SST Programs: Rex Thompson
   Nuclear Licensing: John Harris
   Operations: TBD

   Finalize names by 12/15/00
   Action: Rex Thompson

2. Conduct informal Ecology meeting
   Action: Cherri DeFigh-Price/Bob Lober or Joe Cruz by 12/11/00

3. Schedule Options Priority Workshop for January
   Action: Rex Thompson by 12/18/00

   January team members
   WDOE – 3 TBD
   ORP – 2 TBD
   HAB – ≤4 TBD
   CHG etc. - ~6 Pete Sederburg, Rex Thompson, Cherri DeFigh-Price, TWT: George Reddick, SST Science, Joel Hebdon, Nick Kirch

   15 TOTAL

OPTIONS FOR FURTHER STUDY

A. SAVES/ADDS TO EXISTING SPACE (WITHIN 31.3)

1 Concentrate to DSSF and accept small gas releases
   - 1.1 Concentrate to max. and separate supernate and solids
   - 1.2 Create a dry-solids tank
   - 1.3 Look at SPG limits in tank
   - 1.4 Concentrate to the max, and install mixer pump (group/concentrate)

2 Combine currently segregated waste

3 Separate nonhazardous non-rad fractions

4 Combine aging waste

5 Reduce reserve requirements
   - 5.1 Utilize watch-list tanks
   - 5.2 Utilize feed source/staging tank head space

6 Decrease operational space

7 Postpone deactivation of facilities (e.g. PFP)

8 Postpone watch list tank dilution

9 Eliminate saltwell pumping until retrieval
   - 9.1 Use saltwell liquor from one tank to retrieve another
   - 9.2 Investigate lower dilution ratio retrieval methods (save water)
   - 9.3 Retrieve as solids
   - 9.4 Transport as solids

OPTIONS FOR FURTHER STUDY

B. ADDS NEW SPACE (BEYOND 31.3)

1 Raise allowable liquid levels
2 Utilize compliant alternative storage for emergency reserves (Grout vaults)
   2.1 Use current emergency DST space by designating temporary tanks as emergency space
   2.2 Use DCRTs
      - Consider emergency storage
3 Put liners in SSTs
4 Consolidate SST waste in SST system
5 Double-contained surface storage (e.g., tanker trucks, rail cars, LERF)
   5.1 User LERF for interim storage
   5.2 WNP-1 and 4
   5.3 Build inexpensive kind
   5.4 Compliant open air above ground bladders
6 Use Grout vaults
7 Build DST (new)
   - Use old design, MWTF, AQ, AT

C. TREATMENT ALTERNATIVES AT VIT

1 Optimize the waste treatment sequence (low aluminum first)
   1.1 Pre-concentrate to the Vit plant
   1.2 Blend feed to Vit plant
   1.3 Blending retrieved SST material with Vit plant feed
2 Use Vit plant processing tank early
3 Accelerate Vit plant commissioning
4 Use guts, feathers, and all for Vit plant (i.e., blend and vitrify)
   4.1 Vortec melter via above

OPTIONS FOR FURTHER STUDY

D. CHG RETRIEVE AND STORE OR TREAT ELSEWHERE

1 Low volume capacity process unit
   1.1 Separate nonhazardous non-rad fractions
   1.2 Move Vit plant pre-treatment processes between DSTs and SSTs
   1.3 Use low volume capacity unit (incoming waste)
   1.4 Small mobile Vit plant
2 Use Grout vaults with better waste form than Grout
3 Stabilize (kitty litter), interim treat (encapsulate) to store in above-ground piles
   3.1 Dry, pelletize waste form for interim storage

STRATEGIES TO CONSIDER

1 Convert waste to dry-form and interim storage
2 Reduce volume of new waste at sources
3 Build full-size Vit plant
4 Redefine high level waste to a nuclide activity basis

FOLLOW ON RECOMMENDATION TO ACCOMMODATE WASTE POST 2011

1 Excavate SST farm and convert to above ground storage
   1.1 Seek Part B hazardous waste permit

TANK SPACE OPTIONS STATUS WORKSHOP

January 12, 2001

Hanford Training Center
Willamette Falls Room

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CONTENTS

- Agenda, Attendees, Guidelines and Expectations, Opening Remarks

- Options for Further Study
  - Identified as likely or less likely to alleviate 2007-2011 situation
  - Potential New Options

- Tank Space Options Annotated Report Outline

- Memories

- Action Items

TANK SPACE OPTIONS STATUS WORKSHOP
Hanford Training Center, Willamette Falls
January 12, 2001

Purpose: Review, status, and solicit input on the current tank space options path forward and define success expectations for the final report.

AGENDA

8:00 - Welcome/Purpose, Introductions, and Opening Remarks
- Review Agenda, Guidelines and Expectations

8:45 - Review and Status Tank Space Options
- Overview November Workshop Results
- Begin to use parking lot sheets, as required

9:45 - **BREAK**

10:00 - Continue Review and Status of Tank Space Options
- Solicit input on current and potential new options
- Clarify Tank Space Options Report Path Forward

11:30 - **LUNCH**

12:30 - Define Success Expectations for Final Report
- Present draft report outline with example
- Solicit and finalize final report expectations

1:45 - **BREAK**

2:00 - Develop Path Forward
- Define communications plan
- Review/Validate parking-lot information sheets
- Identify actions required to proceed

3:00 - Finish Session with a Round-Robin Closeout
- Last minute items
- Meeting utility

Project Title: Tank Space Options Status Workshop
Location of Workshop: Hanford Training Center, Willamette Falls **Dates:** 1/12/01

TEAM MEMBERS

NAME	DISCIPLINE	CO.
C. (Cherri) DeFigh-Price (TL)	SST Interim Closure Prog.	CHG
R.R. (Rex) Thompson	SST Interim Closure Prog.	CHG
J.B. (Joel) Hebdon	Environmental	CHG
D. A. Reynolds	Process Control	CHG
V. C. Boyles	Process Control	CHG
J. G. Kristofzski	DST Program	CHG
J. P. (Pete) Sederburg	DST Program	CHG
P. A. (Perry) Meyer	SST Science Team	PNNL
D. (Dan) Simpson		HAB
R.W. (Bob) Lober	Strategic Planning	ORP
E. J. (Joe) Cruz	Project Requirements	ORP
R.G. (Russ) Harwood	Operations Support	ORP
M. (Melinda) Brown		Ecology
R. V. (Richard) Heggen		Ecology

Team Leader (TL)

FACILITATORS

NAME	DISCIPLINE	CO.
R.A. (Richard) Harrington, CVS	SST	CHG
R.E. (Robin) Kummer	SST	CHG

GUIDELINES AND EXPECTATIONS

- Open and honest communication
  - Active listening
  - Courage and consideration
- Identify facts vs. perceptions
- Be succinct → make your point
- Considerable options were identified
  - Are there any others?
- Final report expectations
  - Review outline and example
  - Clarify expectations
  - Want it right the first time
- Facilitator and you (roles)
  - Process vs. content
- Use of flipcharts, etc.
- Key to success
  - Communication
  - Clarity of expectations
  - Make a difference and have some fun ☺

OPENING REMARKS

- Thanks for your participation
- This is the document that identifies the options for the person/people to select the preferred approach(s)
- Proposing three categories:
  1. Most promising, viable options
  2. Viable options that may not be possible
  3. Captured ideas that are possible, but improbable
- Looking at the SST/DST time frame
  - 2006 supporting retrieval
  - 2006-2011 is the crunch years implement the viable options
- Don't want any surprises
  - Agree to the outline
  - Identify the right detail (i.e., success expectations)
- November workshop was truly an interdisciplinary team
- Draft report will be delivered by 3/31/01

ORP

- During SST negotiations
  - A lot of commitments; some didn't come true
- Two concerns:
  1. SST waste volumes/space to facilitate retrieval
  2. Go beyond the 99 report:
     - Acceptable options
     - Solicit feedback/input
     - Integrate and/or plan with Vit. schedule
- Want to do the best we can with what we have
  - Minimize risk to success
- Need everyone to have a voice
- Lots of customers
  - A real challenge
- One essential key interface is with Operations

OPENING REMARKS

Ecology

- Appreciate the opportunity to participate
  - Our concerns are the same as yours; lots of risk
    - Primary concern is tank space
    - We want the Vit. plant to operate, retrieval success with tank space
- It is difficult to respond to TPA without solid ideas to proceed forward (e.g., viable options)

HAB

- Looking for the right answer to meet our needs
  - Successfully support the outcome

PNNL

- We are excited and impressed with the effort to date. Space is the key to retrieval.

OPTIONS FOR FURTHER STUDY

A. SAVES/ADDS TO EXISTING SPACE (WITHIN 31.3)

4 - 1 Concentrate to DSSF and accept small gas releases
- 1.1 Concentrate to max. and separate supernate and solids
- 1.2 Create a dry-solids tank
- 1.3 Look at SPG limits in tank
- 1.4 Concentrate to the max, and install mixer pump (group/concentrate)
- 1.5 Raise Sg from 1.41 to 1.5

4 - 2 Combine currently qualified waste (feed tanks)

5 - 3 Separate nonhazardous non-rad fractions

4 - 4 Combine aging waste (AZ tanks)
- 4.1 Raising the limit >5 mo of sodium for aging waste tanks
- 4.2 Remove liquid from aging waste tanks (liquid is the bottleneck for pretreatment Cs)

4 - 5 Reduce reserve requirements
- 5.1 Utilize watch-list tanks
- 5.2 Utilize feed source/staging tank head space

4 - 6 Decrease operational space (i.e., head space)

4 - 7 Postpone deactivation of facilities (e.g., PFP)

4 - 8 Postpone flag gas, caustic or corrosion tank dilution (i.e., cut gas releases; e.g., flam gas)
- 8.1 Defer caustic additions to DSTs
- 8.2 Use something similar to the on-board ship generators, with caustic addition

4/5 - 9 Modify saltwell pumping until retrieval
- 9.1 Use saltwell liquor from one tank to retrieve another
- 9.2 Investigate lower dilution ratio retrieval methods (save water)
- 9.3 Retrieve as solids
- 9.4 Transport as solids

OPTIONS FOR FURTHER STUDY

A. SAVES/ADDS TO EXISTING SPACE (WITHIN 31.3)

5 - 10 Use evaporator as a chemical reactor specifically for organic tanks (Envelope C)

OPTIONS FOR FURTHER STUDY

B. ADDS NEW SPACE (BEYOND 31.3)

4 - 1 Raise allowable liquid levels

4 - 2 Utilize compliant alternative storage for emergency reserves

- 2.1 Use current emergency DST space by designating temporary tanks as emergency space (Grout vaults)
- 2.2 Use DCRTs
- • Consider emergency storage
- 2.3 Use the ½ Mgal Tank (empty) outside PUREX; a surge tank

5 - 3 Put liners in SSTs

5 - 4 Consolidate SST waste in SST system

4/5 - 5 Double-contained surface storage (e.g., tanker trucks, rail cars, LERF)

- 5.1 User LERF for interim storage
- 5.2 WNP-1 and 4
- 5.3 Build inexpensive kind
- 5.4 Compliant open air above ground bladders
- 5.5 Expand capacity of the WRFs (Waste Receiving Facilities)

5 - 6 Use Grout vaults

- 6.1 Restart Grout (for at least phosphate waste)

4 - 7 Build DST (new)

- • Use old design, MWTF, AQ, AT

OPTIONS FOR FURTHER STUDY

C. TREATMENT ALTERNATIVES AT VIT

5 - 1 Optimize the waste treatment sequence (low aluminum first)
- 1.1 Pre-concentrate to the Vit plant
- 1.2 Blend feed to Vit plant
- 1.3 Blending retrieved SST material with Vit plant feed

4 - 2 Use Vit plant processing tank early

5 - 3 Accelerate Vit plant commissioning

5 - 4 Use guts, feathers, and all for Vit plant (i.e., blend and vitrify)
- 4.1 Vortec melter via above

D. CHG RETRIEVE AND STORE OR TREAT ELSEWHERE

4 - 1 Low volume capacity process unit
- 1.1 Separate nonhazardous non-rad fractions
- 1.2 Move Vit plant pre-treatment processes between DSTs and SSTs
- 1.3 Use low volume capacity unit (incoming waste)
- 1.3.1 Ceramics (being explored at Los Alamos on a bench scale)
- 1.4 Small mobile Vit plant
- 1.5 Portable evaporators

5 - 2 Use Grout vaults with better waste form than Grout

5 - 3 Stabilize (kitty litter), interim treat (encapsulate) to store in above-ground piles
- 3.1 Dry, pelletize waste form for interim storage

LEGEND

4 = IV – Options evaluated likely to alleviate 2007-2011 situation

5 = V – Options less likely to alleviate 2007-2011 situation

POTENTIAL NEW OPTIONS

B6 Restart Grout (for at least phosphate waste)
A4 Raising the limit >5 mo of sodium for aging waste tanks
A4 Remove liquid from aging waste tanks (liquid is the bottleneck for pretreatment Cs)
D1.3 Ceramics (being explored at Los Alamos on a bench scale)
A8.1 Defer caustic additions to DSTs
A8.2 Use something similar to the on board ship generators, with caustic addition
A10 Use evaporator as a chemical reactor specifically for organic tanks (Envelope C)
B5.5 Expand capacity of the WRFs (Waste Receiving Facilities)
D1.5 Portable evaporators
B2.3 Use the ½ Mgal tank (empty) outside PUREX; a surge tank

- Strategy
  - Do not use premium tank space for emergency space

Tank Space Options Report
Annotated Outline

Executive Summary

A few words and table that defines the options and results (schedule, cost, PROs, CONs, etc.). A brief summary of the process used and why (the problem the milestone was addressing).

I. Introduction
(Describe the layout of the report)

II. Background
a. Define Tank Space Problem statement
Addressing specifics of near term retrieval and objective to continue retrieval of high-priority SSTs during completion and start-up of the Waste Treatment Facility.
b. Describe Existing Tank Facilities (a simple line diagram); consider the schematic tank system provided to Ecology for M-32 Admin. Order submission

III. Methodology for Study
Time frame and focus of Options Study
Actions taken to define problem and identify options.
i. Workshops (what, when, why; introduce the four categories developed, evaluation criteria, and Perry's chart)
ii. Describe evaluation groups
1. Likely to alleviate 2007-2011 situation
2. Longer term solutions
3. Discounted

IV. Options evaluated likely to alleviate 2007-2011 situation (~4-6 pages for each option)
1. Description
- What is the concept
- Why will it increase available space
- Approximately how much space will be created
2. Background (source of reference list)
- Technical basis
- Prior studies
- Any implementation
3. Criteria for evaluation (briefly describe how this option matches)
- Technical feasibility
- Environmental risk reduction
- Worker health and safety
- Supports mission requirements
- Meet schedule
- Maintenance/operability
- Cost effective

- Ease of operations
- Regulatory impacts
- Other considerations and ancillary benefits

4. Cost estimate to implement and life-cycle cost considerations
   - Basis of cost
   - Uncertainty
5. Schedule
   - Basis of schedule
   - Uncertainty

V. Options evaluated less likely to alleviate 2007-2011 situation
(Brief outline of concept, potential benefits, rough estimate of timing separated into four categories: A. Saves/adds to existing space [within 31.3], B. Adds new space [beyond 31.3], C. Treatment alternatives at Vit Plant, and D. CHG retrieve and store or treat elsewhere)

VI. Options Also Considered
(A couple of sentences expanding description, reasons)

VII. Summary

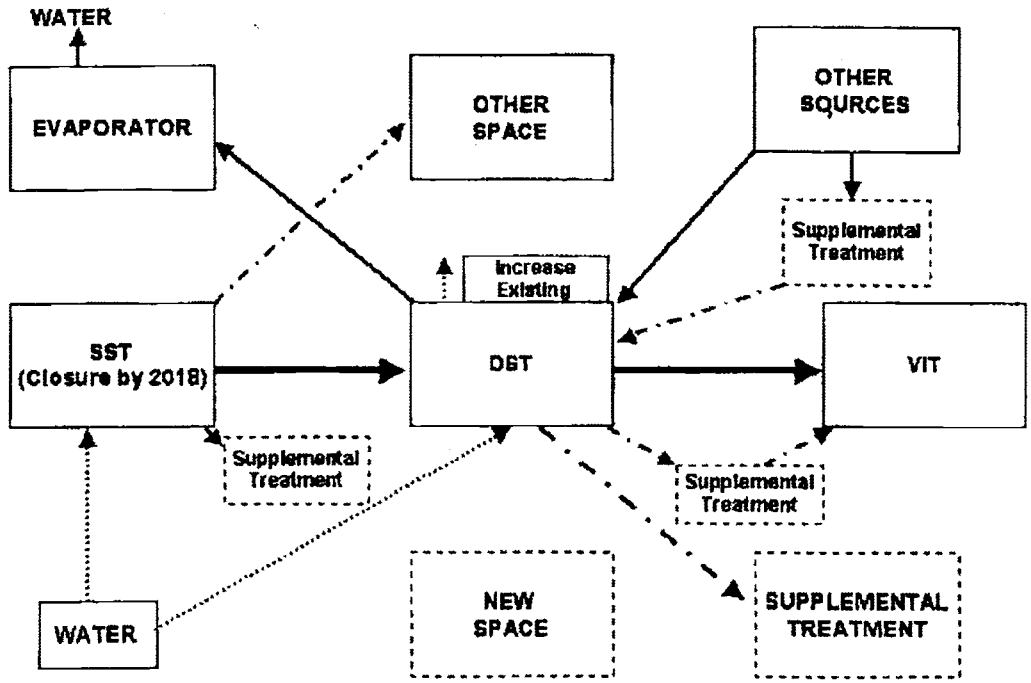
VIII. References

Appendices
A. November 29-30, 2000 Workshop Notes
B. January 12, 2001 Workshop Notes

MEMORIES

- ✓ Consider options to "optimize" retrieval
- ✓ HLW is constrained by RCRA requirements; approved treatment is only Vit. for land disposal
- ✓ Second cross-site transfer line (to be considered via analysis)
  - Joe Cruz to update/interface with Richard Heggen
- ✓ Use pictures/graphics to minimize words (Rex and Vick, good stuff)
- ✓ Ecology cannot give any approval due to internal Ecology procedures; therefore, they cannot represent without peer review

✓ = Validated memory; no action



NOTE: Include ancillary items such as DCRTs, etc.

ACTIONS

WHAT	WHO	WHEN
1. Communication between now and 3/31/01 • ORP – Open informational/ informal interface as sections are completed - Including advance draft • HAB – With Joe, conduct path forward presentation at the February waste management meeting (HS&WM) • WDOE – Via Joe Cruz/Bob Lober, etc. provide updates for the monthly TPA Project Managers meeting.	Cheri DeFigh-Price/ Rex Thompson	
2. Convey results/path forward to ORP management and convey outcome to Cherri DeFigh-Price	Joe Cruz	1/19/01
3. Provide WDOE advanced draft report informally	Joe Cruz	3/10/01
4. Convey results/path forward to WDOE management and convey outcome to Joe Cruz (Joe to Cherri DeFigh-Price)	Melinda Brown and Richard Heggen	1/23/01
5. Issue draft typed flipcharts and updated option pages to entire team via e-mail	Richard Harrington/ Robin Kummer	1/16/01

Johnson, Jeremy M

From:	Nguyen, Duc M
Sent:	Wednesday, October 10, 2012 11:16 AM
To:	Wold, Kristi (Washington State Department of Ecology); Lyon, Jeffery; Hendrickson, Michelle (Washington State Department of Ecology); 'Barnes, Michael (ECY)'
Cc:	Mauss, Billie M; Johnson, Jeremy M; Reynolds, Jacob G
Subject:	AY-102 Annulus DQO and SAP
Attachments:	RPP-53434-R0.pdf; RPP-PLAN-53352-00.pdf

Attached are the DQO and SAP. Please let me know if you have any questions about these documents.

Thanks,

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DOCUMENT RELEASE FORM

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241-AY-102 Annulus Sampling Data Quality Objectives

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Key Words:
241-AY-102, 241 AY-102, annulus, sampling, analysis, data quality objective, tank waste, tank, Kaolite™, cement

Abstract:
This document describes the data quality objective requirements for sampling unidentified solids in the tank 241-AY-102 annulus.

Trademarks:
Kaolite is a registered trademark of Thermal Ceramics, Babcock and Wilcox Company

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LIST OF TERMS

Acronyms and Abbreviations

CAM	Continuous Air Monitor
DQO	Data Quality Objectives
HLW	High level waste
ORSS	Off-Riser Sampling System
PSQ	Principle Study Question
WTP	Waste Treatment and Immobilization Plant

1.0 INTRODUCTION

Tank 241-AY-102 was built in 1971. This tank has a history of anomalous and off-normal contamination problems related to construction, moisture in the annulus, and contamination in the tank annulus. During construction of the tank, numerous problems with welding were identified, because of the cold ambient air temperatures.

At the time of construction, it was noted that the tank has a substandard Kaolite™ [1] base that is soft, friable, and nearly cohesionless (ARH-1933, *Investigation of the 241-AY Insulating Refractory Task Force Report*). The Kaolite™ is a kaolin clay-based material used as a castable refractory material. The Kaolite™ 2200-LI was used as an eight-inch thick, refractory, insulating pad between the primary and secondary tank liners. The Kaolite™ was used to insulate the outer tank from high temperatures applied to condition the primary tank prior to use. The outer 21 inches edge of the damaged Kaolite™ was excavated and replaced by stronger Portland cement. Subsequently, additional problems were noted (RPP-19097, *Evaluation of Insulating Concrete in Hanford Double-Shell Tanks*).

Historically, condensation in the annulus has been noted; this may have originated by intrusion of rain water (7G410-JKE/MJR-007-005, *Evidence of Annulus Moisture Accumulation in Tanks 241-AY-101 and 241-AY102*). Some moisture is related to intrusion of water into the annulus through a gap and metal flashing. The moisture has been associated with corrosion and mineral deposits.

In the past, vapor contamination was noted in the annulus continuous air monitor (CAM) (HNF-4798, Rev. 0, *Tank 241-AY-102 Annulus Continuous Air Monitor High Readings*). Prior operations of the tank have resulted in tank levels so low as to permit contaminated tank vapors and/or aerosols to be drawn by vacuum into the annulus (Attachment A, Tardiff, G.R., *Evaluation of AY-102 Annulus CAM Readings*). Some gaskets that control vapors have failed.

Operation of the tank led to a variety of waste being stored in tank. Initially the tank served as the Aging Waste Spare for B Plant. It received Aging Waste starting in 1977. Through the 1980s and 1990s the tank served primarily as the Dilute Non-Complexed Waste receiver. In 1998, received waste from 241-C-106, the High Level Waste (HLW) feed for the Waste Treatment and Immobilization Plant (WTP). Subsequently, the Low Activity Waste feed for the WTP from 241-AP-101 was added to the tank.

With the modification of the tank ventilation system to receive the high-heat waste from C-106, the tertiary leak detection pit for AY-102 began to accumulate liquid at rate higher than previously experienced. This liquid was sampled in 2007 and it was shown to be slightly contaminated.

During the regular 2012 visual inspection of the 241-AY-102 annulus, unknown solids were observed in videos of the annulus of tank 241-AY-102. Problems were noted of newly identified masses of material and radioactive particles (Attachment B, Email from Cook, G. 2012-08-14, to Steve McKinney, *Optical and scanning electron microscope examination of AY102 residues and* Attachment C, Email from Rice, A. 2012-08-13, to McKinney, S. G; Washenfelder, D. J;

Boomer, K. D; Levy, G.; *AY102 Sample Update*). These solids were identified in WRPS-PER-2012-1363, entitled "*AY-102 Annulus Video Inspection – Potential Intrusion Identified.*" These unknown masses are the subject of this DQO process to determine sampling and analysis needs. Additional masses of material were located near Riser 83 (Attachment D, Email from Engeman, J. to Little, D. B; Sams, T. L., 2012-8-29, *AY-102 Riser 83 Inspection Results*).

Preliminary radiological screening (Attachment C) and scanning electron microscope/energy-dispersive X-ray spectroscopy of grit collected below the riser indicate that the particles are radioactive and have elements associated with tank waste. The unknown materials include the following:

- A small dome about 8 inches high and about 3 by 2 feet covering one of four air supply ventilation pipes for the tank (Figure 1-1). The material covers most of a horizontal run to where the pipe turns ninety degrees under the tank through the Portland Cement repair and Kaolite™ 2200-LI insulating refractory material to center of the tank. From visual observations of video footage, the material appears red-brown in color, but this color may only be on the surface and it may cover a white material below. This deposit is located directly below annulus exhaust Riser 92, where construction activities replaced corroded annulus vent piping in 1989.

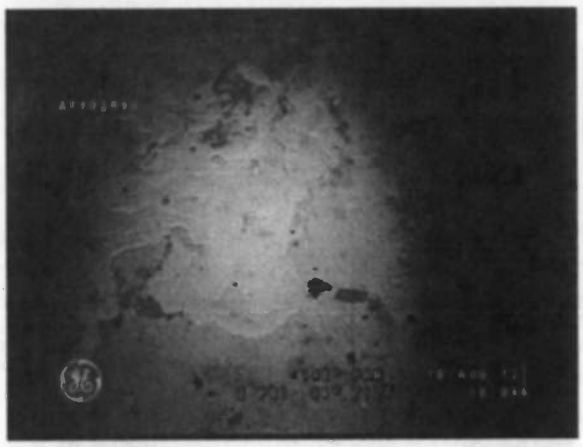
Figure 1-1. Mound Covering Inlet Air Pipe

- A small cascade of white material coming out from under the inner tank (Figure 1-2) through a cooling air channel in the Portland Cement and Kaolite™ extending downward about 6 ½ inches on the steel retaining ring to the floor of the annulus of the tank. The air channel (1 ½ inch by 1 ½ inch) has been filled with what appears to be white material.

Figure 1-2. Cascade from Air Channel

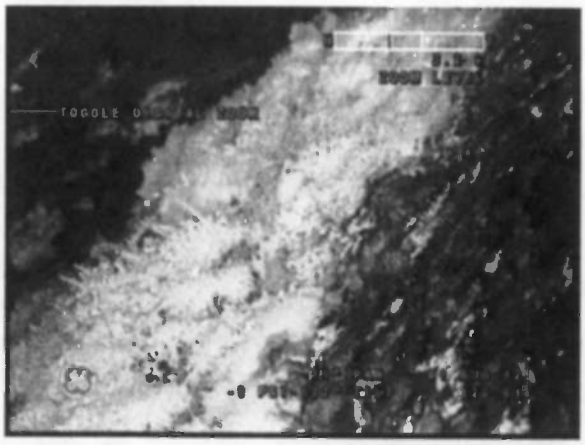
- A white, horizontal flow of materials along the floor under riser 92 (Figure 1-3).

Figure 1-3. Material on the Floor of the Annulus under Riser 92



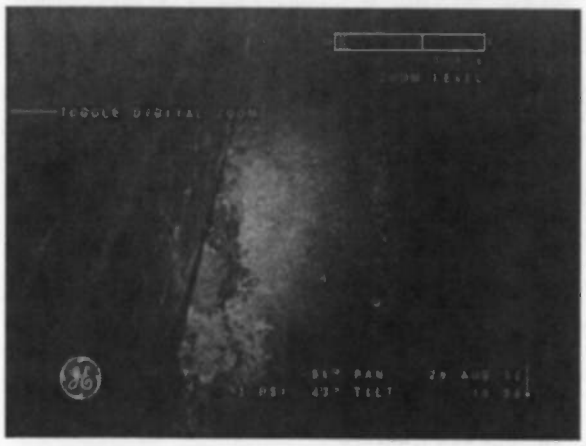
- An accumulation of whitish material is present on the top side of the inner tank (Figure 1-4). This material is located above the liquid level in the tank near the junction of the primary tank and the secondary liner. In detailed photographs, the material is clear to whitish. Well-formed clear to white crystals, some of which appear to extend upward, forming complex patterns.

Figure 1-4. Annulus Crystals



- Ongoing investigations may identify additional materials in the annulus which may also require evaluation as outlined in this DQO. One such material appeared to be a thin layer of solids on the annulus floor under Riser 83 (Figure 1-5).

Figure 1-5. Materials on the Floor of the Annulus under Riser 83



The proposed conceptual models for transport of the material masses and/or contamination are the following:

- Intrusion of rain water or spilled surface water through the tank flashing and leachates from concrete and possible leachates from contaminated backfill over the tank
- Leachates from Kaolite™ refractory due to water intrusion or refluxing in annulus, possible during lengthy annulus ventilation outages.
- Soil and/or rust through a hole in a pipe (e.g., annulus ventilation pipe/duct)

- Vapor and/or aerosol transport of tank waste from the primary tank headspace when the annulus-pump-pit, drain-down pipe was uncovered by low levels of tank supernate and by failure of gasket seals.
- Deposit from construction debris or soil backfill during reconstruction of annulus ventilation piping in 1989 past water intrusions; or
- Tank leak.

It is unknown if contamination is present solely on the surface of the features or if contamination is distributed through the mass of the structures. If determined, the distribution of the contamination might contribute to an understanding of the origin of contamination and the transport mechanism.

The evaluation and interpretation of analytical results along with other information will be used by an established, formal tank leak assessment group and process (TFC-ENG-CHEM-D-42, *Tank Leak Assessment Process*). A formal technical evaluation will be reviewed and approved by the Executive Safety Review Board and issued as a final assessment report.

Corrosion data may be needed to evaluate the potential effects of these solids on the secondary shell. The metal in the secondary shell is potentially more prone to corrosion than the primary shell because the primary shell has been heat treated.

A multi-disciplinary team met and developed the data quality objectives (DQO) for sampling and analysis of the unknown solids. The DQO process was conducted according to TFC-ENG-CHEM-C-16, as revised, *Data Quality Objectives for Sampling and Analyses*. Results of the DQO process are documented in the following sections.

2.0 PROBLEM STATEMENT

The DQO problem statement was decided as:

In order to identify the unknown materials found in the 241-AY-102 annulus to support a tank leak assessment, sample data are needed.

3.0 DECISION STATEMENTS

Principal Study Question (PSQ) – *Are the characteristics of the solids in the Tank 241-AY-102 annulus consistent with tank waste?*

A secondary question is *whether or not the unknown material could harm (corrode) the secondary steel shell.* (Additional analyses or tests may be performed on the 241-AY-102 annulus solids to answer this question if sufficient sample volumes can be collected.)

Alternatives for the PSQ:

- Tank waste leak;
- Tank vapor or aerosol deposition;
- Leachates from Kaolite™ refractory material;
- Leachates from Portland cement;
- Rust;
- Other unidentified sources (contaminated backfill soil, leachate from surface soil, leachate from Kaolite™ or cement, etc.);
- A mixture of these materials.

Additional new anomalies may be found.

The decision statement is developed by combining the PSQ and the alternatives.

Decision Statement:

Determine if the characteristics of the solids in the Tank 241-AY-102 annulus are consistent with tank waste and conclude that the sample results are an indication of a tank leak; otherwise, conclude that the solids are Kaolite™ refractory, Portland cement, rust, or an unidentified source (such as soil, leachate from surface soil, leachate from Kaolite™ or cement or mixture of materials).

As stated earlier, sample results are only one of a number of sources of information that will be used in the tank leak assessment.

4.0 DATA INPUTS

The samples will be analyzed for analytes that are "signatures" of source materials discussed in this DQO. The DQO team identified the signature analytes as follows.

a) Tank waste signature analytes:
   - Soluble salt crystals – sodium nitrate, sodium nitrite, ammonium nitrate, sodium carbonate, sodium phosphate, sodium fluoride phosphate, and mineral species;
   - Insoluble – Fe, K, Na, Ca, Al;
   - Radiochemistry – ^{137}Cs, ^{90}Sr, ^{60}Co; and
   - pH and hydroxide titration.

b) Kaolite™ 2200LI signature analytes: Al, Si, Ca, and mineral species;

c) Portland cement signature analytes: Ca, Si, Mg, Al, and mineral species;

d) Unidentified source signature analytes: Si for soil, Ca for leachate, and mineral species;

If sufficient sample materials are collected and the other data indicate a need for these tests, a test plan will be developed for corrosion testing. One or more of the following analyses or tests may be performed: pH, OH^- titration, Cl^-, F^-, NO_3^-, NO_2^-, PO_4^{-3}, SO_4^{-2}, corrosion coupons, and corrosion rate, crevice corrosion, electrochemical test, passive immersion test, scanning electron microscope, and cyclic potentiodynamic polarization.

The data inputs based on the signature analytes are summarized in Table 4-1. The preferred sample preparation is fusion digest.

The laboratory will perform quality control sample analyses (laboratory control samples, blanks, matrix spikes, etc.) at the frequency specified in the reference method. Analytical quality control results shall meet the laboratory statistical process control limits. The laboratory will use the largest sample aliquot and/or the smallest dilution possible to obtain the lowest practical detection limits.

Table 4-1. Data Inputs

Analytical Method	Required Data	Comments
Analytical Methods for Surface Samples		
GEA	^{137}Cs, ^{60}Co	
Beta counting	^{90}Sr	
Solid phase characterization (PLM, SEM, EDS, XRD)	Mineral species	
Solid Specific Gravity	Solid Specific Gravity	Performed if sufficient material is retrieved
TGA	Weight Percent water	
IC	NH_4^+	
pH	H^-	Liquid/solid (1 to 1 proportions)
Analytical Methods for Bulk Samples		
GEA	^{137}Cs, ^{60}Co	
Beta counting	^{90}Sr	
Solid phase characterization (PLM, SEM, EDS, XRD)	Mineral species	
Solid Specific Gravity	Solid Specific Gravity	Performed if sufficient material is retrieved
TGA	Weight Percent Water	
ICP/AES	Fe, K, Na, Ca, Al, Si, Mg	
IC	F^-, NO_3^-, NO_2^-, PO_4^{3-}, SO_4^{2-}, NH_4^+	
pH	H^+	Liquid/solid (1 to 1 proportions)
Persulfate with Coulometric detection	TIC/TOC	

Abbreviations:

EDS=energy-dispersive X-ray spectroscopy
GEA = Gamma Energy Analysis
IC = ion chromatography
ICP/AES = inductively coupled plasma/atomic emission spectrometry
PLM = polarizing light microscopy
SEM = scanning electron microscope
TGA = thermogravimetric analysis
TIC/TOC = Total inorganic carbon/total organic carbon
XRD = x-ray diffraction

5.0 STUDY BOUNDARIES

This step in the DQO process defines the spatial boundaries for the required sampling and analyses needed to make the necessary decisions. The spatial boundaries define the physical area to which the decisions will apply and where the samples should be taken. In addition, this portion of the DQO addresses any sampling constraints.

The spatial boundaries for sampling and analysis of unknowns in the tank annulus are the following four identified media:

1. Cascading material at the air slot
2. Brownish colored mound adjacent to pipe at base of tank annulus near Riser 90
3. Thin layer of material on the annular floor near the plugged air slot
4. White to clear crystalline material on the top of the primary tank near Riser 89.

As inspections and surveys continue, additional anomalies may be found, sampled, and analyzed.

Sampling is constrained to existing access ports. Internally in the annulus, various features constrain access.

Analyses may be constrained by sample volumes. Radiological and chemical data are of primary importance and corrosion data are secondary in priority.

6.0 DECISION RULES

The DQO team agreed on the following criteria for determining whether or not the solids are tank waste:

1. The solids are tank waste if the concentrations of the tank waste signature analytes, concentration ratios of ^{137}Cs and ^{90}Sr (and ^{60}Co, if detected) to Na, and mineral species are consistent with those of dried 241-AY-102 tank waste and contaminants are not found only on the solids surface.
2. The solids are not tank waste if the composition (concentration and relative abundance) and mineral species of each material are consistent with those of other materials identified in this DQO.

Based on the above criteria, the decision rule is the following:

If the concentrations of tank-waste-signature analytes, ratios of ^{137}Cs and ^{90}Sr (and ^{60}Co, if detected) to sodium, and mineral species in the solids are consistent with those of a dried 241-AY-102 tank waste and if contaminants are determined not to be surface contamination, then it will be concluded that the sample results may be one indication of a tank leak, otherwise, it will be concluded that solids probably are not a result of a tank leak.

If the solids are concluded probably not to be tank waste, then the composition and mineral species of the solids will be compared to those of the materials identified earlier in this DQO to identify the source material.

[Note: Final analysis of data will be conducted by the tank leak assessment groups.]

7.0 ERROR TOLERANCE

As indicated earlier, the determination of the source of materials in the 241-AY-102 annulus will be based on a combination of concentration, ratios of contaminants, and mineral species. Therefore, no numerical uncertainty is specified. Other aspects and data from additional sources will be evaluated and used by the Leak Assessment Technical and Executive Groups to increase confidence in data and decisions.

8.0 SAMPLING DESIGN

The priorities for sampling the locations were determined to be:

1. Cascading whitish material at the air slot near Riser 92.

2. Brownish colored mound adjacent to the air supply ventilation pipe at base of tank annulus near Riser 90.

3. Thin layer of whitish material on the annular floor near the plugged air slot near Riser 92 – based on the videos, this material appears to be the same as the cascading material at the air slot. Therefore, it was given the third highest priority.

4. White to clear crystalline material on the top of the primary tank near Riser 89.

5. Additional materials, as located. Any other deposits discovered during ongoing investigations will be prioritized according to their location, appearance, and perceived potential to have a tank waste origin. One such material appeared to be a thin layer of solids on the annulus floor under Riser 83.

The solids under Riser 83 appeared accessible for sampling using the Off-Riser Sampling System (ORSS). One ORSS grab sample will be taken at this location. Because the solids appear to be a thin layer, only a bulk sample is needed.

It was decided that, of the remaining locations, the priority locations 1 and 2 will be sampled first. Based on the results of the samples taken from the first two locations, a decision will be made on whether or not to select samples from the other locations.

It is desirable to be able to distinguish surface from non-surface contamination for samples taken from locations 1 and 2. Therefore, if a sampler which obscures the spatial configuration of the specimen (e.g., an auger, scoop, or chipping tool) is used, two samples will be taken at each location, one at the surface (approximately 3/8-inch deep) and one bulk sample (preferably where the surface sample was taken). If a sampler which preserves the spatial configuration of the specimen (e.g., a core sampler) is used, only one sample is needed.

Sufficient material shall be collected for the analyses and tests specified in Table 4-1. In addition, the bulk or core samples must be large enough to be representative of the bulk material. The required sample amount will be specified in the sampling and analysis plan.

9.0 REFERENCES

7G410-JKE/MJR-007-005, *Evidence of Annulus Moisture Accumulation in Tanks 241-AY-101 and 241-AY102*, CH2M HILL Hanford Group, Inc., Richland, Washington, February 8, 2007.

ARH-1933, *Investigation of the 241-AY Insulating Refractory Task Force Report*. Atlantic Richfield Hanford Company, October 30, 1970.

HNF-4798, Rev. 0, *Tank 241-AY-102 Annulus Continuous Air Monitor High Readings*, Lockheed Martin Hanford Corporation, July 28, 1999.

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TFC-ENG-CHEM-C-16 (procedure), *Data Quality Objectives for Sampling and Analyses*, as revised, Washington River Protection Solutions LLC, Richland, Washington.

TFC-ENG-CHEM-D-42 (procedure), *Tank Leak Assessment Process*, Rev. B-4, Washington River Protection Solutions LLC, Richland, Washington.

WRPS-PER-2012-1363, *AY-102 Annulus Video Inspection – Potential Intrusion Identified*, Washington River Protection Solutions LLC, Richland, Washington.

ATTACHMENT A –
TARDIFT, G.R., *EVALUATION OF AY-102 ANNULUS CAM READINGS*
(UNPUBLISHED, UNNUMBERED, WHITE PAPER),
CH2M HILL HANFORD GROUP, JUNE 29, 2001

EVALUATION OF AY-102 ANNULUS CAM READINGS

G. R. Tardiff, AWF System Engineer
CH2M Hill Hanford Group, Inc. June 29, 2001

I. Purpose

In April of this year, the 241-AY-102 annulus continuous air monitor (CAM) began to show an upward trend in radiation readings. This paper provides a technical evaluation of the possible causes for the trend and discusses activities planned to resolve the elevated CAM readings. It also addresses the concerns of an ORP Facility Representative raised in June 2001.

II. Introduction

The annulus CAM samples air after it is discharged from the annulus, just upstream of the exhaust HEPA® filters. The purpose of the CAM is to detect leaks from the primary tank into the annulus. The latest readings have been less than 1500 counts per minute (cpm). The Action Limit setpoint for the CAM is 3000 cpm. Elevated CAM readings will result when contamination from the primary tank enters the annulus system. The contamination can enter the annulus via a direct leak, either liquid or vapor, from the primary tank, or as a vapor through other pathways that connect the primary tank vapor space with the annulus. The following discussion will address the various pathways that exist that may have allowed primary tank vapors to enter the annulus. The discussion will focus on past contamination of the annulus that may be contributing to the elevated CAM readings, and will describe the expected response of the CAM system to a leak from the primary tank to the annulus.

III. AY-102 Leak Path Evaluation

An overview of potential contamination pathways between the primary tank and the annulus, which were considered during the 1999 and 2001 investigations of elevated annulus CAM readings, is provided below. The potential leak pathways are shown on the attached AY-102 Leak Path Diagram. The pathways are color coded to correspond to the color noted in the parenthesis at the end of each of the following Section headings.

Leak Detection Pit and Annulus Pump Pit Cross-ties to Annulus Vent System (Green and Red)

All leak detection pits and annulus pump pits in AY and AZ tank farms are designed and built with an upper pit and lower pit. All upper pits contain components such as a drain line with a drain plug, 1 or 2 blanked wall nozzle connector heads, a transfer leak detector and either a transfer pump (mounted on a flange in the upper pit but extending into the lower pit) or a shield plug. All lower pits contain equipment such as the lower section of the pump; weight factor dip tubes and vent lines that tie into the annulus vent system.

All central pump pits (Blue), sluice pits, annulus pump pits and leak detection pits have drain-down legs that are piped back to the primary tank and are designed to discharge underneath the waste surface. However, the leak detection pits and annulus pump pits have the greatest potential to contaminate the annulus ventilation system since the lower part of these pits are vented directly to the annulus vent system. The purpose of the drain- down leg is to seal

vapors from the pits. This was a critical design feature since the Aging Waste Facility (AWF) tanks were designed to handle high heat boiling waste at elevated temperatures. Each drain-down leg stops approximately 60 inches above the bottom of the tank, and is normally submerged below the waste surface.

The drain-down leg design creates a potential contamination pathway from the primary tank vapor space to any of the connected pits, if the liquid level in the double shell tank (DST) drops below 60 inches. The amount of contamination going into the top part of the pits will be increased if an open pathway exists from the top part of the pit to the bottom part of the pit. The magnitude of the contamination spread will be greatly increased if the shield plug and drain plug are removed or improperly sealed. In the event that the annulus vacuum is greater than the primary tank vacuum, contamination spread could be further increased.

To reduce the potential for cross contamination from the primary tank into the lower part of the pits, shield plugs or metal plate covers have been installed in all pump positions for all the AY/AZ annulus pump pits, leak detection pits, central pump pits and sluice pits. All shield plugs and plate covers are fitted with gasket material to provide a positive seal. In most cases the gasket is made of neoprene. However, since most of these plugs have been in service for 20-30 years, gasket degradation is a credible possibility.

Verification that shield plugs or metal plate covers are in place cannot be completed without entering each pit or dropping a camera (if possible) into the pit. Within the last two years, three out of four annulus pump pits have been visually confirmed as having shield plugs or metal plate covers (all except AZ-102 annulus pump pit). None of the six leak detection pit shield plugs have been visually verified within the last 10 years.

Another potential pathway into the annulus vent system is through the pump out routes from the annulus pump pits. These transfer lines are potential sources of cross contamination into the upper part of the annulus pits. Based on the 200 East Area Routing Board, all transfer route nozzles in AY and AZ annulus pump pits and leak detection pits have either a PUREX head process blank (H-2-72284 and H-2-72285) or an isolation blank (H-2-73453).

Therefore, the potential for a large cross contamination pathway from these pits into the annulus ventilation system is substantially reduced. The largest leak would be reduced to small cracks in the gasket material as the gasket material deteriorates over time. This type of leak will most likely show up as a small increase in the contamination sensed by the annulus CAM.

Side Fill Lines in AWF DSTs (Light Blue)

Each of the four tanks in the AWF have four side fill lines. The lowest transfer line is at an elevation of approximately 370 inches from the bottom of the tank. Each side fill line is sleeved or encased and runs through the annulus space. The sleeving material is Type 304 stainless steel. The sleeve consists of a bellows (or expansion joint) and a packed flanged section welded to the primary tank. The transfer line itself is not welded to the primary tank but is supported by the flanged section. Between the flanged section and the primary tank and between the transfer pipe and encasement is a packing material sealing the encasement section

from the primary tank. The packing material is graphite impregnated with long fiber asbestos (RefH-2-67316 and H-2-64448).

There is a potential for this flanged section to leak waste or vapors from the primary tank into the annulus. To date, vapor leaks via annulus side fill lines have been theorized but never confirmed. Operation Limits contained within operating procedures are designed to control AWF liquid level below 364 inches to prevent waste attacking the packing or waste pressurizing the packing.

Cross-Tie Lines in AY and AZ DSTs (Light Purple)

The cross-tie lines are 8 inch lines connected to the annulus at one end and connected to the 20 inch primary tank vent line. Between the primary and annulus there were two 8 inch butterfly valves which could be opened. In theory, both the primary tank and the annulus could be ventilated on the primary tank vent system in the event of a primary tank failure. Project W-030 removed all4 cross ties when they removed the old 20 inch vent lines from each of the AWF DSTs (Ref. H-2-131086 and H-2-131087) during construction of the 702-AZ ventilation system. Originally, the AZ cross-tie lines were going to be left in place since the project was going to tee into the 4A riser above the cross-tie lines. Project plans changed when the 14 inch vent line encasement had to be run to the top of the riser to meet environmental requirements. As a result, removal of the cross-tie lines in AZ Farms was necessary. The AY farm cross-ties were also removed as originally planned.

Consequently, the cross-tie lines connected to the annulus tanks do not present any risk of contamination spread from the primary tank to the annulus ventilation system.

AY Annulus Ventilation System (Yellow)

The AY-101 and AY-102 annulus vent systems were originally designed and built with a supply fan as well as an exhaust fan. Each system had air dryers and heaters to deliver dry air to the annulus system at less than 12 percent relative humidity. The exhaust fan had more capacity than the supply fan, so the annulus pressure operated slightly negative most of the time. The annulus operated at approximately 2000 scfm flow rate at -1 to +1 inch water gauge pressure inside the annulus. In 1983, this system was modified to the existing system, eliminating the supply fans and operating the annulus under negative pressure.

In 1997, after a long down time (7 years), both annulus systems were repaired and new HEPA filter housings installed. The exhausters were repaired and adjusted to allow approximately 1200-1500 scfm through the system at approximately -1 inch vacuum. The AY-101 system ran only 6 weeks before it was shutdown because the tank's liquid level was being pumped below 64 in to support an Evaporator Campaign. At 64 inches, the annulus exhaust system must be shutdown as required per OSD 17.2.1.1, Primary Tank Liquid Level limit. The AY-102 system continued to operate for approximately 8 months, until W-320 annulus modification work required the system to be shutdown.

In 1998, the W-320 project modified the AY-102 vent system to allow 100% of the flow through the air slots under the primary tank. In order to achieve enough airflow through the

slots, the annulus vacuum had to be significantly increased. Project W-320 evaluated the structural design of the AY DSTs and concluded that the annulus primary tank could withstand a 20 inch water gauge vacuum in the annulus. The exhaust fan was modified to allow the higher vacuums of -12 inches to -18 inches of vacuum at approximately 1000 scfm flow. It should be noted that the W-320 design change for the AY-102 annulus did not significantly change the flow rate. Sampling systems for both the record sampler and annulus CAM were evaluated by Engineering to determine if equipment changes were required to maintain representative sampling for the new flow conditions. No changes were made since the overall flow rate had not changed significantly.

OTP-320-001 was performed to test the new high vacuum system (Ref. HNF-2317 Operability Test Report). The system performed well. The average flow rate for the test was 1077 scfm with -16 inch vacuum. The average CAM reading was 413 cpm with a maximum CAM reading of 1100 cpm. The test demonstrated that there was no significant source of cross contamination as a result of the increased vacuum.

241-AY-102 Tank Integrity Evaluation

Over the past several months UT and video examinations were performed on the primary tank liner of AY-102. Cameras, UT equipment, light sources and reach rods were used inside several risers and the annulus space. All equipment placed into the annulus space was removed with no measurable amount of contamination. Additional annulus and primary tank video examinations are planned for this year to view and then evaluate as much of the tank as practical.

IV. History of Elevated AY-102 Annulus CAM Readings

The 241-AY-102 annulus has been subjected to numerous potential cross-contamination events over the years. The first event of interest occurred in October 1976 when a transfer of waste lowered the 241-AY-102 primary tank level to 15 inches. At this level, the leak detection pits drain-down legs, the central pump pit drain-down leg, the annulus pump pits drain-down legs and all the sluice pits drain-down legs were uncovered, exposing the drain-down legs to the primary tank vapor space. Between January 1982 and January 1990, all of the drain-down legs were uncovered twelve additional times. The attached Figure, *AY 102 LEVEL & ANNULUS DATA,* provides a comparison of tank level and annulus CAM readings from January 1984 to January 1999.

The annulus exhauster has an operating history of periods of operation followed by periods of shutdown. After each startup, the annulus CAM count rate has been in the range of 600 to 2,800 cpm with occasional higher peaks. The annulus exhauster was on line from late 1984 until mid 1987. In late 1986 and early 1987, the annulus leak detection CAM count rate showed fourteen peaks between 5,000 cpm and 20,000 cpm; these peaks correspond to periods when the tank waste level uncovered the drain-down legs. The annulus exhauster was off line from mid 1987 to early 1988. The exhauster was restarted and was on line from early 1988 to mid 1991. The CAM count rate during this period was nominally 1,000 to 2,000 cpm

with many peaks in excess of 2,000 cpm. The largest peak was 10,000 cpm. The annulus exhauster was again secured in mid 1991 and remained offline until early 1997.

The exhauster was next operated for a short period between early 1997 and early 1998. CAM count rates during this period fluctuated between 500 and 1,500 cpm. The annulus exhauster's last shutdown period was early 1998 to mid 1998. In mid 1998, the annulus exhauster was started and has been on line since (except when shutdown for repairs).

The CAM count rate increased upon startup with the count rate being a nominal 1,500 cpm with many peaks between 1,800 cpm and 2,800 cpm; four peaks were recorded at 3,000 cpm or higher.

In December 1998, the Tank Farm Contractor (TFC) issued Discrepancy Report 98-857 concerning the higher than normal count rate observed on the 241-AY-102 annulus CAM. As follow-on documentation, the TFC issued an Occurrence Report against the count rate. To resolve the Occurrence Report, HNF-4798, *Tank 241-AY-102 Annulus Continuous Air Monitor High Readings* was issued in July 1999. HNF-4798 states that surveillance data for the 1984 and 1986 level decreases clearly indicate a correlation between the level drop and the annulus CAM count rates.

Several historical incidents of contamination of pump pits have been documented. In October 1994, the AY-102 central (02D) pump pit became contaminated from a failed transfer line. This line failed in the wall of the 02D pit and sprayed waste into the 02D pit, and set off the leak detector. At that time, there was an open wall nozzle in the 02D pit. This wall nozzle is part of a transfer line system connected to the annulus pump pit. The open wall nozzle could have allowed contamination to move into the upper part of the annulus pump pit. However, a PUREX blank was installed (and still is installed) on the annulus pump pit side. The condition of the PUREX head is unknown but historically PUREX heads when installed properly create a pressure tight seal.

A 1997 video of the annulus pump pit showed that the pump had been removed and all of the transfer lines had been blanked. On February 17, 1999, smears were obtained of the annulus pump pit pump opening, the pit drain area, and the floor of the pit. Smearable contamination was found on all samples with contamination levels ranging from 2,000 to 3,000 dpm/100 cm^2. Laboratory analysis revealed the presence of very low levels of Cs-137 and Sr-90.

During the activity to obtain annulus pump pit radiological contamination smears in 1999, it was discovered that the plug on the drain line leading to the primary tank, was lying on its side near the drain line. The plug was reseated in an effort to better seal the primary tank from the annulus pump pit. After sealing the drain line, CAM count rate remained in the range of 200 cpm to 2500 cpm.

It is not known how long the drain line plug had been removed. With the drain line open, contamination from the primary tank has a much easier pathway to get into the upper annulus pump pit. In addition, a significant amount of moisture was observed in the annulus pump pit

when reviewing the 1997 video of the pit. Water could be seen beading off the cover block and walls. The pit floor also looked wet. Contamination water could pass from the upper pit to the lower pit, if the shield plug has a deteriorated gasket.

The investigation conducted for HNF-4798 concluded that the increased annulus CAM count rate in the 241-AY-102 annulus was related to historical smearable contamination of the annulus pump pit. The existing contamination may be re-disturbed by changes in ventilation flow (startups and shutdowns) coupled with water intrusion into the annulus pump pit.

Review of the CAM data has shown that, since late 1984, the annulus CAM has indicated count rates of 500 cpm to as high as 20,000 cpm with the normal reading being 1,500 cpm to 2,500 cpm. During the week preceding the CAM shutdown on June 21, 2001, CAM readings ranged from 600 cpm to 900 cpm.

Investigation of the elevated count rate in the 241-AY-102 annulus has continued. As stated above, it is known that the annulus pump pit is contaminated. It is suspected that moisture (condensation, intrusion) within the annulus pump pit, as observed in a 1997 video, becomes contaminated as it drips down the pit walls. It then seeps through a deteriorated shield plug gasket and enters the annulus.

V. Annulus CAM Response to a Leak

In August 1998, Pacific Northwest National Laboratory issued PNNL-11956, "Calculation of SY Tank Annulus Continuous Air Monitor Readings after Postulated Leak Scenarios," in support of a Washington State Department of Ecology compliance inspection at 241-SY Farm. Table 1 of the report provides the expected CAM response for a 0.01 gallon per minute leak of tank waste. SY annulus exhaust rate was assumed to be 300 cfm. The report indicates that the count rate resulting from a leak of waste will be significantly higher than the CAM alarm set-point in a matter of minutes for a leak totaling 73 gallons, and a matter of just a few hours for the 0.01 gallon per minute leak. The CAMs are expected to reach their alarm state as a result of a very small leak well within the required twenty-four hour detection period required under 40 CFR 265 and WAC 173-303-640. Although the PNNL report was prepared to specifically address the SY tanks, the methodology of the analysis is applicable to AY-102.

When using the PNNL equation for AY-102 to make a direct comparison, the following assumptions are made:

1. The source terms in both tanks are approximately the same (AY-102 source term is actually greater).
2. The two annulus systems have approximately the same annulus volume – 21,900 $ft.^3$
3. The flow rate for AY-102 will be assumed to average 850 cfm (based on Operator Round Sheets).

Below is a comparison of the two tanks at the lowest leak rate (0.01 gal/min or 14 gal/day):

	CAM Readings above Background (CPM)	
Time (min)	**SY Tanks**	**AY-102**
60	400	215
120	1,100	930
180	5,500	2,120
240	10,300	3,770

The table above shows that the AY system will take longer to alarm than the SY system. The SY annulus system will alarm in approximately 140 minutes at the 3,000 cpm CAM setpoint, while the AY system will take approximately 215 minutes. Both are well within the 24 hour guide established by 40 CFR 265 and WAC 173-303-640, and will provide positive indication that waste has leaked from the tank.

A question has been raised regarding the setpoint for the annulus CAM system. CHG is currently reviewing the W-320 project files for the AY-102 annulus CAM setpoint calculation. In parallel we are reconstituting the setpoint calculation for the AY-102 annulus CAM. Preliminary results of the calculation indicate that the setpoint of 3000 cpm for the AY-102 annulus CAM is valid for the current system flow rate. The calculation demonstrates that the CAM sample flow rate is subisokinetic, which is conservative. The sample that enters the probe will be more concentrated than the effluent in the duct. Additionally, a preliminary calculation of the collection efficiency of the sample system indicates that it is approximately 83% efficient. This satisfies the requirement of ANSI N 13.1-1999, which requires a minimum of 50% sampling efficiency. The field configuration will be verified against the drawing and the calculation completed and verified prior to submittal to ORP.

VI. CHG Conclusion

CHG believes that the cross-contamination scenario, rather than a leak of waste from the primary tank, is considered the most probable cause of the increased count rate on the 241-AY-102 annulus leak detection CAM. This position is based on the following:

- High CAM counts have been observed in AY-102 since 1976 (ARHCO 1976b and 1976c, Rodgers 1976). In the past this phenomenon has been infrequent, and typically lasts for a few months and then disappears. The evidence and data for these past increases point to a slightly contaminated annulus pump pit that resulted from the lowering of tank waste levels below 60 inches, with the annulus ventilation running. This allowed contamination to travel up the drain-down keg and deposit onto pit surfaces. As a direct result of these occurrences, OSD-17.2.1 was written (Pan 1981) to ensure the annulus ventilation is shutdown prior to lowering tank liquid level below 64 inches.
- The tank integrity program has not identified any significant liner corrosion in 241-AY-102.

- There have been no annulus CAM alarms or annulus conductivity leak detector alarms.
- A leak from the primary tank would exceed the annulus CAM setpoint in a short period of time (i.e., hours), even for a very small leak.
- If the primary tank liner or any of the side fill lines were leaking, the annulus would be highly contaminated. Any equipment lowered into the annulus vapor space would also likely become contaminated. To date, no contamination has been found on any of the equipment lowered into the tank annulus space to perform tank integrity inspections.

Based on the review of historical data and potential contamination paths, the source of increased count rate in the 241-AY-102 annulus is postulated to be a result of previous contamination of the annulus pump pit and the subsequent movement of contamination into the annulus through deteriorating seals/gaskets in the pump pit. Present and past operating modes (i.e., greater vacuum in the annulus relative to the primary tank) of the annulus ventilation system coupled with moisture in the pit support the movement of liquid from the annulus pump pit into the annulus via the seals/gaskets.

VII. Path Forward

The following path forward is planned to resolve the elevated CAM problem:

Work package 2E-O1-01027, "Seal 102-AY 02F Pit" is currently in the planning stage. The work will include resealing the funnel/plug assembly and replacing the gasket on the 12 inch shield plug. A second work package will spray the pit with fixative to prevent further contamination into the annulus system. Once this work has been completed, the pit will be closed up and resealed to prevent water or moisture intrusion. This work is anticipated to complete by the end of September 2001.

Field verification of the sample probe may require entry into the annulus exhaust duct, which will require planning and preparation of a work package. Alternately, additional document reviews may provide the information to verify the type of probe installed in the duct. If a field inspection is required, it will take two to three weeks to complete the CAM setpoint calculation. If the proper documentation is available, the calculation will be complete early next week.

After the completion of the above actions, the annulus CAM will be monitored (i.e., tracked and trended) for at least a year (in order to see all the seasonal changes) to ensure that the problem has been resolved.

REFERENCES

ARHCO, 1972, 241-AY Tank Farm Information Manual, ARH-MA-102, October, Atlantic Richfield Hanford Company, Richland Washington.

ARHCO, 1975, *Alarm Signal from the 101-AY "B" Leak Detection Pit,* Occurrence Report 75-110, October 2, Atlantic Richfield Hanford Company, Richland Washington.

ARI-ICO, 1976a, *High Radiation in Tank 101-AY Annulus Exhaust Air,* Occurrence Report 76-132, September21, Atlantic Richfield Hanford Company, Richland Washington.

Rodgers, J.G., 1976, *Surveillance Operational Survey on the 102-AY Liquid Level Drop,* Letter to H. F. Jensen, October 20, Atlantic Richfield Hanford Company, Richland Washington.

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WHC, 1989, Double-Shell Tank Annulus Air Flows. SD-WM-TA-017, July 24, Westinghouse Hanford Company, Richland Washington.

PNNL, 1998, *Calculation of SY Tank Annulus Continuous Air Monitor Readings after Postulated Leak Scenarios,* PNNL-11956, Pacific Northwest National Laboratory, Richland Washington.

LMH, 1999, *Tank 241-AY-102 Annulus Contamination Air Monitor High Readings,* HNF-4798, July 28, Lockheed Martin Hanford Company, Richland, Washington.

ATTACHMENT 1

I. Aging Waste Facility (AWF) Leak Path Evaluation

Below is an overview of potential contamination pathways from the various AWF structures and ancillary equipment considered during the 1999 and 2001 investigations of the elevated annulus CAM readings. The potential leak pathways are shown in the color noted in the parenthesis on the attached AWF Diagram.

Leak Detection Pit and Annulus Pump Pit Cross-ties to Annulus Vent System (Green and Red)

All leak detection pits and annulus pump pits in AY and AZ Tank Farms are designed and built with an upper pit and lower pit. All upper pits contain components such as a drain line with a drain plug, 1 or 2 blanked wall nozzle connector heads, a transfer leak detector and either a transfer pump (mounted on a flange in the upper pit but extending into the lower pit) or a shield plug. All lower pits contain equipment such as the lower section of the pump; weight factor dip tubes and vent lines which tie into the annulus vent system.

All central pump pits (Blue), sluice pits, annulus pump pits and leak detection pits have drain lines that are piped back to the primary tank and are designed to discharge underneath the waste surface. However, the leak detection pits and annulus pump pits have the greatest potential to contaminate the annulus ventilation system since the lower part of these pits are vented directly to the annulus vent system. The purpose of the drain line is to seal vapors from the pits. This was a critical design feature since the AWF DSTs were designed to handle high heat boiling waste at elevated temperatures. Each drain line stops approximately 60 inches off the bottom of the tank and is normally submerged beneath the waste.

The drain line design creates a potential contamination pathway from the primary tank vapor space to any of the connected pits, if the liquid level in the DST drops below 60 inches. The amount of contamination going into the top part of the pits will be increased if an open pathway exists from the top part of the pit to the bottom part of the pit. The magnitude of the contamination spread will be greatly increased if the shield plug and drain plug are removed or improperly sealed. In the event that the annulus vacuum is greater than the primary tank vacuum, contamination spread could be further increased.

To reduce the potential for cross contamination from the primary tank into the lower part of the pits, shield plugs or metal plate covers have been installed in all pump positions for all the AY/AZ annulus pump pits, leak detection pits, central pump pits and sluice pits. All shield plugs and plate covers are fitted with gasket material to provide a positive seal. In most cases the gasket is made of neoprene. However, since most of these plugs have been in service for 20-30 years, gasket degradation is a credible possibility.

Verification that shield plugs or metal plate covers are in place can not be completed without entering each pit or dropping a camera (if possible) into the pit. Within the last two years, three out of four annulus pump pits have been visually confirmed as having shield plugs or metal plate covers (all except AZ-102 annulus pump pit). None of the six leak detection pit shield plugs have been visually verified within the last 10 years.

Another potential pathway into the annulus vent system is through the pump out routes from the annulus pump pits. These transfer lines are potential sources of cross contamination into the upper part of the annulus pits. Based on the 200 East Area Routing Board, all transfer route nozzles in AY and AZ annulus pump pits and leak detection pits have either a PUREX head process blank (H-2-72284 and H-2-72285) or an isolation blank (H-2-73453).

Therefore, the potential for a large cross contamination pathway from these pits into the annulus ventilation system is substantially reduced. The largest leak would be reduced to small cracks in the gasket material as the gasket material deteriorates over time. This type of a leak will not produce sustainable elevated CAM readings, which is what has been observed over the past 20 years.

Side Fill Lines in AWF DSTs (Light Blue)

All 4 tanks in the AWF have side fill lines. Each tank has 4 side fill lines. The lowest transfer line.is at an elevation of approximately 370 inches from the bottom of the tank. Each side fill line is sleeved or encased and runs through the annulus space. The sleeving is made out of 304 stainless steel with a bellows or expansion joint and a packed flanged section welded to the primary tank. The transfer line itself is not welded to the primary tank but is supported by the flanged section. Between the flanged section and the primary tank, and between the transfer pipe and encasement is a packing material sealing the encasement section from the primary tank. The packing material is graphite impregnated with long fiber asbestos (Ref H-2-67316 and H-2-64448).

There is a potential for this flanged section to leak waste or vapors from the primary tank into the annulus. To date vapor leaks via annulus side fill lines have been theorized but never confirmed. Operation Limits contained within operating procedures are designed to control AWF liquid level below 364 inches to prevent waste attacking the packing or waste pressurizing the packing.

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The cross-tie lines are 8 inch lines connected to the annulus at one end and connected to the 20 inch primary tank vent line. Between the primary and annulus there were 2 – 8 inch butterfly valves which could be opened. In theory, both the primary tank and the annulus could be ventilated on the primary tank vent system in the event of a primary tank failure. Project W-030 removed al14 cross ties when they removed the old 20 inch vent lines from each of the AWF DSTs (Ref. H-2-131086 and H-2-131087) during construction of the 702-AZ ventilation system. Originally, the AZ cross-tie lines were going to be left in place since the project was going to tee into the 4A riser above the cross-tie lines. Project plans changed when the 14 inch vent line encasement had to be run to the top of the riser to meet environmental requirements. As a result, removal of the cross-tie lines in AZ Farms was necessary. The AY farm cross-ties were also removed as originally planned.

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241-AY-102 Tank Integrity Evaluation

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II. Annulus CAM Behavior Evaluation

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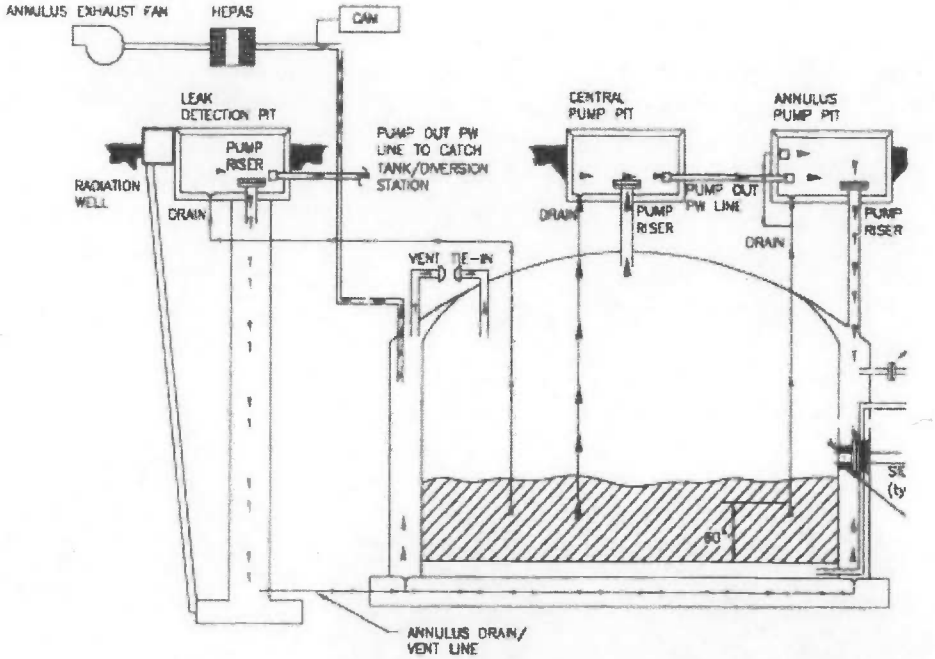
We are currently reviewing the W-320 project files for the same setpoint calculation. In parallel we will reconstitute the setpoint calculation for the AY-102 annulus CAM. The calculation will be completed by July 6th.

IV. AWF LEAK PATH DIAGRAM



- - PRIMARY TO ANNULUS VIA ANNULUS PUMP PIT
- - PRIMARY TO ANNULUS VIA CENTRAL PUMP PIT AND ANNULUS PUMP PIT
- - PRIMARY TO ANNULUS VIA LEAK DETECTION PIT AND ANNULUS VENT
- - CATCH TANK/DIVERSION STATION TO ANNULUS VIA LEAK DETECTION PIT AND ANNULUS VENT
- - PRIMARY TO ANNULUS VIA PRIMAR AND ANNULUS VENT TIE-IN
- - PRIMARY TO ANNULUS VIA SIDE-FI LINE PACKING

POTENTIAL CROSS CONNECTIONS BETWEEN PRIMARY AND ANNULUS AGING WASTE FACILITY TANKS (TYPICAL)

REFERENCES

ARHCO, 1972, 241-AY Tank Farm Information Manual, ARH-MA-102, October, Atlantic Richfield Hanford Company, Richland Washington.

ARHCO, 1975, *Alarm Signal from the 101-AY "B" Leak Detection Pit,* Occurrence Report 75-110, October 2, Atlantic Richfield Hanford Company, Richland Washington.

ARHCO, 1976a, *High Radiation in Tank 101-AY Annulus Exhaust Air,* Occurrence Report 76-132, September21. Atlantic Richfield Hanford Company, Richland Washington.

Rodgers, J.G., 1976, *Surveillance Operational Survey on the 102-AY Liquid Level Drop,* Letter to H. F. Jensen, October 20, Atlantic Richfield Hanford Company, Richland Washington.

Pan, R. B., 1981, *Structural Analysis of the 241-AW/AN Primary Steel Tank For Revised Operating Criteria,* Letter to G. T. Dukelow, July 29, Rockwell Hanford Company, Richland Washington.

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LMH, 1999, *Tank 241-AY-102 Annulus Contamination Air Monitor High Readings,* HNF-4798, July 28, Lockheed Martin Hanford Company, Richland, Washington.

ATTACHMENT B –
EMAIL FROM COOK, G. 2012-08-14, TO STEVE MCKINNEY, S., *OPTICAL AND SCANNING ELECTRON MICROSCOPE EXAMINATION OF AY102 RESIDUES*

ATTACHMENT B

Email, from Cook, G., 2012-08-1, to Steve McKinney,
Optical and Scanning Electron Microscope Examination of AY102 Residues

From: Cooke, Gary
Sent: Tuesday, August 14, 2012 3:11 PM
To: McKinney, Steve G
Cc: Johnson, Jo M; Seidel, Cary M; Prilucik, John R
Subject: Optical and scanning electron microscope examination of AY102 residues

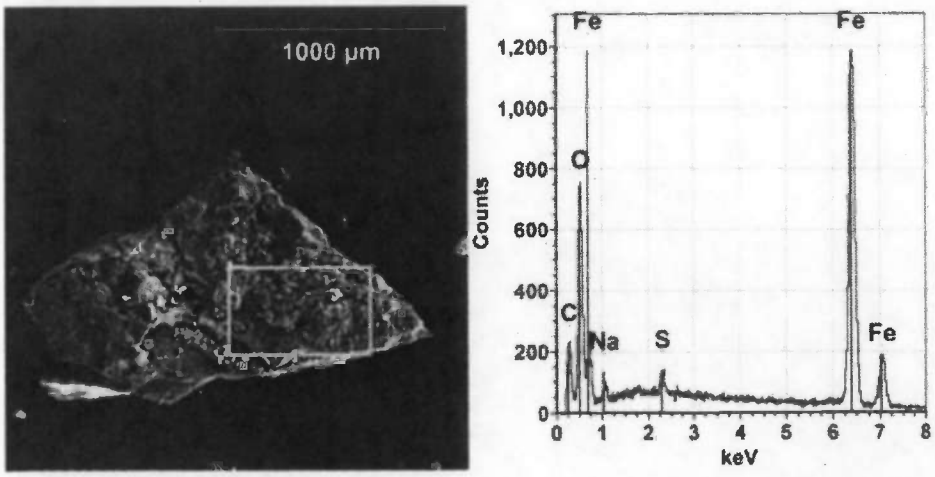
Steve:

We examined the particulate recovered from three samples from the Tank 241-AY-102. The samples consisted of particulate adhering to duct tape which had been placed in clear yellow plastic bags. The samples were identified as:

AY102Annulus-1-1 (S12R000485)
AY102Annulus-1-3 (S12R000487)
AY102Annulus-1-4 (S12R000488)

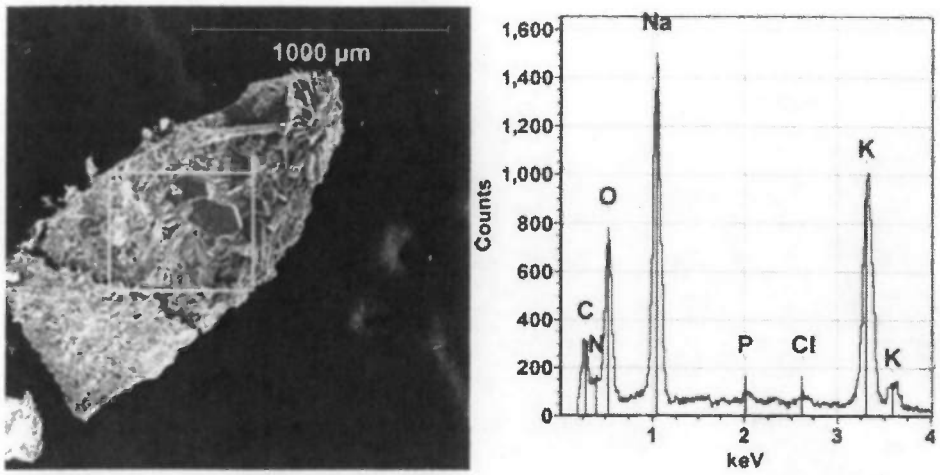
The three samples were examined and individual particles were removed and placed on an adhesive tab on an SEM specimen mount. The selected particulate was examined first on a binocular microscope and then carbon coated and examined on the SEM. The SEM images, below are paired, with the image on the left with the area or spot examined by the energy dispersive x-ray (EDS) detector marked by the yellow cross or box, and the EDS spectrum on the right.

The particulate appears to be dominated by rust. Only a few examples of the rust were examined and found to be composed primarily of iron and oxygen, as expected:

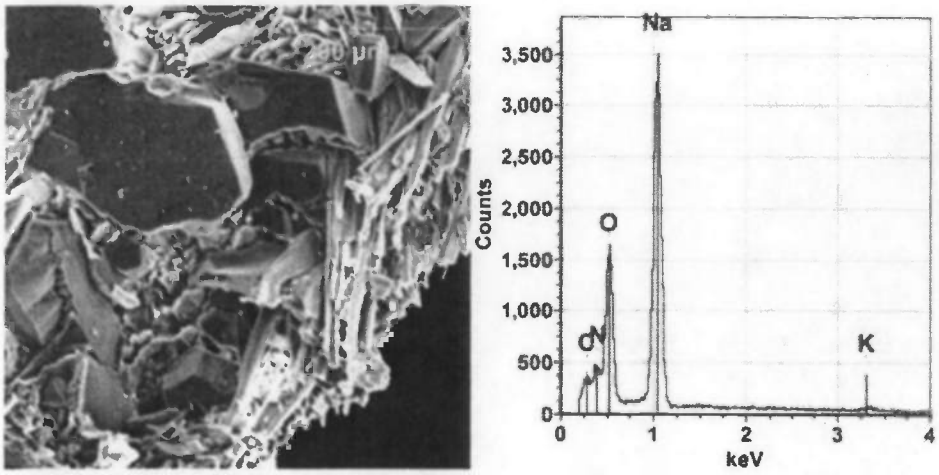


The scattered blue particulate appears to be some type of paint. The EDS signature indicates a kaolinite mineral is the filler in the paint and there are cellulose fibers present as well.

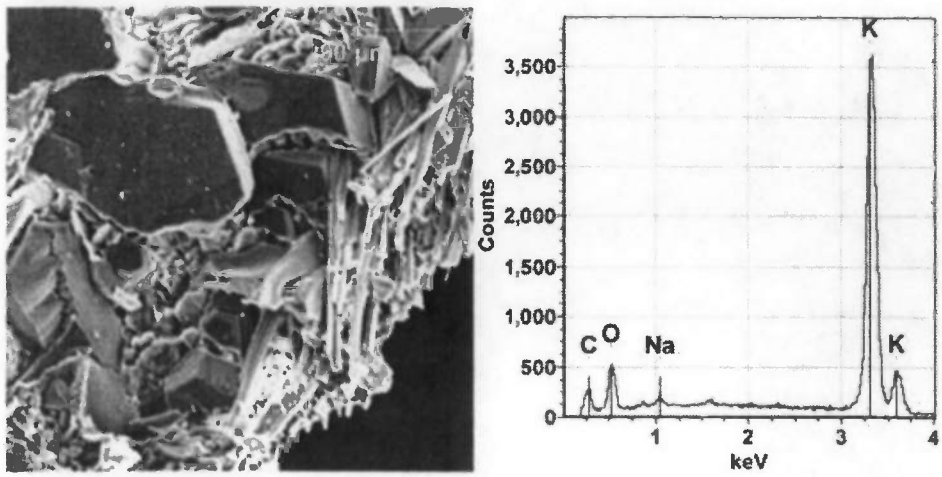
The remainder of the particulate is mostly light gray to amber colored aggregates of fine-grained crystalline material. Several of these particles were examined. The chemistry was fairly uniform, with sodium, potassium, carbon, oxygen, nitrogen, phosphorous and chlorine identified in the EDS spectra:



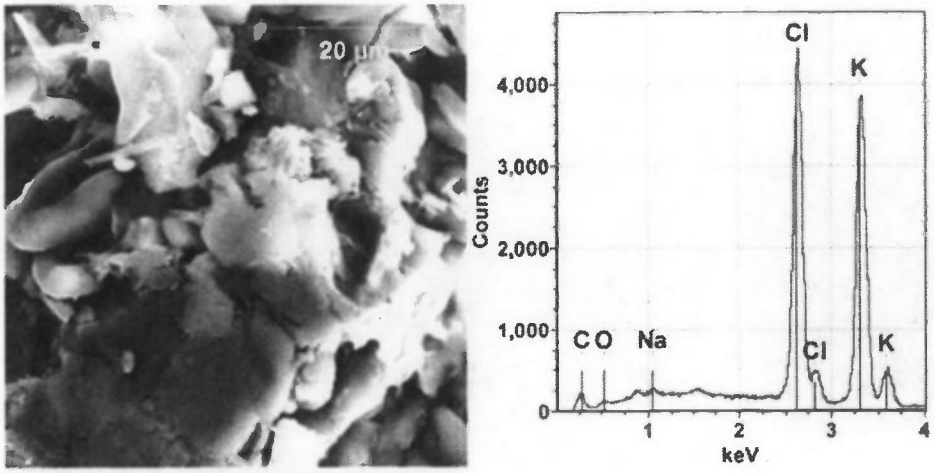
The largest crystals are blocky, equant crystals of sodium nitrate (Nitratine):



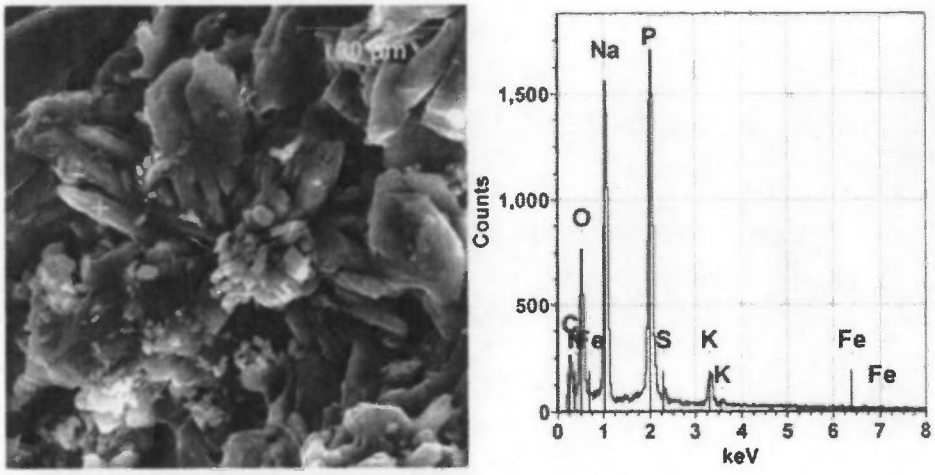
These are mixed with a blade-like or lath-like potassium-rich phase:



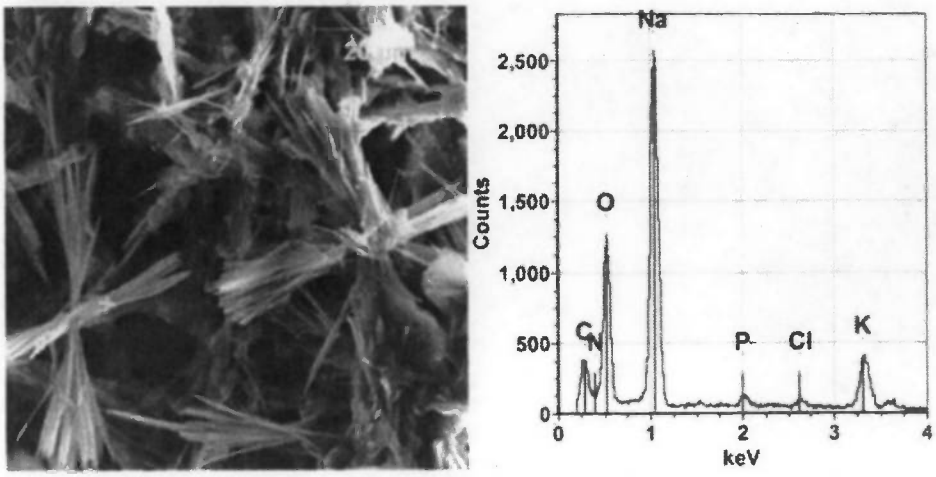
Also found with these salt phases was potassium chloride:



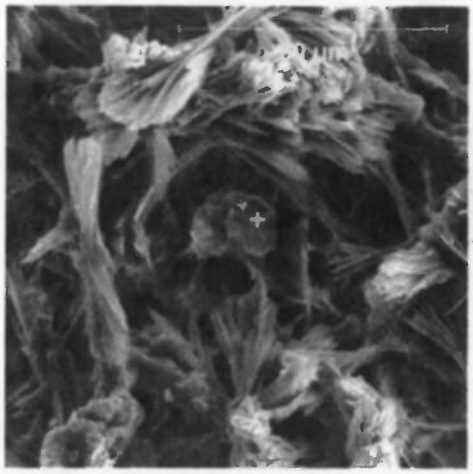
Sodium phosphate dodecahydrate:

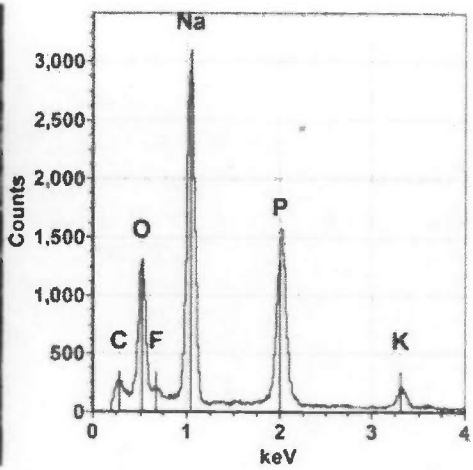


Possible sodium carbonate (Thermonatrite):



and a trace amount of sodium fluoride phosphate hydrate (Kogarkoite):





The sodium phases listed above are all water soluble phases that have been identified in tank waste. The source of the potassium is uncertain. Potassium is generally rare in tank waste.

Please pass this on to whoever needs to see it. If you have any questions, please let me know.

Gary A. Cooke

gary_cooke@rl.gov (509) 373-2154 Cell: (509) 845-3988

Washington River Protection Solutions, contractor to the United States Department of Energy

ATTACHMENT C –
EMAIL FROM RICE, A., 2012-08-13, TO MCKINNEY, S. G; WASHENFELDER, D. J; BOOMER, K. D; LEVY, G.; *AY102 SAMPLE UPDATE*

ATTACHMENT C

Email from Rice, A., 2012-08-13, to McKinney, S. G; Washenfelder, D. J; Boomer, K. D; Levy, G.; *AY102 Sample Update*

From: Rice, Andrew D
Sent: Monday, August 13, 2012 2:01 PM
To: McKinney, Steve G; Washenfelder, Dennis J; Boomer, Kayle D; Levy, Gregery
Cc: Renberger, Duane L; Prilucik, John R; Johnson, Jo M; Ritenour, Gerald P; Hansen, Daniel R; Watts, Heather D; Anderson, Brian P; Noyes, Gary W
Subject: RE: AY102 sample update

Appended below are the preliminary results for the AY-102 Annulus sample collected and delivered to the 222-S laboratory on Friday, 8/10/2012.
These results represent the amount of each nuclide that could be acid leached from one portion of the duct tape sample.

Nuclide	Result each (µCi)	MDA (µCi)	Comments
Cs-137	3.9E+00	9.8E-04	Gamma spectroscopy
Sr-90	1.0E-01	4.1E-03	Separation and beta count
Pu-239/240	4.1E-05	2.1E-05	Separation and alpha spectroscopy
Am-241	1.6E-04	8.3E-06	Separation and alpha spectroscopy

No isotopes of curium were detected.

It should be observed that the Pu/Am results are near the detection limit, and therefore will lack precision. It may be possible to improve these results by analyzing a larger aliquot of digest.

Please note that this is preliminary data and could change upon further review.

Let me know if you have any questions.

Andy Rice
Radiochemistry Manager 222-S
509.372.2057
509.551.8401

From: McKinney, Steve G
Sent: Saturday, August 11, 2012 12:07 PM
To: Washenfelder, Dennis J; Boomer, Kayle D
Cc: Renberger, Duane L; Prilucik, John R; Johnson, Jo M; Rice, Andrew D; Ritenour, Gerald P
Subject: AY102 sample update

Just a heads up on where ATL is – Andy Rice will send out a more detailed summary later, once he is out of the lab. The AY102 annulus sample was broken down this morning. Based on appearance, it was decided to remove the double-sided tape along with the sample and not try to scrape sample off the tape (ATL took photographs). The tape and sample were removed from the weight and was then divided into four sections. The section with the least amount of plastic adhering to the tape was chosen for digest. This section was digested (chemist noted slight fizzing upon addition of acid) and by appearance, all

sample material dissolved off the tape. GEA prep will be completed today, radiochemical separations and counting are scheduled for tomorrow and tomorrow night. We expect data, as planned, by Monday. Added observation – there was a towel in with the sample that appeared to have been used to wipe down the cable as the sample was withdrawn through the riser. This towel also was contaminated but at this time, nothing has been done with it.

Thanks.

ATTACHMENT D-
EMAIL FROM ENGEMAN, J. K., 2012-08-29, TO LITTLE, D. B AND SAMS, T. L., *AY-102 RISER 83 INSPECTION RESULTS*

ATTACHMENT D

Email from Engeman, J. K., 2012-08-29, to Little, D. B and Sams, T. L., *AY-102 Riser 83 Inspection Results*

From: Engeman, Jason K
Sent: Wednesday, August 29, 2012 7:22 PM
To: Little, David B; Sams, Terry L
Cc: Washenfelder, Dennis J; Strasser, David W
Subject: AY-102 Riser 83 Inspection Results
Importance: High

David/Terry,

Inspection of Riser 83 in AY-102 took place this morning. I had a chance to briefly review the original footage taken this afternoon while out in AY Farm located on the camera hard drive. The AY/AZ team burned a copy to a DVD for my review and I recommend we sit down and go through it. I viewed a portion of the DVD with Dave Strasser to ensure he was aware of the inspection results. The quality of the footage on the DVD is marginal so I recommended to the operator that the original footage on the camera system hard drive not be erased due to what appears to be a substantial increase in color quality.

Here is my summary/interpretation based on review of the original footage and the DVD: On the right hand side of the tank as viewed by Riser 83 there is what appears to be a small green colored pool of liquid. There does not appear to be any measureable flow into this pool at the time of the inspection. There are crystal-like nodules which are connected to the green material. The pattern displayed is indicative of the green material evaporating as it moves away from the pool. I reviewed the footage from the adjacent riser (Riser 82) and the inspection clearly shows none of the green material or the crystal-like nodules.

My understanding is that camera resources will be used for the routine inspection via Riser 90. I recommend our review of the DVD occur in the morning so if there is further footage required we can revisit Riser 83. The work package is written in a way that allows us to revisit a riser previously inspected.

Jason

DISTRIBUTION SHEET

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RPP-53434, 241-AY-102 Annulus Sampling Data Quality Objectives		ECN No.

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(6) Document Title: Tank 241-AY-102 Annulus Sampling and Analysis Plan			
(7) Change/Release Description: Initial Release			
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(11) Approvals:

(a) Author (Print/Sign): S. J. Harrington	Date: 9/20/2012
(b) Reviewer (Optional, Print/Sign): D. M. Nguyen Date: 9/20/2012	B. G. Orth approved via e-mail S.J. Harrington for B.G. Orth Date: 9/20/2012
R. A. Bushaw Date: 9/20/2012	J. R. Prilucik 9/20/12 Date: 9/20/2012
T. L. Sams Date: 9/20/2012	Date:
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A-6003-881 (REV 3)

geb 9-20-12

From: Orth, Barry G
Sent: Thursday, September 20, 2012 10:45 AM
To: Harrington, Stephanie J; Nguyen, Duc M; Bushaw, Ruth A; Prilucik, John R; Sams, Terry L; Reynolds, Jacob G
Subject: RE: AY-102 annulus sampling and analysis plan

Approved

From: Harrington, Stephanie J
Sent: Thursday, September 20, 2012 10:02 AM
To: Nguyen, Duc M; Bushaw, Ruth A; Orth, Barry G; Prilucik, John R; Sams, Terry L; Reynolds, Jacob G
Subject: AY-102 annulus sampling and analysis plan

All,

Please find the final copy of the SAP for the AY-102 annulus attached. I need your signature on the DRF form and wanted you to look through and ensure you are ready to sign today. There is one hold-up with the turn-around time for the format 2 report that is being worked out today. I have put in some potential language as track changes that may be acceptable, but I am not going to make any final changes until a resolution is agreed upon by all interested parties. As this does not affect everyone on this list, if you are ready to sign knowing this change may happen please let me know so I can start collecting signatures. I have been receiving multiple messages indicating that the final signed SAP is needed for work package planning in order to prepare for sampling next week.

Thank you,

Stephanie Harrington, PhD
Chemical Process Engineer
Washington River Protection Solutions,
contractor to the United States Department of Energy

2750E Room A219 or 639 Cullum B119
(509) 376-1336

Tank 241-AY-102 Annulus Sampling and Analysis Plan

Author Name:
S. J. Harrington
Washington River Protection Solutions, LLC.
Richland, WA 99352
U.S. Department of Energy Contract DE-AC27-08RV14800

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B&R Code: N/A Total Pages: ~~26~~ 27

Key Words: Annulus, 241-AY-102, Sampling, Solids

Abstract: This Sampling and Analysis Plan is to determine the origin of solids observed in the annulus area of tank 241-AY-102. Five different solid types have been observed to date. These solids will be sampled and analyzed following the requirements detailed in this sampling and analysis plan to determine if they originated from tank waste or not.

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

APPROVED
By G. E. Bratton at 1:40 pm, Sep 20, 2012

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RPP-PLAN-53352
Rev. 0

Tank 241-AY-102 Annulus Sampling and Analysis Plan

S. J. Harrington
Washington River Protection Solutions LLC

Date Published
September 2012

washington river protection solutions
Post Office Box 850
Richland, Washington

Prepared for the U.S. Department of Energy
Office of River Protection

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LIST OF TERMS

Abbreviations and Acronyms

ATL	Advanced Technologies and Laboratories International, Inc.
AWWA	American Water Works Association
BBI	Best Basis Inventory
CCN	Characterization Change Notice
DOE	Department of Energy
DQO	Data Quality Objective
DST	Double-Shell Tank
EDS	Energy Dispersive Spectroscopy
EPA	U.S. Environmental Protection Agency
FY	Fiscal Year
GEA	Gamma Energy Analysis
IC	Ion Chromatography
ICP-AES	Inductively Coupled Plasma/Atomic Emission Spectroscopy
ORSS	Off-riser Sampling System
PER	Problem Evaluation Request
PLM	Polarized Light Microscopy
QA	Quality Assurance
QC	Quality Control
RIDS	Records Inventory and Disposition Schedule
SEM	Scanning Electron Microscopy
TC	Total Carbon
TIC	Total Inorganic Carbon
TOC	Total Organic Carbon
SAP	Sampling and Analysis Plan
TWINS	Tank Waste Information Network System
WRPS	Washington River Protection Solutions LLC
XRD	X-ray Diffraction

List of Units

mL	milliliters
µCi	microcuries
g	gram
µg	micrograms
µg C	micrograms Carbon
Ci	Curies
wt%	weight percent

1.0 SAMPLING AND ANALYSIS OBJECTIVE

This sampling and analysis plan (SAP) identifies sample collection, laboratory analysis, quality assurance/quality control (QA/QC), and reporting objectives for the characterization of solids located in the 241-AY-102 (AY-102) double-shell tank (DST) annulus. The solid samples will be collected and analyzed in accordance with the requirements of the data quality objective (DQO) RPP-53434, *241-AY-102 Annulus Sampling Data Quality Objectives*.

During a routine inspection of the annulus area of tank AY-102, solids were found that had not been observed in past inspections. The origin of these solids is unknown, resulting in the Problem Evaluation Request (PER) WRPS-PER-2012-1363, Queried 08/13/2012, [Washenfelder, D. J., *AY-102 annulus video inspection – potential intrusion identified*, 08/07/2012, WRPS-PER-2012-1363, Rev. 0], http://estars.rl.gov/per/index.cfm?page=main.cfm&perid=39198&screen=1. During the performance of one of the initial recommended corrective actions (#2) from WRPS-PER-2012-1363, solid particulates were obtained from the floor of the annulus area, directly under Riser 90, using duct tape on a weight lowered down the riser. Preliminary results from the 222-S laboratory analysis of the acid leached particulates and duct tape indicated the presence of radionuclides. Concentrations of these species could not be estimated due to insufficient information on the sample weights and densities. Since the discovery of solids in the annulus near Riser 90, solid material has been observed on the floor of the annulus near Riser 83.

To determine the characteristics of the solids of interest, solid samples will be obtained from two main locations of interest in the tank annulus near Riser 90 using an annulus sampling system, as well as a new location on the floor of the annulus near Riser 83. The new location near Riser 83 will be sampled initially using the off-riser sampling system (ORSS) and, if necessary due to insufficient sample recovery, the annulus sampling system. The basis for selecting these locations is provided in RPP-53434. Initially, Tank Farm Sampling will take a sample using the ORSS from the floor near Riser 83. Subsequent samples will be taken by AREVA using an annulus sampling system to collect solids from the remaining areas of interest. Sufficient material will be collected from each location to perform the required analyses and tests. Tank Farm Sampling will package the solids and ship them to the 222-S Laboratory. Advanced Technologies and Laboratories International, Inc. (ATL) at the 222-S Laboratory will receive the samples, perform chemical, physical and radiochemical analyses on the samples, and archive any remaining sample material for potential future analyses. Samples will be collected from the tank annulus as directed in Section 3.0 and sent to 222-S Laboratory to perform the chemical and radiological analyses requested in Section 4.0 of this SAP.

2.0 TANK ANNULUS AND UNKNOWN SOLIDS DESCRIPTION

The annulus of tank AY-102 is the secondary containment area between the primary and secondary tank walls. The annulus area, as depicted in Figure 2-1 taken from H-2-64449, *Tank Elevations and Details*, is an approximately 2.5 foot wide space between the primary and

secondary tanks at the bottom, spanning the circumference between the primary and secondary tanks. This area contains pipes used for air cooling of the tank through a network of ventilation slots in the insulating concrete supporting the primary tank, as well as leak detectors, thermocouples, and other instrumentation (see H-14-010506, *Done Penetration Schedules (WST/WSTA) Tank 241-AY-102* for exact locations). This area is typically free of any liquids and/or solids.

During a routine video inspection of the AY-102 annulus area on August 1(Riser 87) and August 5 (Riser 77), 2012, unknown solids were observed. The results of this inspection have led to a PER being written (WRPS-PER-2012-1363), with further sampling and evaluation of the solids being recommended. The tank was again inspected through Riser 90 on August 10, 2012, with an opportunistic sample collected from the annulus floor directly under the riser. Preliminary analytical results of small surface particulates obtained from the annulus floor indicated potential radiological contamination and the presence of various salts. The origin of these solids is unknown. Potential sources of origin, as outlined in RPP-53434, include construction debris, dried leachate from waste intrusion into the annulus, constituents leached from the Kaolite® refractory pad beneath the primary tank, and AY-102 tank waste. Of these potential sources, only tank waste will contain appreciable radioactivity. Annulus contamination has previously been attributed to aerosols entrained from the primary tank headspace (HNF-4798, *Tank 241-AY-102 Annulus Continuous Air Monitoring High Readings*).

Five locations have been identified for solid sampling and chemical, mineralogical, and radiologic analysis (RPP-53434). Four of these locations can be seen in Figure 2-2, with the photographs taken from Riser 90 and Riser 83 and the plan view taken directly from H-14-010506. An initial sample will be taken of the material on the floor of the annulus near Riser 83 using the ORSS. Subsequent samples will be taken using the annulus sampling system being developed by AREVA. The two highest priority locations for solids sampling performed by AREVA through Riser 90 are (1) the filled air slot and (2) the mound over the annulus air outlet pipe. Secondary locations for sampling performed by AREVA would be the floor area of the annulus, with images shown in Figure 2-2 as (3) and (4). Floor samples will be taken opportunistically (i.e. only if the sampling equipment is capable of collecting solids from the floor) using AREVA's annulus sampling system. The results of all sample analyses will be compared to both current and historic AY-102 sludge, supernatant and interstitial liquid analytes on a dry-weight basis and passed on to the Double-Shell Tank Integrity group to determine if it potentially originated from AY-102 waste.

For shipping purposes, an estimate of the radionuclide activities expected to be in each sample is required. Since it is unknown what these solids consist of, as they may have originated from sources other than tank waste, a conservative upper bounding estimate for the radioactive activities was produced. This estimate is the maximum concentration of each radionuclide present in any of the AY-102 waste phases in the primary tank on a dry weight basis. These values were calculated using the adjusted concentration of the various radionuclides, adjusting units if the concentrations were for a liquid state, and adjusting for water weight. The general calculation followed the equation shown below:

$$Concentration\ on\ a\ dry\ wt.basis\ \left(\frac{\mu Ci}{g}\right) = \frac{Adjusted\ Concentration\ of\ liquid\ \left(\frac{\mu Ci}{mL}\right)}{Component\ density\ \left(\frac{g}{mL}\right)} \Big/ \left(1 - \frac{wt.\%\ water}{100}\right)$$

The radionuclide adjusted concentrations, density, and weight percent water values of the supernatant, sludge solids, and sludge interstitial liquid in the current Best-Basis Inventory (BBI) were downloaded from the Tank Waste Information System (TWINSa, Tank Waste Information System, Queried 8-15-2012, [TWINS Data Base, Best-Basis Inventory, Best-Basis Calculation Detail, Tank Name 241-AY-102], Internet at https://twins.labworks.org, Washington River Protection Solutions LLC, Richland, Washington and TWINSb, Tank Waste Information System, Queried 8-15-2012, [TWINS Data Base, Best-Basis Inventory, Tank Density and Percent Water, Tank Name 241-AY-102], Internet at https://twins.labworks.org, Washington River Protection Solutions LLC, Richland, Washington).

The supernatant currently in tank AY-102 replaced previous supernatant that was pumped out in December of 2006 and replaced in January 2007. Therefore, the supernatant previously in tank AY-102 is also included in this evaluation. The Calculation Detail report, density, and weight percent water information for AY-102 as of Fiscal Year 2006 (FY06), Quarter 4 (Q4) were obtained from files on a share drive (TWINSc, Tank Waste Information System download, Queried 8-15-2012, ['hanford\data\sitedata\stdinv\BBI\Baseline Inventory Calc Detail\FY06 Q4 update\FY06 Q4 – Calc Detail – DSTs – downloaded 11-27-06r1.xls'], CH2M Hill Hanford Group Inc., Richland, Washington and TWINSd, Tank Waste Information System download, Queried 8-15-2012, ['hanford\data\sitedata\stdinv\BBI\Baseline Inventory Calc Detail\FY06 Q4 update\FY06 Q4 – Density and Wt% Water Report – downloaded 112706.xls'], CH2M Hill Hanford Group Inc., Richland, Washington). The inventory from FY06 Q4 was chosen for comparative reasons since this was the last inventory prior to the AY-102 supernatant being transferred to tank 241-AN-106 and 241-AW-102 and subsequently being replaced with that from tank 241-AP-101 (RPP-RPT-44630, *Derivation of Best-Basis Inventory for Tank 241-AY-102 as of January 1, 2012*). The maximum upper bounding activity of the various radionuclides is provided in Table 2-1.

It is unknown if the solids found in the annulus of tank AY-102 are AY-102 tank waste. The solids could have originated from other sources, as described in RPP-53434. It is also uncertain when the solids would have originated. Therefore, the radionuclide concentrations in Table 2-1 are considered an upper bounding estimate. It is possible that the solids originated from other sources and contain much less radioactivity than that shown in Table 2-1.

Figure 2-1. Cross-Section View of Tank 241-AY-102 Double-Shell Tank (H-2-64449).

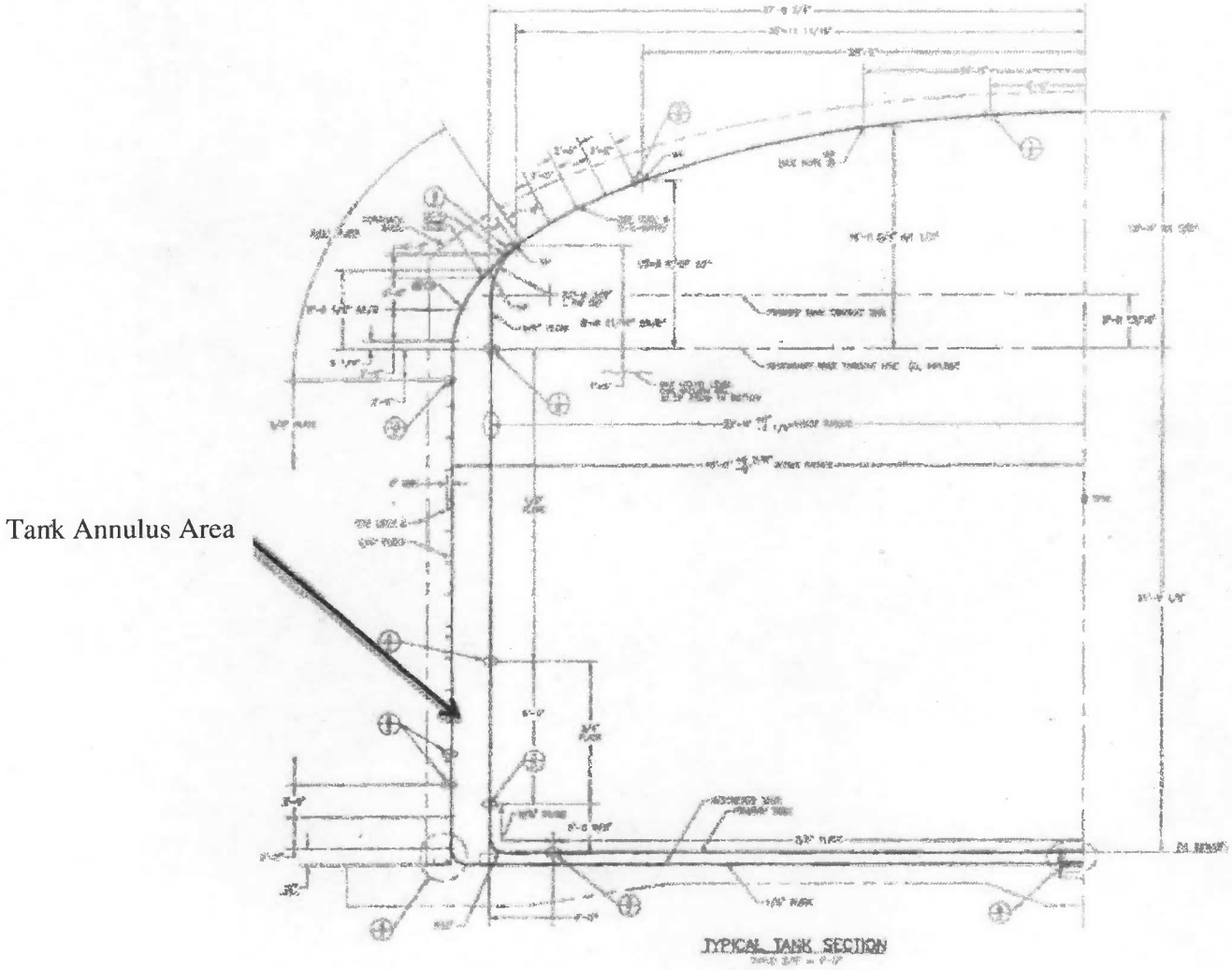

Figure 2-2. Plan View of Tank 241-AY-102 Double-Shell Tank (H-14-010506) showing images (as viewed from Riser 90 and Riser 83) and locations for samples to be taken with this SAP.

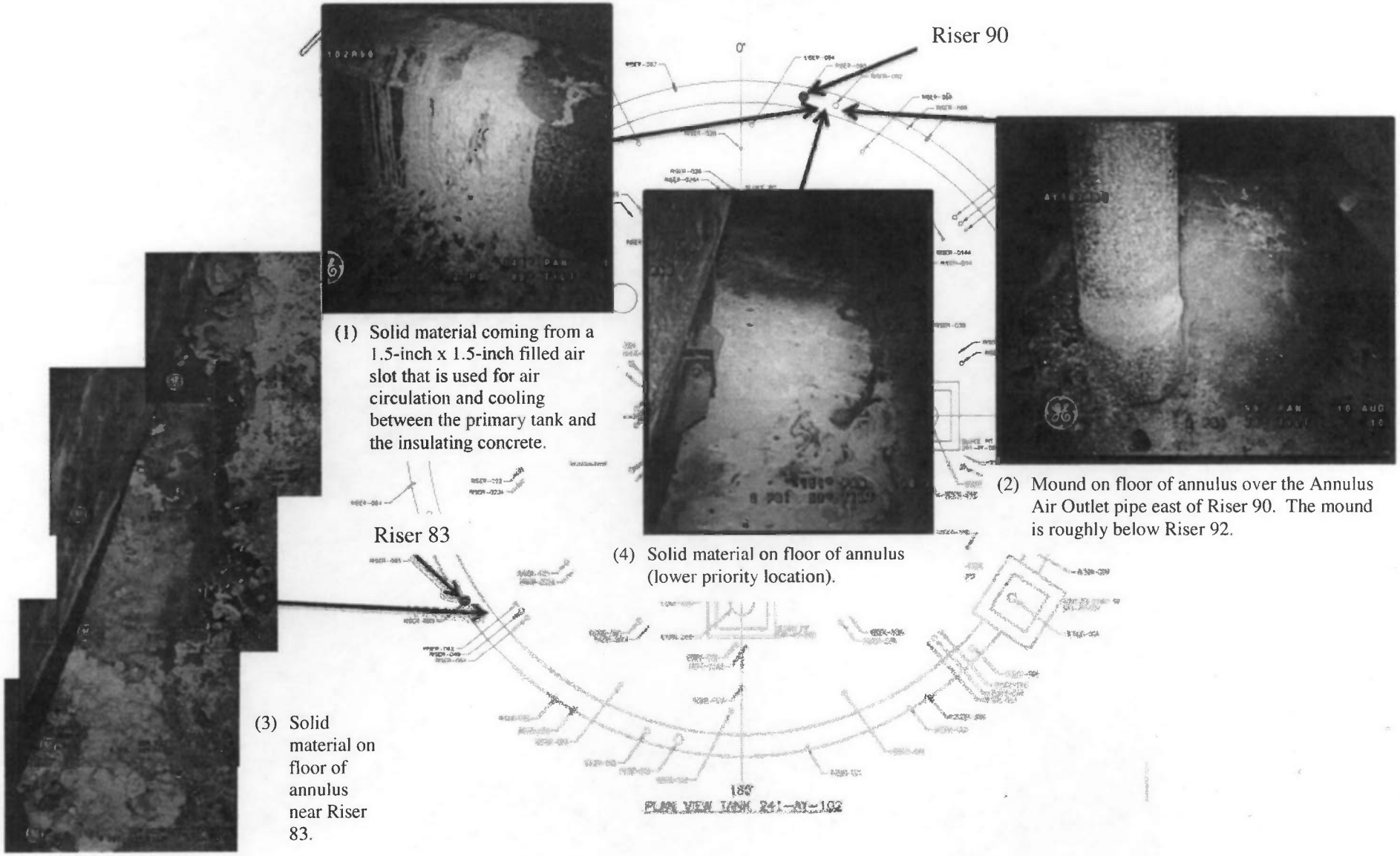

Table 2-1. Estimates of Radionuclide Concentrations in Tank 241-AY-102 Solid Samples (2 pages)

Radionuclide Decay Date: 1/1/2008

Analyte	Phase	Concentration (µCi/g)	Activities per Sample (Ci/240-mL Jar)
106Ru	Solid	1.96E-06	8.04E-10
113mCd	Solid	4.07E-02	1.67E-05
125Sb	Solid	4.37E-02	1.79E-05
126Sn	Solid	2.15E-02	8.82E-06
129I	Solid	2.87E-04	1.18E-07
134Cs	Solid	1.40E-02	5.73E-06
137Cs	Solid	3.30E+02	1.35E-01
137mBa	Solid	3.12E+02	1.28E-01
14C	Solid	1.29E-03	5.29E-07
151Sm	Solid	1.19E+02	4.88E-02
152Eu	Solid	1.03E-01	4.23E-05
154Eu	Solid	8.72E+00	3.58E-03
155Eu	Solid	3.69E+00	1.51E-03
226Ra	Solid	2.59E-07	1.06E-10
227Ac	Solid	1.34E-05	5.49E-09
228Ra	Solid	6.84E-05	2.81E-08
229Th	Solid	2.49E-08	1.02E-11
231Pa	Solid	6.55E-05	2.69E-08
232Th	Solid	6.85E-05	2.81E-08
232U	Solid	3.49E-06	1.43E-09
233U	Solid	9.66E-05	3.96E-08
234U	Solid	2.43E-03	9.95E-07
235U	Solid	1.03E-04	4.24E-08
236U	Solid	7.34E-05	3.01E-08
237Np	Solid	5.22E-03	2.14E-06
238Pu	Solid	1.11E-01	4.56E-05
238U	Solid	2.27E-03	9.32E-07
239Pu	Solid	2.08E+00	8.54E-04
240Pu	Solid	5.18E-01	2.13E-04
241Am	Solid	7.08E+00	2.91E-03
241Pu	Solid	5.05E+00	2.07E-03
242Cm	Solid	9.07E-03	3.72E-06
242Pu	Solid	5.01E-05	2.06E-08
243Am	Solid	5.59E-03	2.29E-06
243Cm	Solid	3.43E-03	1.41E-06
244Cm	Solid	8.12E-02	3.33E-05

Table 2-1. Estimates of Radionuclide Concentrations in Tank 241-AY-102 Solid Samples (2 pages)

Radionuclide Decay Date: 1/1/2008

Analyte	Phase	Concentration (µCi/g)	Activities per Sample (Ci/240-mL Jar)
3H	Solid	3.12E-02	1.28E-05
59Ni	Solid	3.92E-02	1.61E-05
60Co	Solid	1.16E-01	4.76E-05
63Ni	Solid	3.55E+00	1.46E-03
79Se	Solid	2.88E-04	1.18E-07
90Sr	Solid	6.23E+03	2.56E+00
90Y	Solid	6.23E+03	2.56E+00
93mNb	Solid	3.07E-02	1.26E-05
93Zr	Solid	3.59E-02	1.47E-05
99Tc	Solid	1.09E-01	4.46E-05
239/240Pu	Solid	2.55E+00	1.05E-03
243/244Cm	Solid	8.78E-02	3.60E-05

The current volumes of solids in the annulus are unknown. It is believed that the filled ventilation slot at (1) fills the 1.5 inch by 1.5 inch air slot (see H-2-64307, *Structural Insulating Concrete Plan + Details*) and the mound over the annulus air outlet pipe at (2) is approximately 8 inches high by 2.5 feet wide and 3 feet deep.

3.0 SAMPLING EVENT REQUIREMENTS

The current sampling plan is to use the ORSS to collect solid samples from the floor near Riser 83. A secondary sampling event using AREVA's annulus sampling system will be used to collect solid samples from Riser 90 and potentially those near Riser 83, if necessary. Video cameras will be needed to operate the ORSS and AREVA's annulus sampling system. Videos obtained during collection of the solids samples using the ORSS and AREVA's annulus sampling system shall be recorded.

3.1 SAMPLE COLLECTION BY THE OFF-RISER SAMPLING SYSTEM NEAR RISER 83

The ORSS system consists of a remotely operated, mobile sampler and a sample jar carrier. The ORSS is designed to collect residual waste samples from any location on a tank floor. It will be used in this instance to collect solid samples from the floor location of interest in the AY-102 tank annulus near Riser 83. The ORSS is lowered through a 12- or 24-inch diameter riser (Riser 91 or Riser 89, respectively) to the tank annulus bottom. The sampler is then maneuvered remotely to collect solid samples from the floor near Riser 83. Once solids are collected, the

sampler deposits the solid material into a sample jar located in the sample carrier which is then raised into the glove bag at the top of the riser. This process will be repeated until all sample material required from this sample location is collected, unless otherwise authorized by the tank coordinator.

Sample jars shall be cleaned using a procedure developed per protocol in SW-846, *Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods*. Alternatively, certified clean, capped jars may be used that are purchased from a qualified vendor. Each clean sample jar shall be labeled with a unique sample identification number, as specified in Table 3-1. Prior to taking sampling equipment in the field, the portion of the end effector that will contain the sample and the sample funnel shall be cleaned using the established 222-S Laboratory procedure for cleaning sampling equipment.

In accordance with RPP-53434, one bulk sample shall be taken from this sample location. Sample locations shown in Figure 2-2 are general locations for sampling. The tank coordinator will specify the exact locations during the sampling event.

Each bulk sample jar shall be approximately half-full or more based on visual observations of the jar after removing it from the tank annulus. If the jar is determined not to meet the minimum quantity requirement, it shall be lowered back into the annulus for additional material or a replacement shall be taken, unless the tank coordinator authorizes otherwise. Sampling requirements for material near Riser 83 are summarized in Table 3-1. Field and trip blanks are not required for solids samples, as stated in RPP-53434.

Table 3-1. Sampling Requirements for Tank AY-102 Annulus Near Riser 83

Sample Identification Number[1]	Sample Location	Sample Jars/Lids
2AY-12-ANU1	Bulk sample of scraping of floor solids near riser 83.	240-mL Teflon™[2] jars and lids.

Notes: [1] If more than one jar is required to obtain sufficient sample from a location, it shall be identified by adding an alphabetic suffix (e.g., 2AY-12-ANU1A) to the sample identification number at that location.
[2]Teflon is a registered trademark of the E. I. du Pont de Nemours and Company, Inc., Wilmington, Delaware.

3.2 SAMPLE COLLECTION BY THE ANNULUS SAMPLING SYSTEM

The annulus sampling system developed by AREVA is a remotely operated, mobile sampler that will be capable of interacting with the sample jar carrier. The mobile sampler is designed to collect residual solid samples using a removable end effector from the two highest priority locations in the AY-102 tank annulus near Riser 90. The annulus sampling system will be lowered through a 12-inch diameter riser (Riser 90) to the tank annulus bottom. The sampler will then be maneuvered remotely to collect solids and deposit the material into a sample jar. The sample jar carrier will be raised into the glove bag at the top of the riser. The sample jar will be replaced with an empty jar and the carrier will be lowered back into the annulus for collecting the next sample.

If the solids cannot be deposited into the sample carrier, the entire annulus sampling system will be raised into the glove bag above Riser 90 to collect the sample. The end effector containing the sampled solids will be placed into the sample jar and shipping cask. A new end effector will be attached to the annulus sampling system and the annulus sampling system will be lowered back into the annulus area for collection of subsequent samples.

The above process will be repeated until all sample material required by this SAP is collected, unless otherwise authorized by the tank coordinator.

Sample jars shall be cleaned using a procedure developed per protocol in SW-846, *Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods*. Alternatively, certified clean, capped bottles may be used that are purchased from a qualified vendor. Each clean sample jar shall be labeled with a unique sample identification number, as specified in Table 3-2. Prior to taking sampling equipment in the field, the portion of the end effector that will contain the sample and the sample funnel shall be cleaned using the established 222-S Laboratory procedure for cleaning sampling equipment.

In accordance with RPP-53434, at least one approximately ⅜-inch deep surface sample and one bulk sample shall be taken from each sample location. Sample locations shown in Figure 2-2 are general locations for sampling. The tank coordinator will specify the exact locations during the sampling event.

Each surface sample jar shall contain the surface sample, which will be approximately ⅜-inch deep. Each bulk sample jar shall be approximately half-full or more based on visual observations of the jar after removing it from the tank annulus. End effectors with surface samples or bulk samples are acceptable in lieu of loose sample material. If the jar is determined not to meet the minimum quantity requirement, it shall be lowered back into the annulus for additional material or a replacement shall be taken, unless the tank coordinator authorizes otherwise. No sample quantity is specified here for the floor solids, as this location will only be sampled opportunistically. Sampling requirements for the annulus sampling system are summarized in Table 3-2. Field and trip blanks are not required for solids samples, as stated in RPP-53434.

Table 3-2. Sampling Requirements for Tank AY-102 Annulus Near Riser 90

Sample Identification Number[3]	Sample Location	Riser No.	Sample Jars/Lids
2AY-12-ANU2	Surface of the filled annulus air slot	Riser 90[4]	240-mL Teflon™[1] jars and lids.
2AY-12-ANU3	Bulk sample of the filled annulus air slot surface		
2AY-12-ANU4	Surface of the mound over the annulus air outlet pipe		
2AY-12-ANU5	Bulk sample of the mound over the annulus air outlet pipe		
2AY-12-ANU6 [2]	Bulk sample of scraping of floor solids		

Notes: [1]Teflon is a registered trademark of the E. I. du Pont de Nemours and Company, Inc., Wilmington, Delaware.
[2] These solids samples will be taken opportunistically and are not required for completion of this sampling plan.
[3] If more than one jar is required to obtain sufficient sample from a location, it shall be identified by adding an alphabetic suffix (e.g., 2AY-12-ANU2A) to the sample identification number at that location.
[4] Other risers may be used for collecting solid samples of interest as more information and visual inspections are completed of the AY-102 annulus area.

3.3 SAMPLE CUSTODY AND SHIPPING

Tank Farm Sampling shall initiate a chain-of-custody form for each sample jar. The chain-of-custody form shall accompany each sample jar to its final destination. The following information shall be included on the chain-of-custody form, as a minimum:

- Project name (e.g., AY-102 Annulus);
- An identification number unique to each sample jar as assigned in Table 3-1;
- Name and signature of sampler;
- Date and time at which the sample was obtained;
- Name and signature of individual(s) involved in sample transfer;
- Date and time of possession.

If possible, provide a brief description of the sample (e.g., fraction of the volume in the jar, color, and consistency) in the comment section.

Preservatives are not needed for these samples. The laboratory will use the list of requested analytes provided in this SAP. Therefore, the list of analyses is not included on the chain of custody.

Each sample jar will be shipped to the laboratory in an approved shipping container per approved procedure. Radionuclide concentration information that may be used to determine the required shipping container type is provided in Table 2-1. The sampling team shall use the Waste Tank Sample Seals (or custody tape) to deter tampering. The samples shall be shipped on the same day as sampled if possible. A verbal notification by Tank Farm Sampling is to be made to the 222-S Laboratory at 373-2435 at least 24 hours in advance of an expected shipment.

4.0 LABORATORY ANALYSIS REQUIREMENTS

All analysis activities shall be performed in accordance with requirements in this SAP. Direction for sample preparation is provided in Section 4.1. Analyses required to meet RPP-53434 are specified in Section 4.2. Direction is provided in Section 4.3 in the event that the collected sample material is insufficient to perform all requested analyses.

The laboratory is expected to meet all applicable SW-846 holding times. Therefore, sample handling, preparation, and analysis shall be performed with this goal in mind. If holding times cannot be met, the laboratory shall perform the analysis as soon as possible. Where holding time for a requested analysis is not specified, the laboratory shall meet internal laboratory requirements.

4.1 DIRECTION FOR SAMPLE HANDLING AND PREPARATION

The laboratory shall observe and record physical characteristics, such as color and consistency of the solids in each sample jar. Close-up photographs of the sample materials shall be taken. The photographs should show, as clearly as possible, color and consistency of the samples.

If present, liquid in each sample jar shall be decanted. Liquids from each sample location shall be maintained as separate composites and stored in archive until further notice. Unused solids in the samples shall be stored in archive.

4.2 REQUIREMENTS FOR ANALYSIS

Chemical and radiochemical analyses required by RPP-53434 will be performed by ATL. Solids subsamples will be analyzed per Table 4-1 and Table 4-2.

If complete digestion of the solids cannot be achieved with the specified method, the tank coordinator shall be contacted for further direction. A description of the digests and residues shall be provided in the laboratory data report narrative. Inductively-coupled plasma – atomic emission spectroscopy (ICP-AES) analyses shall be performed on acid digests to maintain low detection limits and fusion digests for more complete dissolution of the analytes of interest.

The preferred methods of analysis for analytes listed in this document are SW-846, or other approved standard methods. The SW-846 methods generally are listed without suffixes indicating method revisions; however, the most recent revisions are preferred. The laboratory should use the technique specified in the analysis tables where no approved regulatory methods exist. The laboratory analytical procedures may have changes to the SW-846 methods to accommodate analysis of samples from Hanford Site waste tanks and to reduce radiological exposure to the analysts. Those changes and their effect on method performance will be documented to demonstrate that procedures can provide satisfactory performance for the intended use of the data. The documentation of changes (e.g., substitutions, deviations, or modifications) to the methods shall be in writing, maintained at the laboratory, and available for inspection upon request by authorized representatives of regulatory authorities and WRPS. Additional regulatory and DOE/RL-96-68, *Hanford Analytical Services Quality Assurance Requirements Documents,* requirements for documenting procedure changes must also be followed.

Table 4-1. Analytical Requirements For Solid Surface Samples

Analytes	Analytical Technique	Preparation Method	Reference Method[1]	Unit	Report Format[2]
pH	pH probe	1 to 1 water to solids leach	9045	unitless	II, VI
Ammonium	IC	Distillation	EPA 300.7[3]	µg/g	VI
Solid Specific Gravity[4]	Solid Specific Gravity	Direct	Not available	g/mL	VI
^{90}Sr	Beta counting	Fusion	Not available	µCi/g	II, VI
^{60}Co, ^{137}Cs	GEA	Fusion	Not available	µCi/g	II, VI
Solid mineral phases	Polarized light microscopy (PLM), Scanning electron microscopy – energy dispersive spectroscopy (SEM-EDS), X-ray diffraction (XRD)	Direct	Not available	unitless	II, VI
Weight percent water	TGA	Direct	Not available	Weight percent	VI

Notes: [1]The SW-846 methods are listed without suffixes indicating method revisions; however, the latest updates are preferred.

[2]See Section 8.0 for descriptions of report formats.

[3] EPA Method 300.7, Dissolved Sodium, Ammonium, Potassium, Magnesium, and Calcium in Wet Deposition by Chemically Suppressed Ion Chromatography.

[4] This analysis will be performed opportunistically, if sufficient material is obtained.

Table 4-2. Analytical Requirements For Bulk Solid Samples

Analytes	Analytical Technique	Preparation Method	Reference Method[1]	Unit	Report Format[2]
Al, Ca, Fe, K, Mg, Na, Si	ICP-AES	Acid and Fusion	6010	µg/g	II, VI
F^-, NO_2^-, NO_3^-, PO_4^{3-}, SO_4^{2-}	IC	Water	9056	µg/g	II, VI
pH	pH probe	1 to 1 water to solids leach	9045	unitless	II, VI
Solid Specific Gravity[4]	Solid Specific Gravity	Direct	Not available	g/mL	VI
Ammonium	IC	Distillation	EPA 300.7[3]	µg/g	VI
Total inorganic carbon (TIC) / Total organic carbon (TOC)	Silver-catalyzed Oxidation / Coulometric Auto titration	Direct	Standard Method 5310[6]	µg C/g	VI
^{90}Sr	Beta counting	Fusion	Not available	µCi/g	II, VI
^{60}Co, ^{137}Cs	GEA	Fusion	Not available	µCi/g	II, VI
Solid mineral phases	PLM, SEM-EDS, XRD	Direct	Not available	unitless	II, VI
Weight percent water	TGA	Direct	Not available	Weight percent	VI
Corrosion Testing[5]	Test Plan	To be determined	To be determined	—	—

Notes: [1]The SW-846 methods are listed without suffixes indicating method revisions; however, the latest updates are preferred.

[2] See Section 8.0 for descriptions of report formats.

[3] EPA Method 300.7, Dissolved Sodium, Ammonium, Potassium, Magnesium, and Calcium in Wet Deposition by Chemically Suppressed Ion Chromatography.

[4] This analysis will be performed opportunistically, if sufficient material is obtained.

[5] Corrosion testing will only be performed if there is sufficient sample material and if other data indicate a need for these tests.

[6] Standard Method 5310, 2012, *Standard Method for the Examination of Water and Waste Water*, Method 5310C, *Persulfate-Ultraviolet or Heated Persulfate Oxidation Method*, American Public Health Association, American Water Works Association, Water Environment Federation.

4.3 INSUFFICIENT SAMPLE RECOVERY

If the amount of material in a sample is insufficient to perform the requested analyses, the performing laboratory shall notify the tank coordinator within one working day. The laboratory shall perform analyses that do not consume sample material (e.g., visual observations) first. Direction for analyses that consume sample material will be provided to the laboratory by the tank coordinator based on sample volumes and discussions with clients requiring data from this

SAP (Section 1.0). All analyses requested in this SAP but not performed shall be documented and justified in the narrative section of the laboratory analysis report.

5.0 QUALITY ASSURANCE AND QUALITY CONTROL

Quality requirements for conducting River Protection Project sampling and analysis are described in DOE/RL-96-68. Conditions (e.g., quality problems) that do not conform to requirements specified in this SAP or references herein shall be controlled to prevent inadvertent use. These quality problems shall be identified, documented, controlled, and reported to prevent reoccurrence as required by ATL-312, *ATL Analytical Project Process Flow* procedure (ATL-312, Sec. 4.26, subsection 3.17, 3.18, 3.19), and by WRPS ATS-310, *222-S Analytical Project Process Flow* procedure (ATS-310, Section 1.25, subsection 4.17, 4.18 and 4.19) as revised.

It is anticipated that the 222-S Laboratory will perform all of the analyses. If necessary, the laboratory may subcontract certain analyses to another qualified laboratory. The subcontracted laboratory shall meet all QA/QC requirements in this SAP. If subcontracting any portion of this SAP to a commercial laboratory, the implementing quality assurance program shall comply with the Department of Energy (DOE) *Quality Systems for Analytical Services*, (DOEa) which is maintained by the DOE's Consolidated Audit Program.

All sampling and analysis activities shall be performed using approved methods, procedures, and work packages which are written in accordance with approved operational and laboratory QA plans, consistent with the requirements of this SAP. All sampling and analysis activities specified in this SAP shall be performed by qualified personnel that meet site and job specific training requirements, using properly maintained and calibrated equipment.

5.1 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS FOR SAMPLING

Sample labeling and chain-of-custody is performed as described in Sections 3.1 and 3.2, respectively.

5.2 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS FOR LABORATORY ANALYSIS

Laboratories performing analyses in support of this SAP shall have approved and implemented QA plans. These QA plans shall meet DOE/RL-96-68 minimum requirements as the baseline for laboratory quality systems. Analyses performed by ATL shall meet quality requirements in ATL-MP-1011, *ATL Quality Assurance Project Plan for 222-S Laboratory*. Analyses performed by WRPS shall be governed by ATS-MP-1032, *222-S Laboratory Quality Assurance Project Plan*. All tank sample analyses shall be performed in accordance with these requirements.

The laboratory shall perform QC analyses at the frequency specified in the reference methods. Where such methods are not available, QC analyses shall be performed at the frequency specified in the laboratory analytical procedures.

The DQO RPP-53434 does not specify required detection limits or project-specific QC acceptance criteria. The laboratory shall use the largest sample aliquots and/or the smallest dilution possible to achieve the lowest detection limits. Analytical QC results shall meet the laboratory statistical process control limits.

The laboratory will use internal QA systems for addressing any QC failures. If the QC failures are systematic and cannot be resolved by the internal protocols, the tank coordinator shall be consulted to determine the proper action. The laboratory should suggest a course of action at that time. All data not meeting the QC requirements shall be properly noted and the associated QC failures discussed in the narrative of the data report.

6.0 EXCEPTIONS AND CLARIFICATIONS

This section identifies exceptions and clarifications for sampling and analysis activities under this SAP.

6.1 ANALYTICAL EXCEPTIONS AND CLARIFICATIONS

The laboratory shall report all detected analytical results from IC and ICP-AES analyses, even though only specific analytes are requested. Additionally, the laboratory shall report non-requested GEA analytes detected above the method detection limit with the exception of ambient levels of naturally occurring radon decay elements. No additional preparatory work is required to improve the quality of results for these non-requested analytes, but data not meeting QC limits shall be flagged accordingly. If the laboratory believes a non-requested analyte is erroneous, reporting results for that analyte is not required. The tank coordinator may request additional analyses to improve the results for non-requested analytes on a case-by-case basis.

The IC method employed shall be able to distinguish fluoride from low molecular weight organic anions such as formate and acetate. Report low molecular weight organic anion results if detected.

7.0 ORGANIZATION

The organization and responsibility of key personnel involved with this characterization effort are shown in Table 7-1.

Table 7-1. Project Key Personnel

Responsibility	Individual
Tank Coordinator	S. J. Harrington, 376-1336
Project Coordinator, ATL	R. A. Bushaw, 373-4314
222-S Laboratory Point of Contact (off hours)	222-S Laboratory Leader, 373-2435
Tank Farms Shift Office	Base Operations Shift Manager, 373-2689
Project Coordinator, Analytical Project Management	S. G. McKinney, 372-1945
Manager, Tank Waste Inventory and Characterization	J. G. Reynolds, 373-5999
Sampling Operations	T. W. Craft, 373-0258
Manager, Base Operations Process Engineering	N. W. Kirch, 373-2380
222-S Laboratory Process Chemistry point of contact	C. M. Seidel, 373-5211
Manager, Analytical Project Management	J. M. Johnson, 372-9474
Project Manager, WRPS	T. L. Sams, 376-4653

8.0 DELIVERABLES

All analyses of annulus solid material shall be reported as Formats II and/or VI as indicated in Table 4-1 and Table 4-2. Brief descriptions of these reporting formats are provided in Sections 8.1 and Section 8.2 (see ATL-MP-1011 for more detail).

8.1 FORMAT II REPORTING

This format requires early transmittal of an interim report of the analytical results. The results will be transmitted to the tank coordinator via electronic mail or facsimile. Interim results for format II analyses of pH, GEA, and PLM, SEM-EDS, XRD shall be transmitted within seven (7) working days after receipt of the last sample from each sampling event at the 222-S Laboratory. All other format II analyses, including ICP-AES, IC, and Beta Counting, shall be transmitted within ten (10) working days after receipt of the last sample from each sampling event at the 222-S Laboratory.

8.2 FORMAT VI REPORTING

Results for analyses in Table 4-1 and Table 4-2 shall be documented in a Format VI report. All analytical data, including solid sample analyses, holding time checks, matrix spike analyses, and laboratory control sample analyses shall be verified by the laboratory prior to reporting. The data reports shall include the data for all samples from the respective sampling event. All Characterization Change Notices (CCNs) applicable to the project shall be appended to the data report. ATL shall issue the Format VI report within 60 days following receipt of the last sample

from each sampling event to the WRPS Analytical Project Management group who shall release it in accordance with TFC-ENG-DESIGN-C-25, *Technical Document Control*. The reports shall be issued with the distribution shown in Table 8-1.

The raw data shall be accessible to the program in accordance with the laboratory's Records Inventory and Disposition Schedule (RIDS) and until the respective PER is closed or the solids are removed. In addition, an Excel®.[1] spreadsheet containing reviewed and approved data shall be provided to the tank coordinator. The generation date and time on the spreadsheet shall match, as close as possible, those on the data summary report in the final laboratory report. Sample photographs shall be added to the "HotCellPhoto" share drive, which is accessible to the Tank Coordinator.

In addition to the data report, an electronic version of the analytical results shall be loaded to the data staging area in the Tank Waste Information System (TWINS) within seven (7) calendar days of release of the data package. The electronic version shall be in the standard electronic format as directed in HNF-3638, *Standard Electronic Format Specification for Tank Characterization Data Loader: Version 3.5* (or higher revision). All of the unaltered characterization data shall be included in database upload.

Table 8-1. Laboratory Analytical Report Distribution

Recipient	Report Type (see note)
S. J. Harrington	E
N. W. Kirch	E
D. M. Nguyen	E
J. H. Rasmussen	E
A.M. Templeton	E
J. G. Reynolds	E
T. L. Sams	E
K. D. Boomer	E
D. J. Washenfelder	E
W. J. Powell	E

Note: E = Electronic

9.0 CHANGE CONTROL

Changes related to sampling (e.g., riser, sampling method, number of solid samples, sample location, etc.) must be approved by the tank coordinator. The changes shall be recorded on a Document Revision Form, a Characterization Change Notice (CCN), a permanent data sheet, or directly in the sampling work package(s).

[1] Excel is a registered trademark of the Microsoft Corporation, Redmond, Washington.

The tank coordinator shall document significant changes to the analytical requirements in the SAP (changes impacting scope, cost, or budget) by a revision of the SAP. Minor changes (as determined by the tank coordinator) may be made by the tank coordinator using a CCN. All changes shall be clearly documented in the final data report. Copies of any CCNs shall be appended to the final data report. The tank coordinator has the responsibility of exercising technical judgment in modifying the described work and in justifying the level of documentation required when changes to the described work in the SAP are made.

10.0 REFERENCES

RPP-53434, *241-AY-102 Annulus Sampling Data Quality Objectives*, as revised, Washington River Protection Solutions LLC, Richland, Washington.

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H-2-64449, 2008, *Tank Elevation and Details*, Sheet 1, Rev. 7, U.S. Department of Energy, Office of River Protection, Richland, Washington.

H-14-010506, 2010, *Dome Penetration Schedules (WST/WSTA) Tank 241-AY-102*, Sheet 4, Rev. 2, U.S. Department of Energy, Office of River Protection, Richland, Washington.

HNF-4798, 1999, *Tank 241-AY-102 Annulus Continuous Air Monitoring High Readings*, Rev. 0, Lockheed Martin Hanford Corporation, Richland, Washington.

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TWINSb, Tank Waste Information System, Queried 8-15-2012, [TWINS Data Base, Best-Basis Inventory, Tank Density and Percent Water, Tank Name 241-AY-102], Internet at https://twins.labworks.org, Washington River Protection Solutions LLC, Richland, Washington.

TWINSc, Tank Waste Information System download, Queried 8-15-2012, ['hanford\data\sitedata\stdinv\BBI\Baseline Inventory Calc Detail\FY06 Q4 update\FY06 Q4 – Calc Detail – DSTs – downloaded 11-27-06r1.xls'], CH2M Hill Hanford Group Inc., Richland, Washington.

TWINSd, Tank Waste Information System download, Queried 8-15-2012, ['hanford\data\sitedata\stdinv\BBI\Baseline Inventory Calc Detail\FY06 Q4 update\FY06 Q4 – Density and Wt% Water Report – downloaded 112706.xls'], CH2M Hill Hanford Group Inc., Richland, Washington.

RPP-RPT-44630, 2012, *Derivation of Best-Basis Inventory for Tank 241-AY-102 as of January 1, 2012*, Rev. 3, Washington River Protection Solutions LLC, Richland, Washington.

H-2-64307, 1970, *Structural Insulating Concrete Plan + Details*, Sheet 1, Rev. 4, U.S. Atomic Energy Commission, Richland Operation Office, Richland, Washington.

SW-846, 1986, *Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods*, 3rd Edition (as amended), U.S. Environmental Protection Agency, Washington, D.C.

EPA Method 300.7, *Dissolved Sodium, Ammonium, Potassium, Magnesium, and Calcium in Wet Deposition by Chemically Suppressed Ion Chromatography*, U. S. Environmental Protection Agency, Washington, D. C.

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ATL-312 Section 4.26, *ATL Analytical Project Process Flow*, Advanced Technologies and Laboratories International, Inc., Richland, Washington.

ATS-310 Section 1.25, *222-S Analytical Project Process Flow*, Washington River Protection Solutions LLC, Richland, Washington.

DOEa, *Quality Systems for Analytical Services*, as revised, U. S. Department of Energy, Oak Ridge Office, Oak Ridge, Tennessee.

ATL-MP-1011, *ATL Quality Assurance Project Plan for 222-S Laboratory*, as revised, Advanced Technologies and Laboratories International, Inc., Richland, Washington.

ATS-MP-1032, *222-S Laboratory Quality Assurance Plan*, as revised, Washington River Protection Solutions LLC, Richland, Washington.

TFC-ENG-DESIGN-C-25, 2012, *Technical Document Control*, Rev. D, Washington River Protection Solutions LLC, Richland, Washington.

HNF-3638, 2001, *Standard Electronic Format Specification for Tank Characterization Data Loader: Version 3.5*, Rev. 2, prepared by Pacific Northwest National Laboratory for CH2M HILL Hanford Group, Inc., Richland, Washington.

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DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	Tank Waste Inventory & Char.	Date September 20, 2012
Project Title/Work Order: RPP-PLAN-53352, Rev. 0, Tank 241-AY-102 Annulus Sampling and Analysis Plan		EDT No. N/A
		ECN No. N/A

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
Washington River Protection Solutions LLC					
W. J. Powell	R2-58	X			
G. A. Cooke	T6-05	X			
W. R. Cooper	S7-05	X			
A. B. Cockrell	S7-03	X			
D. L. Dyekman	S5-07	X			
T. L. Sams	R2-52	X			
L. P. Markel	R2-87	X			
S. G. McKinney	T6-05	X			
J. R. Prilucik	T6-05	X			
J. H. Rasmussen	R2-58	X			
C. M. Seidel	T6-14	X			
T. J. Venetz	R2-53	X			
M. L. Sumsion	S5-66	X			
N. W. Kirch	R2-58	X			
D. J. Washenfleder	R2-53	X			
G. R. Tardiff	S5-07	X			
J. G. Reynolds	R2-58	X			
S. J. Harrington	R2-58	X			
D. M. Nguyen	R2-58	X			
K. D. Boomer	R2-53	X			
S. L. Kooiker	S7-03	X			
T. W. Craft	S7-20	X			
B. G. Orth	S7-03	X			
J. A. Voogd	R1-51	X			
D. W. Strasser	S5-63	X			
J. L. Hawley	S7-92	X			
B. W. Brown	S7-92	X			
ATL					
R. A. Bushaw	T6-01	X			
G. P. Ritenour	T6-01	X			

Johnson, Jeremy M

From: Johnson, Jeremy M
Sent: Tuesday, April 09, 2013 3:04 PM
To: 'Hendrickson, Michelle (ECY) (MICH461@ECY.WA.GOV)'
Subject: AY-102 Riser 83 Inspection Results 4/8/13
Attachments: AY-102 Riser 83 4-8-13 Inspection Comparison.pdf

3/19/2013

3/26/2013

4/1/2013

4/8/2013

3/19/2013

3/26/2013

4/1/2013

4/8/2013
Additional Material

3/19/2013

3/26/2013

4/1/2013

4/8/2013

3/19/2013

3/26/2013

4/1/2013

4/8/2013

Johnson, Jeremy M

From: Johnson, Jeremy M
Sent: Thursday, March 07, 2013 12:32 PM
To: 'CWHA461@ecy.wa.gov'; 'Hendrickson, Michelle (ECY) (MICH461@ECY.WA.GOV)'; Lyon, Jeffery; Martell, John; Schmidt, John; 'Ken.Niles@state.or.us'; Wheeler, Isabelle; Irby, Dennis H; Burandt, Mary E
Subject: AY-102 IPT
Attachments: AY-102 Riser 83 2-27-13 Inspection Comparison.pdf; DST Near-Term Extent of Condition Review DD 2013-03-11 v1.pdf

Attached please find the extent of condition activities schedule and the latest riser 83 photos.

Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

2/6/2013

2/14/2013

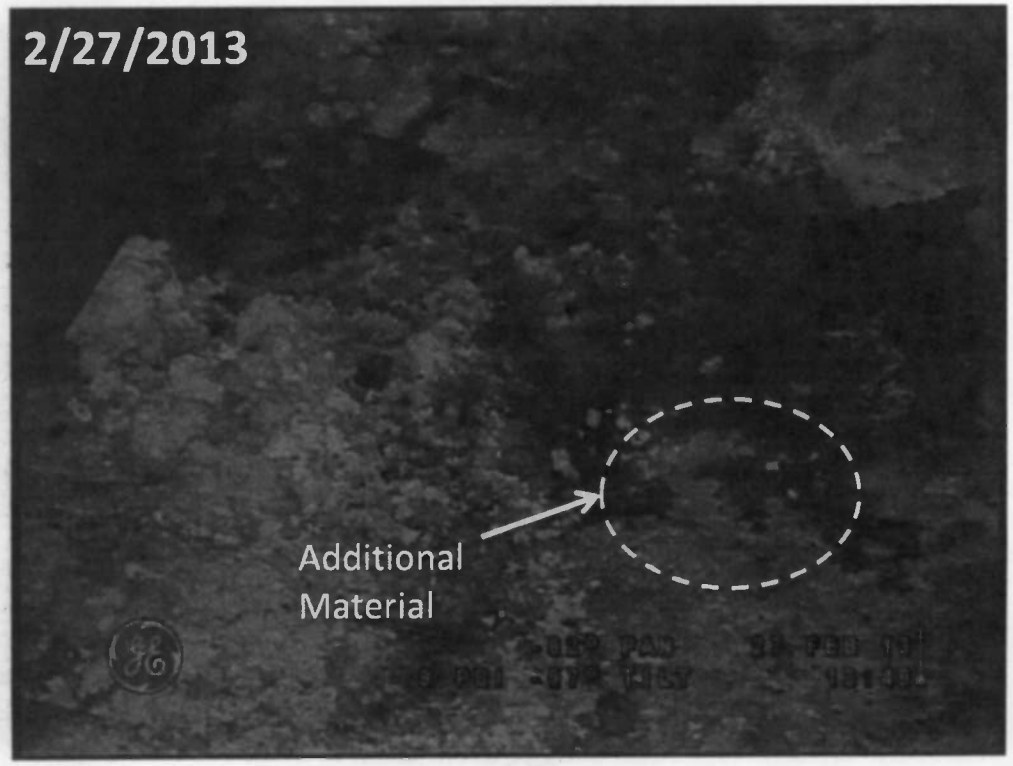
2/22/2013

2/27/2013

2/6/2013

2/14/2013

2/22/2013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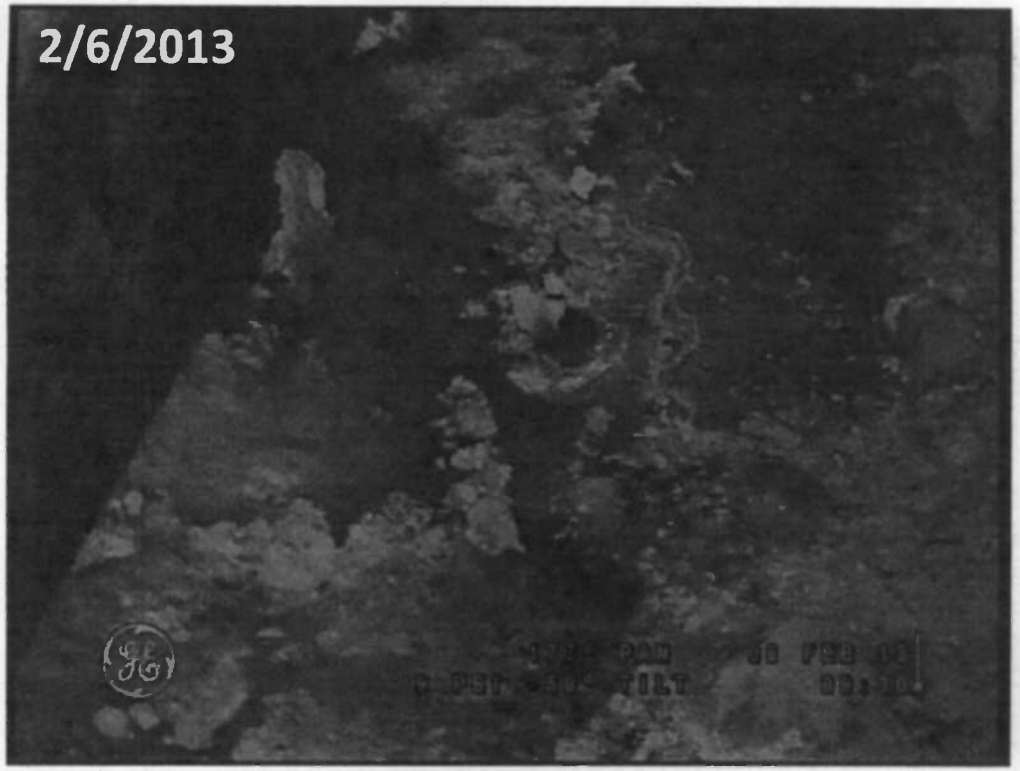
Additional
Material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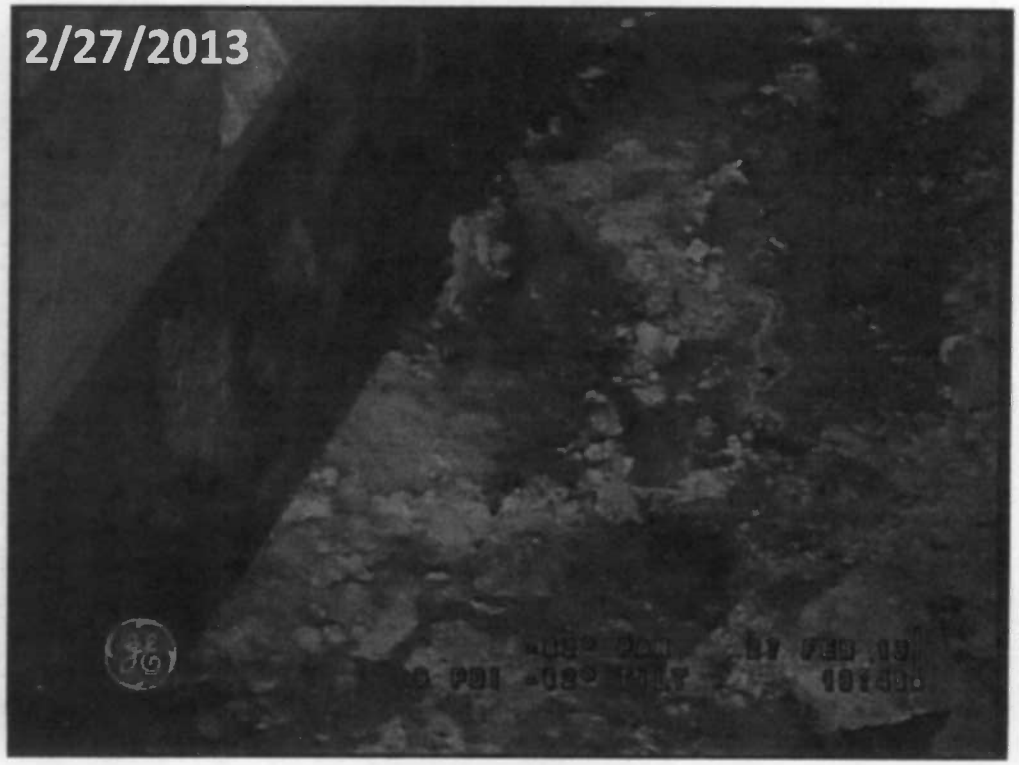
2/22/2013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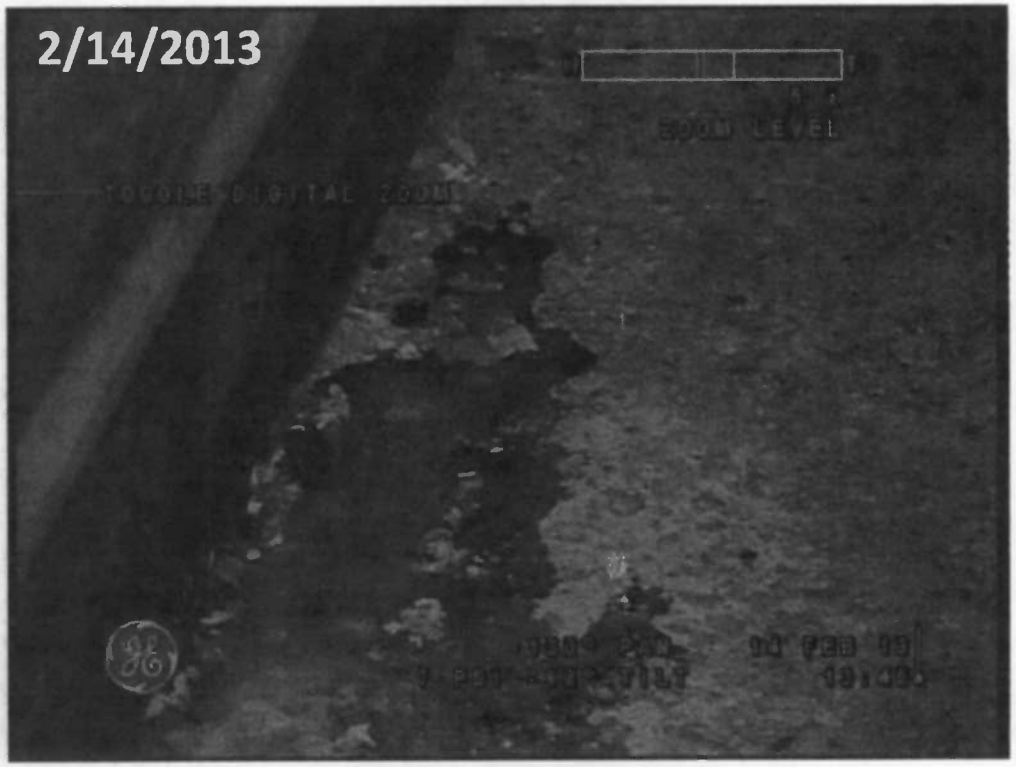
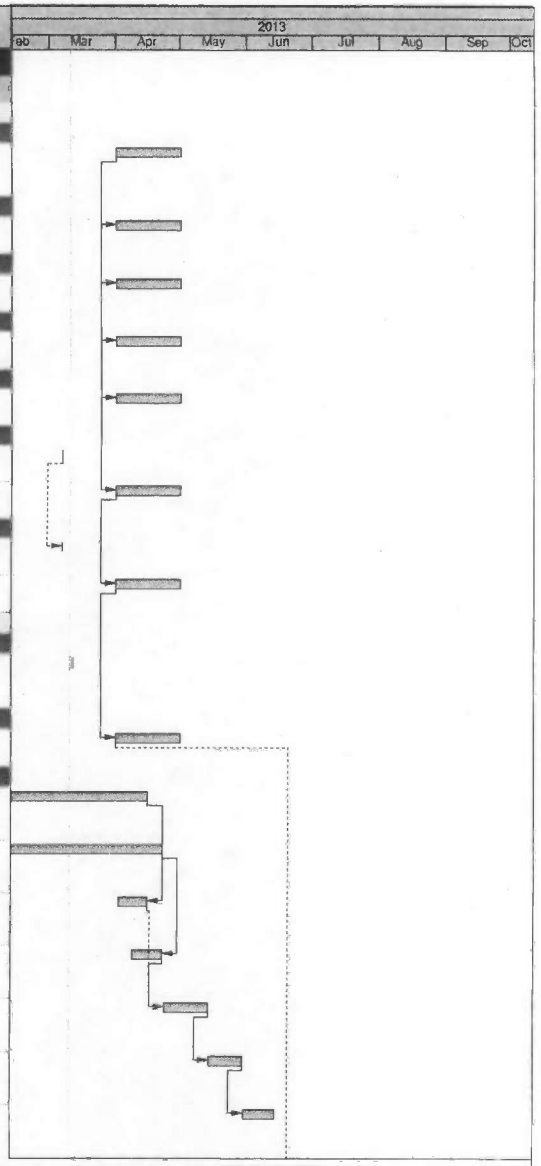

2/14/2013

2/22/2013

2/27/2013

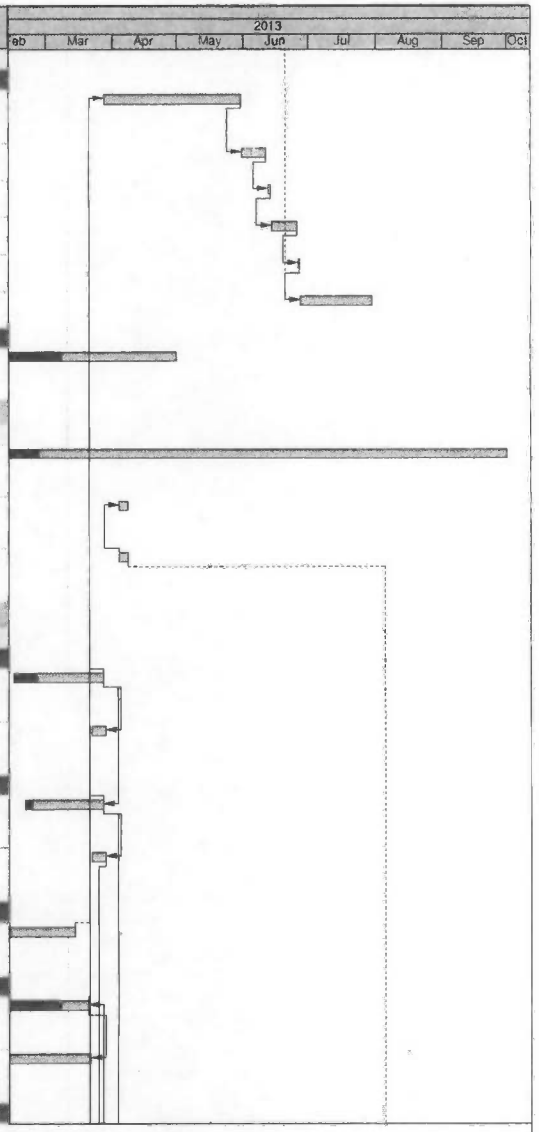
Line Number	Activity ID	Activity Name	RESP	RD	Start	Finish	%	Chg 1 wk	Total Float	Predecessors	Successors	CACN
5.1.1.14: DST Near-Term Extent of Condition Review												
5.1.1.14.2: Pre-Project Planning / Extent of Condition Studies												
5.1.1.14.2.1: Extent of Condition - Engineering Studies												
Evaluate AY-102 Leak Detection (HRR/LDR)												
1	AY102-PC5250	Implement Recommendation (HRR/LDR)	WRPS- Prj Cntrls	21	01-Apr-13*	01-May-13	0%	0	94		FY13, AY102-PC5310, AY102-PC5960, AY102-PC5490	201517
Evaluate AY-102 Leak Detection Pit Integrity (Lines)												
2	AY102-PC5310	Implement Recommendation (AY-102 Leak Detection Pit Integrity (Lines))	WRPS- Prj Cntrls	21	01-Apr-13	01-May-13	0%	0	94	AY102-PC5250	FY13	201517
Evaluate AY-102 Annulus Ventilation Upgrades												
3	AY102-PC5960	Implement Recommendation (Annulus Ventilation Upgrades)	WRPS- Prj Cntrls	21	01-Apr-13	01-May-13	0%	0	94	AY102-PC5250	FY13	201517
Liner Corrosion Assessment												
4	AY102-PC5490	Implement Recommendation (Liner Corrosion Assessment)	WRPS- Prj Cntrls	21	01-Apr-13	01-May-13	0%	0	94	AY102-PC5250	FY13	201517
Evaluate DST Annulus CAM Re-Activation												
5	AY102-PC5370	Implement Recommendation (DST Annulus CAM Re-Activation)	WRPS- Prj Cntrls	21	01-Apr-13	01-May-13	0%	0	94	AY102-PC5250	FY13	201517
Evaluate Additional Rad Monitoring/ LDP												
6	AY102-PC5380	Brief IPT (Additional Rad Monitoring)	WRPS- Little DB	0	07-Mar-13 A	07-Mar-13 A	100%	0		AY102-PC5380	FY13, AY102-PC5670	201517
7	AY102-PC5430	Implement Recommendation (Additional Rad Monitoring)	WRPS- Prj Cntrls	21	01-Apr-13	01-May-13	0%	0	94	AY102-PC5250	FY13, AY102-PC5690	201517
Emergency Pumping (Annulus)												
8	AY102-PC5670	Brief IPT (Emergency Pumping - Annulus)	WRPS- Little DB	0	07-Mar-13 A	07-Mar-13 A	100%	0		AY102-PC5640, AY102-PC5410	FY13	201525
9	AY102-PC5690	Implement Recommendation (Emergency Pumping - Annulus)	WRPS- Prj Cntrls	21	01-Apr-13	01-May-13	0%	0	94	AY102-PC5430	FY13, AY102-PC5550	201525
5.1.1.14.2.2: Extent of Condition - Transfer Options												
Develop Retrieval Options												
10	AY102-PC5720	Final Report Brief to ORP-IPT (retrieval options)	WRPS- Ard, Kevin	1	12-Mar-13*	12-Mar-13	0%	0	126	AY102-PC5900	FY13	201521
Cross Site Transfer Gap Analysis												
11	AY102-PC5550	Implement Recommendation (cross site transfer)	WRPS- Prj Cntrls	21	01-Apr-13	01-May-13	0%	0	94	AY102-PC5690	FY13, AY102-PC5610	201521
Develop Space Management Plan												
12	AY102-PC4000	Space Mgmt Plan: Draft Plan Text	WRPS- Wheeler, M-1	24	26-Nov-12 A	16-Apr-13	55%	-20	71	AY102-PC3980	AY102-PC4010	201521
13	AY102-PC4020	Space Mgmt Plan: Draft Plan Graphics	WRPS- Wheeler, M-1	29	14-Jan-13 A	23-Apr-13	20%	-20	68	AY102-PC3980	AY102-PC4030	201521
14	AY102-PC4010	Space Mgmt Plan: Prepare Status Presentation and Conduct Briefing	WRPS- Wheeler, M-1	9	03-Apr-13	16-Apr-13	0%	-20	71	AY102-PC4000, AY102-PC3990	AY102-PC4040	201521
15	AY102-PC4030	Space Mgmt Plan: Finalize Graphics	WRPS- Wheeler, M-1	10	09-Apr-13	23-Apr-13	0%	-20	66	AY102-PC4020	AY102-PC4040	201521
16	AY102-PC4040	Space Mgmt Plan: Review Plan	WRPS- Wheeler, M-1	13	24-Apr-13	14-May-13	0%	-20	66	AY102-PC4030, AY102-PC4010	AY102-PC4050	201521
17	AY102-PC4050	Space Mgmt Plan: Revise Plan	WRPS- Wheeler, M-1	10	15-May-13	30-May-13	0%	-20	66	AY102-PC4040	AY102-PC4060	201521
18	AY102-PC4060	Space Mgmt Plan: Issue Plan	WRPS- Wheeler, M-1	10	31-May-13	14-Jun-13	0%	-20	66	AY102-PC4050	FY13	201521



Actual Work | Critical Remaining Work | Milestone
Remaining Work | Current Bar Labels | % Complete

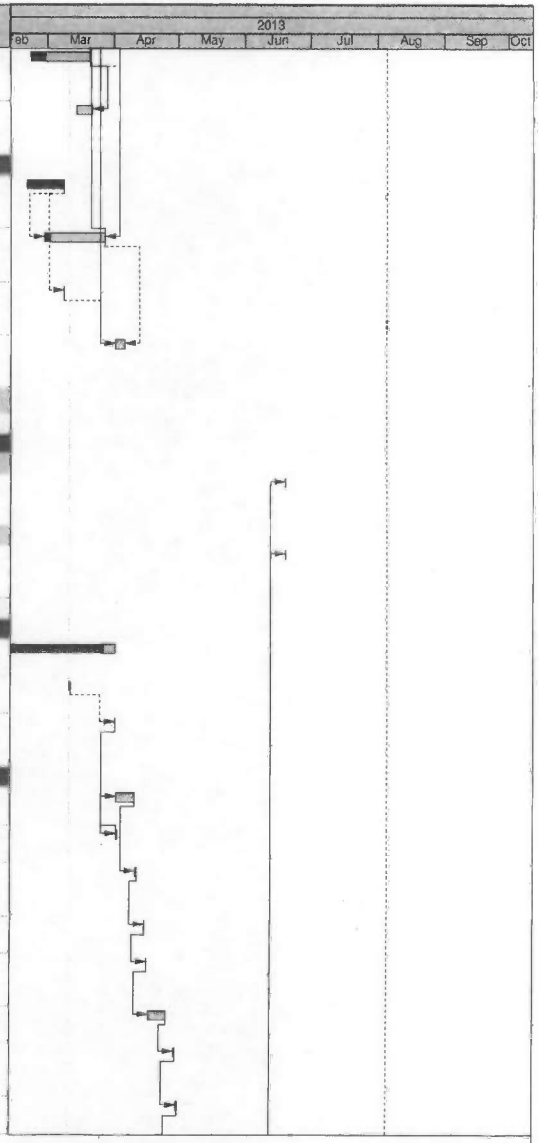
Data Date: 11-Mar-13
Print Date: 06-Mar-13

Line Number	Activity ID	Activity Name	RESP	RD	Start	Finish	%	Chg 1 wk	Total Float	Predecessors	Successors	CACN
5.1.1.14.2.3: Extent of Condition - DST Studies												
Evaluate Modifications to the DST Integrity Project												
19	AY102-PC5050	Prepare Baseline Inspections Report (First Priority DSTs)	WRPS-Washenfelder, D	40	28-Mar-13	30-May-13	0%	0	38	AY102-PC3800, DST-SY103-10, DST-SY101-10, DST-AY101-14	AY102-PC5560, FY13	201522
20	AY102-PC5560	WRPS Internal Review (DST Integrity Project Modifications)	WRPS- Little DB	7	31-May-13	11-Jun-13	0%	0	38	AY102-PC5050	AY102-PC5570	201522
21	AY102-PC5570	Recommendation to ORP (Pre cost and schedule) (DST Integrity Project Modifications)	WRPS- Scott, D	2	12-Jun-13	13-Jun-13	0%	0	38	AY102-PC5560	AY102-PC5580	201522
22	AY102-PC5580	Receive ORP Direction (Post cost and schedule) (DST Integrity Project Modifications)	ORP	7	14-Jun-13	25-Jun-13	0%	0	38	AY102-PC5570	AY102-PC5590	201522
23	AY102-PC5590	Brief IPT (DST Integrity Project Modifications)	WRPS- Little DB	1	26-Jun-13	26-Jun-13	0%	0	38	AY102-PC5580	AY102-PC5610	201522
24	AY102-PC5610	Implement Recommendation (DST Integrity Project Modifications)	WRPS- Prj Cntrls	21	27-Jun-13	30-Jul-13	0%	0	38	AY102-PC5550, AY102-PC5590	FY13	201522
Common Factors Construction Analysis AY/AZ & SY Tanks												
2	AY102-PC5060	Common Factors Construction Analysis (AY/AZ, SY Tanks)	WRPS-Washenfelder, D	33	03-Dec-12 A	30-Apr-13	54%	0	95		AY102-PC4100, FY13	201522
5.1.1.14.3: Enhanced Tank Monitoring												
5.1.1.14.3.1: Enhanced AY-102 Monitoring												
26	AY102-PC5980	Enhanced AY-102 weekly Monitoring	WRPS- Strasser, DW	128	04-Feb-13 A	30-Sep-13	9%	0	0	AY102-PC4090	FY13	201515
27	AY102-PC5030	Video Leak Detection Pit (2)	WRPS- Lutz, Mark T	3	04-Apr-13*	08-Apr-13	0%	-12	109	AY102-PC5040	AY102-PC4100, FY13	201515
28	AY102-PC5040	Pump Leak Detection Pit (2)	WRPS- Lutz, Mark T	3	04-Apr-13*	08-Apr-13	0%	-12	80		AY102-PC4100, AY102-PC5030, FY13, CHGS12D330	201515
5.1.1.14.4: Extent of Condition Field Execution												
5.1.1.14.4.1: Additional Video Assessment of Tanks												
SY-103 Annulus Inspection												
29	DST-SY103-10	Evaluate SY-103 Annulus Video Report	WRPS- Engeman, JK	12	14-Feb-13 A	27-Mar-13	25%	0	38	DST-SY103-8	DST-SY101-10, AY102-PC5050, DST-SY103-11, TGUASY3U100	201516
30	DST-SY103-11	Close Wrk Pkg: SY-103 Annulus Video (TFC-WO-12-4480)	WRPS- Taylor, Scott	5	22-Mar-13	28-Mar-13	0%	0	115	DST-SY103-9, DST-SY103-10	FY13, TGUASY3U100	201516
SY-101 Annulus Inspection												
31	DST-SY101-10	Evaluate SY-101 Annulus Video Report	WRPS- Engeman, JK	5	19-Feb-13 A	27-Mar-13	10%	0	38	DST-SY101-8, DST-SY103-10	DST-SY102-8, AY102-PC5050, DST-SY101-11	201516
32	DST-SY101-11	Close Wrk Pkg: SY-101 Annulus Video (TFC-WO-11-5847)	WRPS- Taylor, Scott	5	22-Mar-13	28-Mar-13	0%	0	110	DST-SY101-9, DST-SY101-10	DST-SY102-11, FY13	201516
AY-101 Annulus Inspection												
33	DST-AY101-14	Evaluate AY-101 Annulus Video Report	WRPS- Engeman, JK	4	03-Dec-12 A	14-Mar-13	70%	-4	46	DST-AY101-11	AY102-PC5050, DST-AY101-13	201516
AZ-101 Annulus Inspection												
34	DST-AZ101-15	Evaluate AZ-101 Annulus Video Report	WRPS- Engeman, JK	7	29-Jan-13 A	20-Mar-13	75%	0	43	DST-AZ101-12, DST-AZ102-14	AY102-PC5050, DST-AZ101-14	201516
35	DST-AZ101-14	Close Wrk Pkg (TFC-WO-12-5828): AZ-101 Annulus Video	WRPS- Denton, DB	1	05-Feb-13 A	21-Mar-13	0%	0	112	DST-AZ101-13, DST-AZ101-15	FY13, TGAZ2PVID740, TGAZ2PVID740	201516
AZ-102 Annulus Inspection												

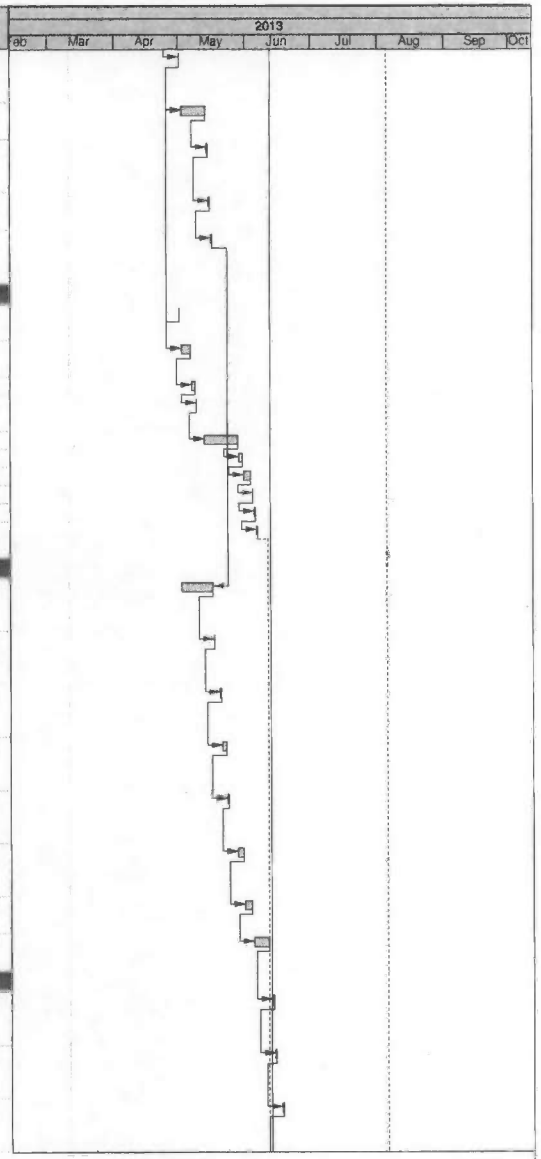


Actual Work | Critical Remaining Work | Milestone
Remaining Work | Current Bar Labels | % Complete

Line Number	Activity ID	Activity Name	RESP	RD	Start	Finish	%	Chg 1 wk	Total Float	Predecessors	Successors	CACN
36	DST-AZ102-14	Evaluate AZ-102 Annulus Video Report	WRPS- Engeman, JK	7	21-Feb-13 A	20-Mar-13	25%	0	43	DST-AZ102-12	DST-SY102-8, AY102-PC5050, DST-AZ102-15, DST-AZ101-15	201516
37	DST-AZ102-15	Close Wrk Pkg (TFC-WO-12-5829): AZ-102 Annulus Video	WRPS- Denton, DB	5	14-Mar-13	21-Mar-13	0%	0	120	DST-AZ102-13, DST-AZ102-14	FY13	201516
SY-102 Annulus Inspection												
38	DST-SY102-9	SY-102 Annulus Video (Includes Integrity Assessment of 4 Risers) - 11 of 11 completed	WRPS- Sumsion, ML	0	19-Feb-13 A	08-Mar-13 A	100%	-4		DST-SY102-7	DST-SY102-10, DST-SY102-8, SS.EXTV*A60, SS.EXTV*A60	201516
39	DST-SY102-8	Evaluate SY-102 Annulus Video Report	WRPS- Engeman, JK	10	27-Feb-13 A	27-Mar-13	10%	0	38	DST-SY102-9, DST-SY101-10, DST-AZ102-14	AY102-PC4100, AY102-PC5050, DST-SY102-11, TGAZ2PVID490	201516
40	DST-SY102-10	SY-102 Annulus Video Demobilization	WRPS- Sumsion, ML	0	08-Mar-13 A	08-Mar-13 A	100%	-2		DST-SY102-9	DST-SY102-11	201516
41	DST-SY102-11	Close Wrk Pkg: SY-102 Annulus Video (TFC-WO-12-5923)	WRPS- Taylor, Scott	5	01-Apr-13	05-Apr-13	0%	0	110	DST-SY102-10, DST-SY101-11, DST-SY102-8	FY13, TGAZ2PVID490, TGAZ2PVID490	201516
5.1.1.14.5: DST Transfer Readiness												
5.1.1.14.5.1: AY-102 Pumping Readiness (Phase 1)												
Work Package Planning												
TFC-12-5986: Modify 241AY02A Pit												
42	AY102-PC6040	Work Package Cancellation (TFC-12-5986)	WRPS- Brown, DW	1	19-Jun-13	19-Jun-13	0%	-12	63	AY102-PC4270	FY13	201525
TFC-12-5987: Modify 241AY02B Pit												
43	AY102-PC6050	Work Package Cancellation (TFC-12-5986)	WRPS- Brown, DW	1	19-Jun-13	19-Jun-13	0%	-12	63	AY102-PC4270	FY13	201525
5.1.1.14.5.1: AY-102 Pumping Readiness (Phase 2)												
Procurement / Contracts												
44	AY102-PC6090	Develop/Issue MRs to Procure Replacement Material for Jumpers (AY-02A)	WRPS- Uik, PF	14	04-Feb-13 A	01-Apr-13	90%	-18	79		AY102-PC4410, AY102-PC4430	201525
45	AY102-PC6100	Decision on use of the AY-02A pit for AY-101 Waste Transfer	Ecology	1	11-Mar-13*	11-Mar-13	0%	0	42		AY102-PC2320	201525
46	AY102-PC2320	Award Design/Fab Contract (AY-02A SS Jumpers - 3x)	WRPS- Procurement	1	01-Apr-13*	01-Apr-13	0%	-12	30	AY102-PC2310, AY102-PC5990, AY102-PC6080, AY102-PC6100	AY102-PC6070	201525
Engineering / Design (AY02A SS Jumper)												
47	AY102-PC3900	Develop 30% Design Media (AY-02A SS Jumpers - 3x)	TBD	7	02-Apr-13	10-Apr-13	0%	-12	30	AY102-PC6070	AY102-PC4140	201525
48	AY102-PC6070	Kickoff Meeting with Contractor (AY-02A SS Jumpers - 3x)	TBD	1	02-Apr-13	02-Apr-13	0%	-12	30	AY102-PC2320	AY102-PC3900	201525
49	AY102-PC4140	Review 30% Design Media (AY-02A SS Jumpers - 3x)	WRPS- Engeman, JK	1	11-Apr-13	11-Apr-13	0%	-12	30	AY102-PC3900	AY102-PC4150	201525
50	AY102-PC4150	Incorporate Comments from 30% Design Review (AY-02A SS Jumpers - 3x)	TBD	1	15-Apr-13	15-Apr-13	0%	-12	30	AY102-PC4140	AY102-PC4160	201525
51	AY102-PC4160	Approve 30% Design Media (AY-02A SS Jumpers - 3x)	WRPS- Engeman, JK	1	16-Apr-13	16-Apr-13	0%	-12	30	AY102-PC4150	AY102-PC4170	201525
52	AY102-PC4170	Develop 60% Design Media (AY-02A SS Jumpers - 3x)	TBD	7	17-Apr-13	25-Apr-13	0%	-12	30	AY102-PC4160	AY102-PC4180	201525
53	AY102-PC4180	Review 60% Design Media (AY-02A SS Jumpers - 3x)	WRPS- Engeman, JK	1	29-Apr-13	29-Apr-13	0%	-12	30	AY102-PC4170	AY102-PC4190	201525
54	AY102-PC4190	Incorporate Comments from 60% Design Review (AY-02A SS Jumpers - 3x)	TBD	1	30-Apr-13	30-Apr-13	0%	-12	30	AY102-PC4180	AY102-PC4200	201525



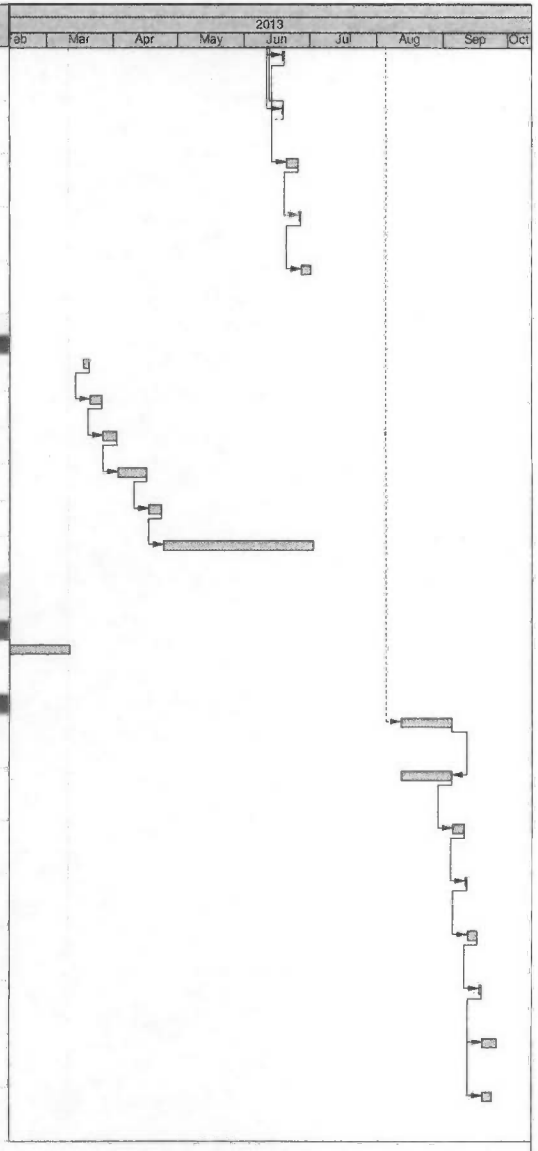
Line Number	Activity ID	Activity Name	RESP	RD	Start	Finish	%	Chg 1 wk	Total Float	Predecessors	Successors	CACN
55	AY102-PC4200	Approve 60% Design Media (AY-02A SS Jumpers - 3x)	WRPS- Engeman, JK	1	01-May-13	01-May-13	0%	-12	30	AY102-PC4190	AY102-PC4210, AY102-PC2340	201525
56	AY102-PC4210	Develop 90% Design Media (AY-02A SS Jumpers - 3x)	TBD	7	02-May-13	13-May-13	0%	-12	30	AY102-PC4200	AY102-PC4220	201525
57	AY102-PC4220	Review 90% Design Media (AY-02A SS Jumpers - 3x)	WRPS- Engeman, JK	1	14-May-13	14-May-13	0%	-12	30	AY102-PC4210	AY102-PC4230	201525
58	AY102-PC4230	Incorporate Comments from 90% Design Review (AY-02A SS Jumpers - 3x)	TBD	1	15-May-13	15-May-13	0%	-12	30	AY102-PC4220	AY102-PC4240	201525
59	AY102-PC4240	Approve 90% Design Media (AY-02A SS Jumpers - 3x)	WRPS- Engeman, JK	1	16-May-13	16-May-13	0%	-12	30	AY102-PC4230	AY102-PC2450	201525
Fabrication (AY02A SS Jumper)												
[illegible]	AY102-PC2330	Ship Jumper Materials to Subcontractor (AY-02A SS Jumpers - 3x)	WRPS- Ulk, PF	1	01-May-13	01-May-13	0%	-12	37	AY102-PC5150	AY102-PC2340	201525
61	AY102-PC2340	Develop Traveler (AY-02A SS Jumpers - 3x)	HILINE	3	02-May-13	06-May-13	0%	-12	37	AY102-PC2330, AY102-PC4200	AY102-PC2350	201525
62	AY102-PC2350	Set up Jig (AY-02A SS Jumpers - 3x)	HILINE	2	07-May-13	08-May-13	0%	-12	37	AY102-PC2340	AY102-PC2360	201525
63	AY102-PC2360	QC Inspect & Approve Jig (AY-02A SS Jumpers - 3x)	WRPS- QC	1	09-May-13	09-May-13	0%	-12	37	AY102-PC2350	AY102-PC2370	201525
64	AY102-PC2370	Fabricate Jumper (AY-02A SS Jumpers - 3x)	HILINE	10	13-May-13	28-May-13	0%	-12	37	AY102-PC2360	AY102-PC2400	201525
65	AY102-PC2400	Hydro Test Jumpers (AY-02A SS Jumpers - 3x)	HILINE	2	29-May-13	30-May-13	0%	-12	37	AY102-PC2370	AY102-PC2410	201525
66	AY102-PC2410	Refit Test (AY-02A SS Jumpers - 3x)	HILINE	2	31-May-13	03-Jun-13	0%	-12	37	AY102-PC2400	AY102-PC2420	201525
67	AY102-PC2420	Final Inspection (AY-02A SS Jumpers - 3x)	HILINE	1	04-Jun-13	04-Jun-13	0%	-12	37	AY102-PC2410	AY102-PC2430	201525
68	AY102-PC2430	Ship to WRPS (AY-02A SS Jumpers - 3x)	HILINE	1	05-Jun-13	05-Jun-13	0%	-12	37	AY102-PC2420	AY102-PC2440	201525
69	AY102-PC2440	Receipt Inspection (AY-02A SS Jumpers - 3x)	WRPS- QC	1	06-Jun-13	06-Jun-13	0%	-12	37	AY102-PC2430	AY102-PC4100, AY102-PC4270	201525
Work Package Planning												
70	AY102-PC2450	Develop Draft Work Package (TFC-13-TBD)	WRPS- McClendon, WH	10	02-May-13	16-May-13	0%	-12	30	AY102-PC4240	AY102-PC2460	201525
71	AY102-PC2460	Perform Walkdown (TFC-13-TBD)	WRPS- McClendon, WH	1	17-May-13	17-May-13	0%	-12	30	AY102-PC2450	AY102-PC2470	201525
72	AY102-PC2470	Incorporate Walkdown Comments (TFC-13-TBD)	WRPS- McClendon, WH	1	20-May-13	20-May-13	0%	-12	30	AY102-PC2460	AY102-PC2480	201525
73	AY102-PC2480	Perform TPM (TFC-13-TBD)	WRPS- McClendon, WH	2	21-May-13	22-May-13	0%	-12	30	AY102-PC2470	AY102-PC2490	201525
74	AY102-PC2490	Incorporate TPM Comments (TFC-13-TBD)	WRPS- McClendon, WH	1	23-May-13	23-May-13	0%	-12	30	AY102-PC2480	AY102-PC2540	201525
75	AY102-PC2540	Approve Work Package (TFC-13-TBD)	WRPS- McClendon, WH	3	28-May-13	30-May-13	0%	-12	30	AY102-PC2490	AY102-PC2550	201525
76	AY102-PC2550	Perform PWR-FAC Review (TFC-13-TBD)	WRPS- OE	2	31-May-13	03-Jun-13	0%	-12	30	AY102-PC2540	AY102-PC2560	201525
77	AY102-PC2560	Implement Lock & Tag Requirements (TFC-13-TBD)	WRPS- OE	5	04-Jun-13	11-Jun-13	0%	-12	30	AY102-PC2550	AY102-PC4120	201525
Field Work												
78	AY102-PC4120	Mobilize Into AY Farm / Stage Crane (AY-02A SS Jumpers - 3x) (TFC-13-TBD)	WRPS- Chapman, SR	2	12-Jun-13	13-Jun-13	0%	-12	30	AY102-PC2560	AY102-PC4250, SS.TFP*940, AY102-PC4330, AY102-PC4340	201525
79	AY102-PC4250	Remove Equip. From Cover Blocks AY02A (AY-02A SS Jumpers - 3x) (TFC-13-TBD)	WRPS- Chapman, SR	1	14-Jun-13	14-Jun-13	0%	-12	30	AY102-PC4120	AY102-PC4260	201525
80	AY102-PC4260	Cover Block Removal AY02A (AY-02A SS Jumpers - 3x) (TFC-13-TBD)	WRPS- Chapman, SR	1	17-Jun-13	17-Jun-13	0%	-12	30	AY102-PC4250	AY102-PC4270, AY102-PC1940	201525



Actual Work | Critical Remaining Work | ◆ Milestone
Remaining Work | Current Bar Labels | % Complete

Data Date: 11-Mar-13
Print Date: 06-Mar-13

Line Number	Activity ID	Activity Name	RESP	RD	Start	Finish	%	Chg 1 wk	Total Float	Predecessors	Successors	CACN
81	AY102-PC1940	Erect Tent for AY-02A (if required) (TFC-13-TBD)	WRPS- Chapman, SR	2	18-Jun-13	19-Jun-13	0%	-12	30	AY102-PC1910, AY102-PC1930, AY102-PC4260	AY102-PC3220	201525
82	AY102-PC4270	Disconnect Existing Jumper & Connect New Jumpers (AY-02A SS Jumpers - 3x) (TFC-13-TBD)	WRPS- Chapman, SR	1	18-Jun-13	18-Jun-13	0%	-12	31	AY102-PC4260, AY102-PC2440, AY102-PC4400	AY102-PC3220, AY102-PC6040, AY102-PC6050	201525
83	AY102-PC3220	Paint/Repair pit coatings as needed (AY-02A) (if required) (TFC-13-TBD)	WRPS- Chapman, SR	3	20-Jun-13	25-Jun-13	0%	-12	30	AY102-PC3210, AY102-PC1940, AY102-PC4270	AY102-PC4280	201525
84	AY102-PC4280	Final NACE Inspection AY02A (AY-02A SS Jumpers - 3x) (TFC-13-TBD)	WRPS- Chapman, SR	1	26-Jun-13	26-Jun-13	0%	-12	30	AY102-PC3220	AY102-PC4290	201525
85	AY102-PC4290	Replace Cover Blocks / Farm Restoration (AY-02A) (AY-02A SS Jumpers - 3x) (TFC-13-TBD)	WRPS- Chapman, SR	3	27-Jun-13	01-Jul-13	0%	-12	30	AY102-PC4280	FY13, SS.TFP*940, WTA21470, WTA28631	201525
5.1.1.14.5.4: DST to DST Transfer Readiness												
Exhauster Permit												
86	WTA28560	ORP formally transmits Permit Mod Request to DOH	WRPS- Killoy, SE	3	18-Mar-13*	20-Mar-13	0%	-9	55	WTA28550	WTA28570	201520
87	WTA28570	DOH issues draft permit conditions	WRPS- Killoy, SE	4	21-Mar-13	26-Mar-13	0%	-9	55	WTA28560	WTA28580	201520
88	WTA28580	ORP/WRPS review and resolution of comments	WRPS- Killoy, SE	4	27-Mar-13	02-Apr-13	0%	-9	55	WTA28570	WTA28590	201520
89	WTA28590	DOH issues final permit conditions	WRPS- Killoy, SE	9	03-Apr-13	16-Apr-13	0%	-9	55	WTA28580	WTA28600	201520
90	WTA28600	Effective date of revised NOC	WRPS- Killoy, SE	5	17-Apr-13	23-Apr-13	0%	-9	55	WTA28590	WTA28610	201520
91	WTA28610	WRPS/ORP/DOH evaluate future permit modifications	WRPS- Killoy, SE	44	24-Apr-13	02-Jul-13	0%	-9	55	WTA28600	FY13	201520
5.1.1.14.6: Tank Waste Sampling												
5.1.1.14.6.1: Tank Waste Sampling												
AY-102 Annulus Sample												
92	CHGS12D230	Procure ORSS assemblies	WRPS- Kooker, SL	1	30-Nov-12 A	11-Mar-13	0%	-2	127		CHGS12D410	201523
AY-102: Leak Detection Pit Sample #3												
93	CHGS12D330	AY-102 #3 (Leak Detection Pit): Complete TSAP	WRPS- Templeton, AM	15	12-Aug-13*	04-Sep-13	0%	-63	2	CHGS12D240, AY102-PC5040	CHGS12D340	201523
94	CHGS12D340	AY-102 #3 (Leak Detection Pit): Work Package Planning (TFC-13-TBD)	WRPS- Hawley, JL	15	12-Aug-13	04-Sep-13	0%	-63	2	CHGS12D330	CHGS12D350	201523
95	CHGS12D350	AY-102 #3 (Leak Detection Pit): Work Package Approval (TFC-13-TBD)	WRPS- Hawley, JL	4	05-Sep-13	10-Sep-13	0%	-63	2	CHGS12D340	CHGS12D360	201523
96	CHGS12D360	AY-102 #3 (Leak Detection Pit): Setup for Grab Sample (TFC-13-TBD)	WRPS- Kooker, SL	1	11-Sep-13*	11-Sep-13	0%	-63	2	CHGS12D350	CHGS12D370, SS.M.7-2*990	201523
97	CHGS12D370	AY-102 #3 (Leak Detection Pit): Perform Grab Sample (TFC-13-TBD)	WRPS- Kooker, SL	2	12-Sep-13	16-Sep-13	0%	-63	2	CHGS12D360	CHGS12D380, SS.M.7-2*990	201523
98	CHGS12D380	AY-102 #3 (Leak Detection Pit): Sample Shipment (TFC-13-TBD)	WRPS- Kooker, SL	2	17-Sep-13	18-Sep-13	0%	-63	2	CHGS12D370	CHGS12D390, SS.M.7-2*990, CHGS12D400	201523
99	CHGS12D390	AY-102 #3 (Leak Detection Pit): Demob/Equipment Removal (TFC-13-TBD)	WRPS- Kooker, SL	5	19-Sep-13	25-Sep-13	0%	-63	2	CHGS12D380	AY102-PC4100, FY13	201523
100	CHGS12D400	AY-102 #3 (Leak Detection Pit): Sample Analysis	WRPS- Kooker, SL	3	19-Sep-13	23-Sep-13	0%	-63	4	CHGS12D380	AY102-PC4100, FY13	201523



Actual Work | Critical Remaining Work | ◆ Milestone
Remaining Work | Current Bar Labels | % Complete

Johnson, Jeremy M

From: Lyon, Jeffery (ECY) <JLYO461@ecy.wa.gov>
Sent: Monday, February 25, 2013 12:47 PM
To: Johnson, Jeremy M; Hendrickson, Michelle (Washington State Department of Ecology); Whalen, Cheryl (ECY); Wold, Kristi (Washington State Department of Ecology)
Cc: Killoy, Steven E; Miskho, Anthony G
Subject: RE: AY-102 Letter

That is OK with me

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Monday, February 25, 2013 12:46 PM
To: Lyon, Jeffery (ECY); Hendrickson, Michelle (ECY); Whalen, Cheryl (ECY); Wold, Kristi (ECY)
Cc: Killoy, Steven E; Miskho, Anthony G
Subject: AY-102 Letter

After our meeting last week, we have thought of an activity that will require water addition to the tank. We plan to remove a string of corrosion coupons this year which require decontamination with a limited amount of water as it's removed. We will include this activity in the letter, give me a call if you would like to discuss.

Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

Document: 13-NWP-009
Document Date: 01/25/2013
Author: HENDRICKSON ML
Addressee: SMITH KW

Actionee: Tom Fletcher
Due Date: 02/27/2013

Title: Washington State Department of Ecology (Ecology) Assessment Report for Field Monitoring Activities Conducted December 27, 2012, of the Waste Material Near Riser 82 of the 241-AY-102 Double Shell Tank (DST)

Information Copied to:

MGR	Mendoza, Estella MGR
	Smith, Kevin W. MGR
DEP	Charboneau, Stacy DEP
AMTF	Fletcher, Tom (Actionee)
	Johnson, Jeremy
	Domnoske-Rauch, Lisa
	Wright, Derek
OCS	Helgeson, Dart
	Olds, Erik
TRS	Harrington, Paul

Comments: ACTION: DRAFT LETTER OF RESPONSE TO JANE HEDGES FROM KEVIN SMITH. REFERENCE INCOMING LETTER IN RESPONSE (13-NWP-009)

Records Schedule Information:
ADM-3.3a1a General Operations

Scan?: Yes Sensitive?: No Sensitive Attachments?: No IDMS Folder: ORP General Only

Date ORP CC Rec'd: 01/28/2013

Document closure is required on your ESTARs task

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
3100 Port of Benton Blvd • Richland, WA 99354 • (509) 372-7950
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

January 25, 2013 13-NWP-009

Mr. Kevin W. Smith, Manager
Office of River Protection
United States Department of Energy
PO Box 450, MSIN: H6-60
Richland, Washington 99352

Re: Washington State Department of Ecology (Ecology) Assessment Report for Field Monitoring Activities Conducted December 27, 2012, of the Waste Material Near Riser 83 of the 241-AY-102 Double Shell Tank (DST)

Dear Mr. Smith:

On December 27, 2012, Ecology visited the 241-AY Farm to witness the weekly visual inspection of the waste material found near Riser 83 of the 241-AY-102 DST. Ecology's Assessment Report and photographs from the field visit are enclosed. The following notes are important highlights from the Visual Inspection:

- The weather reported at the pre-job was cloudy and low winds. According to the Hanford Meteorological Station, the area had received approximately 3 inches of snow on December 25 and additional moisture on December 26 and December 27, 2012.
- The camera viewed the waste in respect to the different in-annular space "landmarks" including the black dot or rock, two white pebbles, orange pieces of insulation/foam, and ventilation slots. It was noted by all witnessing the video that the area of the waste material did appear to have slightly increased in size, near the upper portion of the leak where the waste material extends outward in "finger channels," and near the smaller piece of orange insulation/foam. The extent of the leak seemed to slowly expand as compared to the amount of waste material viewed during the visual inspections conducted on October 25, 2012, and November 12, 2012.
- The increase in the extent of the waste material present within the annulus may be due to an increase in material or as a result of the draining of the deeper pools of waste material outward onto the annulus floor. Many of these "deeper pools" of waste material as indicated by a darker green color of material, appeared to be lighter green in nature and not as thick, which may indicate they are draining.
- The waste material in the ventilation slot appeared to be wider and thicker, especially on the base near the 6 ½ inch ring. The top of the material appeared to have dried where it contacted the concrete. However, moisture streaks on either side of the waste material within the ventilation slot were again visible.

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- The waste material in the finger channels of the waste or pools of waste (that are dark green, light green, and yellow) appear to look deeper, extend in length, and had split to flow toward another direction creating an additional finger channel.

The United States Department of Energy-Office of Rive Protection, Washington River Protection Solutions (WRPS), and Ecology Integrated Project Team continues to meet to develop and evaluate options for the interim and longer term management of this tank and its contents.

It is undetermined at this time if the 241-AY-102 DST will be repaired or closed. Regardless, the waste (supernatant, sludge, and interstitial liquids) must be removed. WRPS has completed the necessary procurement, testing, and construction/installation requirements to be able to pump the supernatant from the tank. However, the capability to remove the sludge is still in the planning phase.

If you have any questions, please contact me at Michelle.Hendrickson@ecy.wa.gov or (509) 372-7970.

Sincerely,

Michelle L. Hendrickson

Michelle L. Hendrickson, CHMM, PE
Tank System Operations and Closure Engineer
Nuclear Waste Program

tkb
Enclosures (2)

cc electronic w/enc:
Dennis Faulk, EPA
Lisa Domnoske-Rauch, USDOE
Tom Fletcher, USDOE
Jeremy Johnson, USDOE
Derek Wright, USDOE
Randall Robinson, DNFSB
Jason Engeman, WRPS
Steve Killoy, WRPS
Jeff Voogd, WRPS
Dennis Washenfelder, WRPS
David Bernhard, NPT
Dirk Dunning, ODOE
Ken Niles, ODOE
John Martell, WDOH
John Schmidt, WDOH
USDOE-ORP Correspondence Control
WRPS Correspondence Control

cc w/enc:
Stuart Harris, CTUIR
Alex Nazarali, CTUIR
Gabriel Bohnee, NPT
Russell Jim, YN
Steve Hudson, HAB
Administrative Record:
DST/TWS/214-AY-102/S-2-3
Environmental Portal, LMSI

ASSESSMENT REPORT

Field Monitoring Activities

A. GENERAL INFORMATION

Project:	241-AY-102 Field Monitoring, Riser 83 Video
Project Contact:	Jeremy Johnson (ORP) Phone: (509) 376-1866
Review Date:	12/27/2012
Reviewer:	Michelle Hendrickson, CHMM, PE
USDOE Project:	US Department of Energy-Office of River Protection (USDOE-ORP)
USDOE Contact::	Tom Fletcher/Jeremy Johnson
Prime Contractor:	Washington River Protection Solutions (WRPS)
Project Manager:	Michael Hardesty Phone: (509) 373-4573
Location:	241-AY-102, 200 East Area, Hanford
Scheduled Start Date:	12/27/2012 Actual Start Date: 12/27/2012 Completion Date: 12/27/2012
Contract Amount:	Approximately $75,000 for 4 Riser Visual Inspections
Sub-Contractor:	N/A
Location:	200 East Area, Hanford Nuclear Reservation, Richland, WA

PROJECT DESCRIPTION:

- On an 8/8/12 visual inspection, material was found in the Annulus Space at AY-102. On 10/23/2012, USDOE-ORP reported that the DST was leaking and more material was accumulating in the Annulus Space.
- To monitor the slow leak, WRPS is conducting weekly and often twice weekly video inspections of the material through the AY-102 Tank's Riser #83.
- As the leak in question has remained very slow, the Integrated Project Team (IPT) has provided guidance that the visual inspections at the AY-102 Tank could be reduced to once a week.

The Pre-job meeting was conducted at 12:30 PM, including the conditions of RWP WTO0399, Rev. 2. The job in the field consisted of:

1. We entered the farm at approximately 12:45 PM. The ventilation exhauster was throttled down in the annulus from -14 inch to a -1 inch vacuum. The ventilation vacuum was lessened as the air currents generated by the vacuum create air currents which cool the sludge. However, these currents also impede the collection of a flammable gas sample and cause the camera to swing, making camera manipulation within the annular space very difficult.

2. A flammable gas sampled was collected and indicated that the annulus space was less than 25% lower flammability limit.

3. The camera was in a plastic bag and wire attached in a sleeve. The sleeve was carefully inspected and then the camera was removed from the bag and lowered into the annulus space. The camera was lowered to the 53-foot mark for the video/photographs. The camera completed a 360-degree scan and was raised and tilted. Also, a zoom of 10-times was used for close-up observation of the waste. Close-ups of the material along the entire area of waste deposition were viewed. The "landmarks" within the tank (black dot or rock, two white pebbles, and ventilation slots) were specifically viewed.

4. Once all of the views were captured, the camera was raised and re-bagged.

5. We surveyed out of the 241-AY Farm.

B. RECORDS AND PROCEDURES

1. Personnel Contacted During Assessment

	Name	Title or Duties/Organization	Phone
a.	Steve Stamper	Camera Operator - WRPS	509-392-3977
b.	Michael Hardesty	Field Work Supervisor - WRPS	509-373-4573
c.	Roger Hammer	Camera Operator - WRPS	509-373-3355
d.	Derek Wright	Facility Representative- USDOE-ORP	509-373-1011

2. Progress
   a. Scheduled Percentage 100 %

	Yes	No	NA	See Remarks
3. Stockpiled equipment or materials				
a. Records adequate?	X	☐	☐	☐
b. Protected?	X	☐	☐	☐
4. Monitoring Procedures up to date?	X	☐	☐	☐
5. Work Packages up to date?	X	☐	☐	☐
6. Adequate involvement in changes?	X	☐	☐	☐
7. Change of monitoring procedures appropriate and submitted to Ecology?	☐	☐	X	☐
8. Instrument(s) Calibrated adequately?	X	☐	☐	☐
9. Permit No/TPA Requirement.: DST System Unit RCRA Permit				

C. FIELD MONITORING

- The weather was reported at the Plan of the Day meeting was cloudy and low winds. The area had received approximately 3 inches of snow on 12/25/2012 and additional moisture yesterday and earlier today.
- The video taken of the waste material was near Riser 83 of the 241-AY-102 Annulus Space.
- The video was viewed and camera manipulated in the AY-801 Building.
- As the camera descended to the bottom of the annular space, a thermocouple became visible. The camera zoomed in and the off-riser sampler/crawler's tracks were no longer visible.
- All witnessing the inspection noted that the color of the waste appeared to be changing. The dark green was changing to a lighter green in some locations. The lighter green was becoming a dark yellow. The darker yellow was changing to a lighter yellow. The lighter yellow was turning to a white color along the waste perimeter. Ecology also noted that some of the waste material that was white in color was now yellow. This indicates that some of the waste material may be drying, most likely due to the ventilation.
- The camera viewed the waste in respect to the different in-annular space "landmarks" including the black dot or rock, two white pebbles, orange pieces of insulation/foam, and ventilation slots. It was noted by all witnessing the video that the size of the area of the waste material did appear to have slightly increased in size, near the upper portion of the leak where the waste material extends outward in "finger channels" and near the smaller piece of orange insulation/foam. The extent of the leak seemed to slowly expand as compared to the amount of waste material viewed during the visual inspection conducted on 10/25/12 and 11/12/2012.
- Ecology noted that the increase in the extent of the waste material present within the annulus may be due to an increase in material or as a result of the draining of the

deeper pools of waste material outward onto the annulus floor. Many of these "deeper pools" of waste material as indicated by a darker green color of material, appeared to be lighter green in nature and not as thick, which may indicate they are draining.

- Ecology noted that the waste material in the ventilation slot appeared to be wider and thicker, especially on the base near the 6 ½ inch ring. The top of the material appeared to have dried where it contacted the concrete. However, moisture streaks on either side of the waste material within the ventilation slot were again visible.
- Ecology also noted that the waste material the finger channels of the waste or pools of waste (that are dark green, light green, and yellow) appear to look deeper, extend in length, and had split to flow toward another direction creating and additional finger channel.
- Ecology could not visually distinguish if any visual damage indicators such as staining, cracking, pitting, etc. of the 6 inch wide carbon steel refractory ring, annulus floor, primary tank liner, or the refractory/concrete material where the waste was in direct contact with the tank structures. This lack of visual assessment is due to the increased growth of crystals, especially in the lower 2/3rds of the leak area and increased amount of deposition of mineralization around the perimeter of the leak area within the annulus. It is unknown at this time what influence the waste will have that is contacting the annulus floor and refractory/concrete pedestal.

	Yes	No	NA	See Remarks
1. Comply with Procedures and QA/QC Specifications?	X	☐	☐	☐
2. Field Test Being Accomplished?	X	☐	☐	☐
3. Satisfactory Contractor Quality Control?	X	☐	☐	☐
4. Inspection Documentation Satisfactory?	X	☐	☐	☐
5. Site Condition				
a. Orderly?	X	☐	☐	☐
b. Control room interface adequate?	X	☐	☐	☐
c. Equipment set-up adequate?	X	☐	☐	☐
6. Monitoring bypassing satisfactory?	☐	☐	X	☐
7. Unsafe Conditions/Health Hazards Observed?	☐	X	☐	☐
8. Is Project on Schedule?	X	☐	☐	☐
9. Is the Operations and Maintenance Documentation on Schedule?	☐	☐	X	☐
10. Is the Maintenance Management System on Schedule?	☐	☐	X	☐
11. Traffic control and traffic safety?	☐	☐	X	☐

REMARKS:

Photographs from this field monitoring event are attached.

Assessment Completed:

Michael V. Hendrickson, Ethan, PE — 1/25/13

Project Engineer's Signature — *Date*

12/6/2012

12/10/2012

12/18/2012

12/27/2012

12/6/2012

12/10/2012

12/18/2012

12/27/2012
Slow Build-up
of Additional
Material

12/6/2012

12/10/2012

12/18/2012

12/27/2012

Document: NA (OREGON)
Document Date: 01/17/2013
Author: KITZHABER JA
Addressee: CHU S

Actionee: Tom Fletcher
Due Date: 02/27/2013

Title: Need for New Tank Waste Storage Capacity at Hanford

Information Copied to:

MGR	Mendoza, Estella MGR		
	Smith, Kevin W. MGR		
DEP	Charboneau, Stacy DEP		
AMTF	Fletcher, Tom (Actionee)		
	Diediker, Janet		
	Johnson, Jeremy		
	Steiling, Jeri		
	Tobias, Shannon	WTP	Harp, Ben
	Higgins, Kathy		Harrington, Chris
	Knight, Daniel		
	Mattlin, Ellen M.		
	Rambo, Jeff		
	Trenchard, Glyn		
	Wright, Teresa		
OCS	Helgeson, Dart		
	Olds, Erik		
TRS	Mauss, Billie		

Comments: ACTION REQUIRED: DRAFT LETTER OF RESPONSE TO GOVERNOR JOHN A KITZHABER / GOVERNOR OF OREGON

Records Schedule Information:
ADM-3.3a1a General Operations

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Date ORP CC Rec'd: 01/28/2013

Document closure is required on your ESTARs task

JOHN A. KITZHABER, MD
Governor

January 17, 2013

The Honorable Steven Chu
Secretary of Energy
1000 Independence Avenue, SW
Washington D.C. 20585

Dear Secretary Chu:

The Oregon Hanford Cleanup Board, which advises me on the Hanford Site cleanup, is deeply concerned about the recent discovery that the inner liner of a Hanford double-shell tank is leaking. The board has determined that it is time for Hanford to construct additional storage capacity for high-level waste. The board does not make this recommendation lightly – it understands that building additional tank capacity is not a permanent solution for Hanford, it just buys us a bit more time. In addition, Hanford's budget is already inadequate to meet compliance milestones. Building new tank capacity represents a significant new expenditure.

Nevertheless, the clear degradation of at least one double-shell tank; the continued technical problems with the construction of the Waste Treatment Plant complex; and the ongoing need to retrieve and store waste from the old single-shell tanks demand immediate action to develop additional tank capacity.

We don't presume to know the technical specifications of waste storage that will meet current and future needs at Hanford – whether it is four new tanks, or six, or whether some combination of sizes and above-and below-ground tanks is needed. We leave that to you and your experts to determine. However, it is clear that Hanford needs additional capacity and the sooner the better. The board also believes that new tank capacity should be integrated to meet needs of the Waste Treatment Plant for blending, mixing and waste staging.

Advocating for new tank capacity should in no way be construed as doubt about the need for the Waste Treatment Plant. Oregon's board believes it is even more imperative that technical issues be resolved and funding continued to complete construction, commissioning and operation of the Waste Treatment Plant, preferably without losing further ground in the schedule.

Funding for new tank capacity should be in addition to the current level of Hanford funding. We should not have to defer planned cleanup work to resolve this problem.

254 STATE CAPITOL, SALEM OR 97301-4047 (503) 378-3111 FAX (503) 378-6827
WWW.OREGON.GOV

Nothing has changed from a strategic standpoint: the Hanford cleanup must move forward expeditiously to protect the Columbia River. However, from a tactical standpoint, we cannot count on the Waste Treatment Plant to be operational in time to alleviate the need for additional tank storage capacity. Nor can we count on the existing tanks indefinitely.

Thank you for your involvement working through the myriad of technical issues that have hampered timely progress on the Waste Treatment Plant. The Cleanup Board also supports your efforts and I encourage you to ensure that these issues are resolved in an open and transparent process.

Please contact me if you have any questions about Oregon's concerns about the Hanford cleanup. I look forward to your response.

Sincerely,

John A. Kitzhaber, M.D.
Governor

JAK/MH/sb

RECEIVED
JAN 28 2013
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Johnson, Jeremy M

From: Johnson, Jeremy M
Sent: Thursday, January 17, 2013 4:08 PM
To: Wheeler, Isabelle; Burandt, Mary E; Irby, Dennis H; Martell, John; 'Schmidt, John W (DOH) (John.Schmidt@doh.wa.gov)'; 'CWHA461@ecy.wa.gov'; Lyon, Jeffery
Subject: AY-102 Riser 83 Inspection Results 1/17/13
Attachments: AY-102 Riser 83 1-17-13 Inspection Comparison.pdf

As discussed in today's IPT, here are the latest inspection pictures from riser 83. You can see in the picture that the changes seen last week continue and there appears to be a minor amount of additional material on the floor. WRPS continues to track the meteorological data to understand whether changes are associated with changes in humidity.

Jeremy

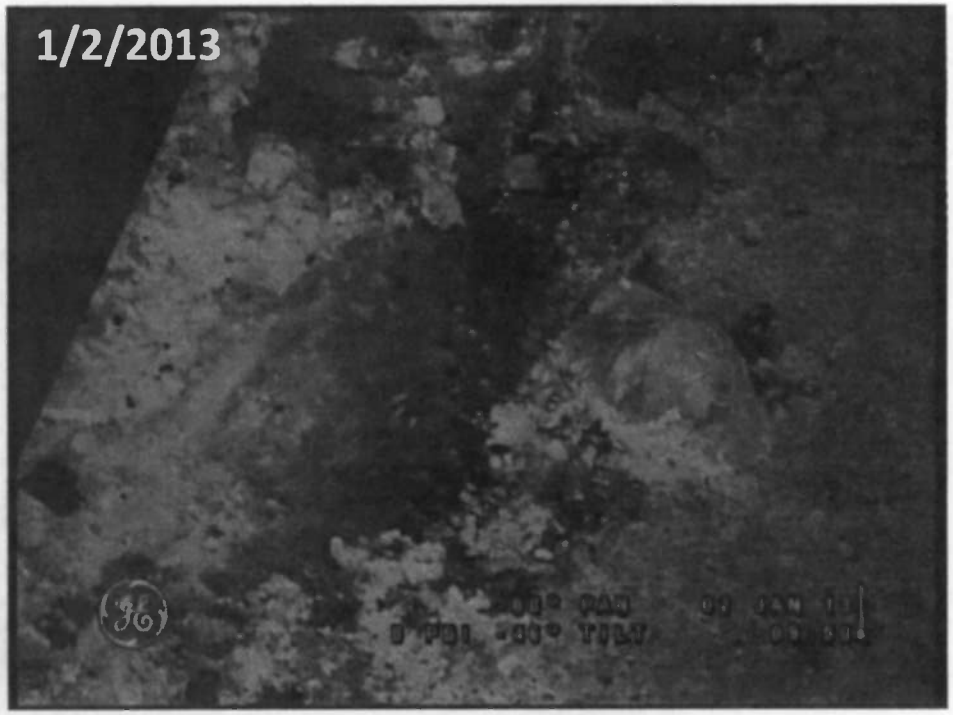
12/27/2012

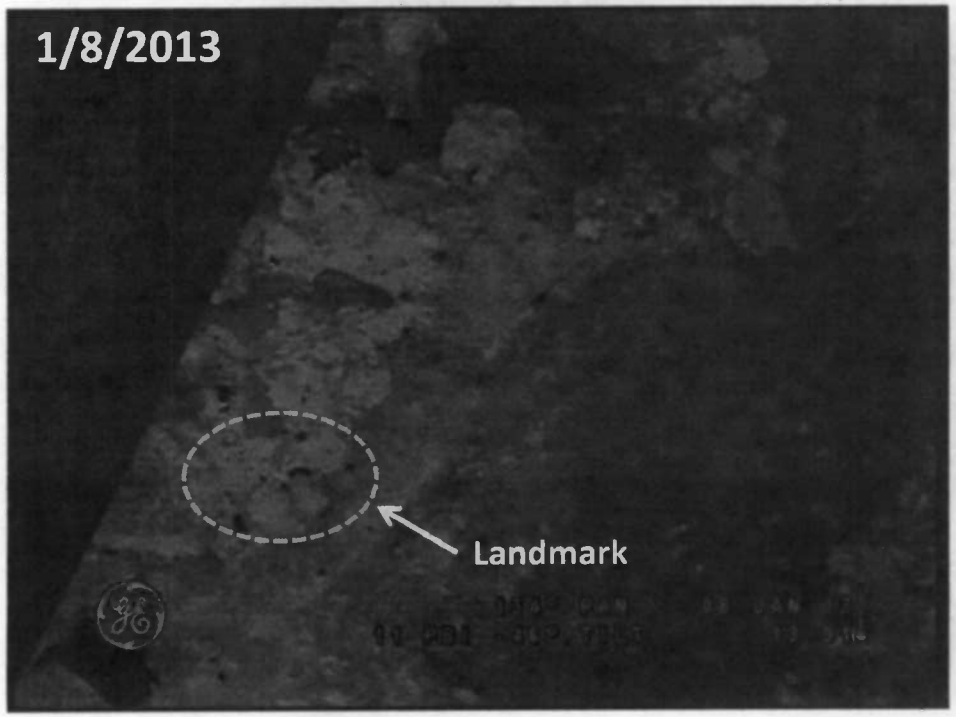
1/2/2013

1/8/2013

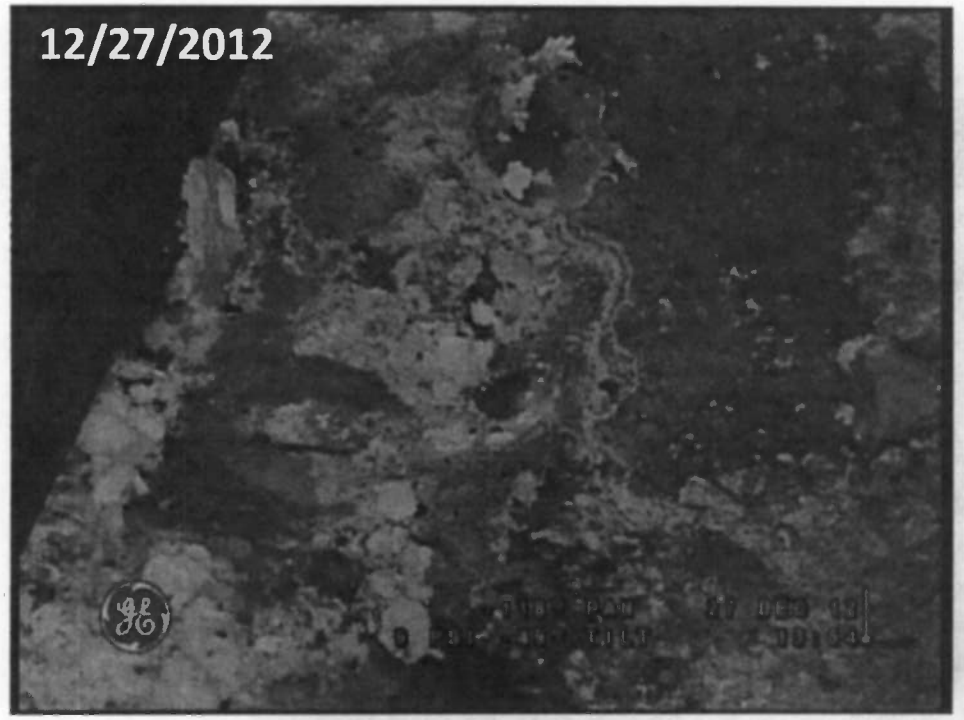
1/17/2013

12/27/2012


1/2/2013

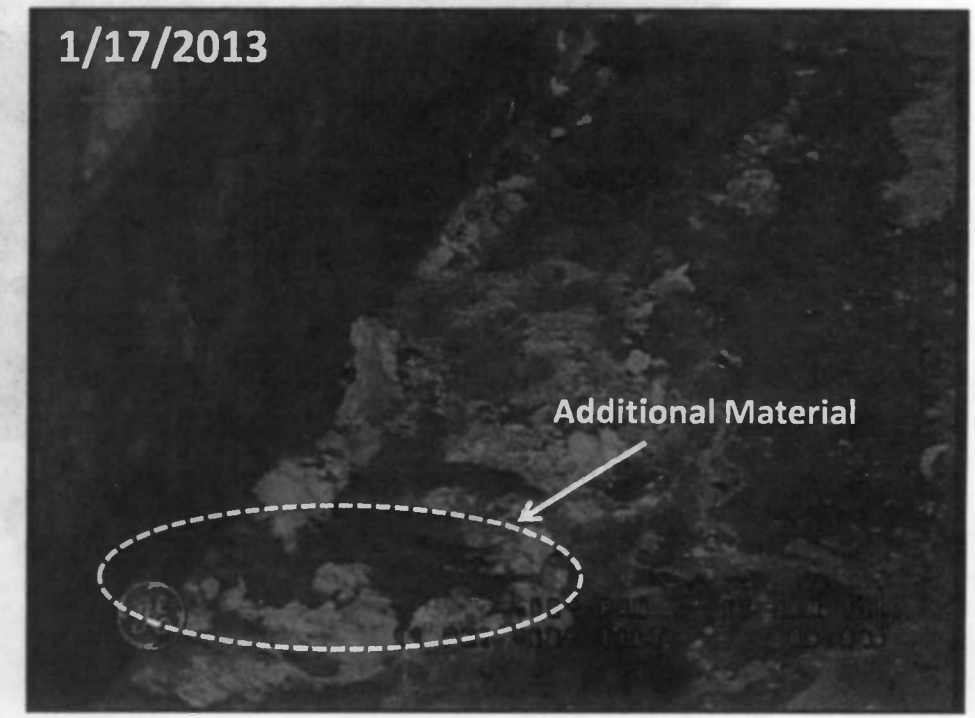

1/8/2013
Landmark

1/17/2013
Additional Material

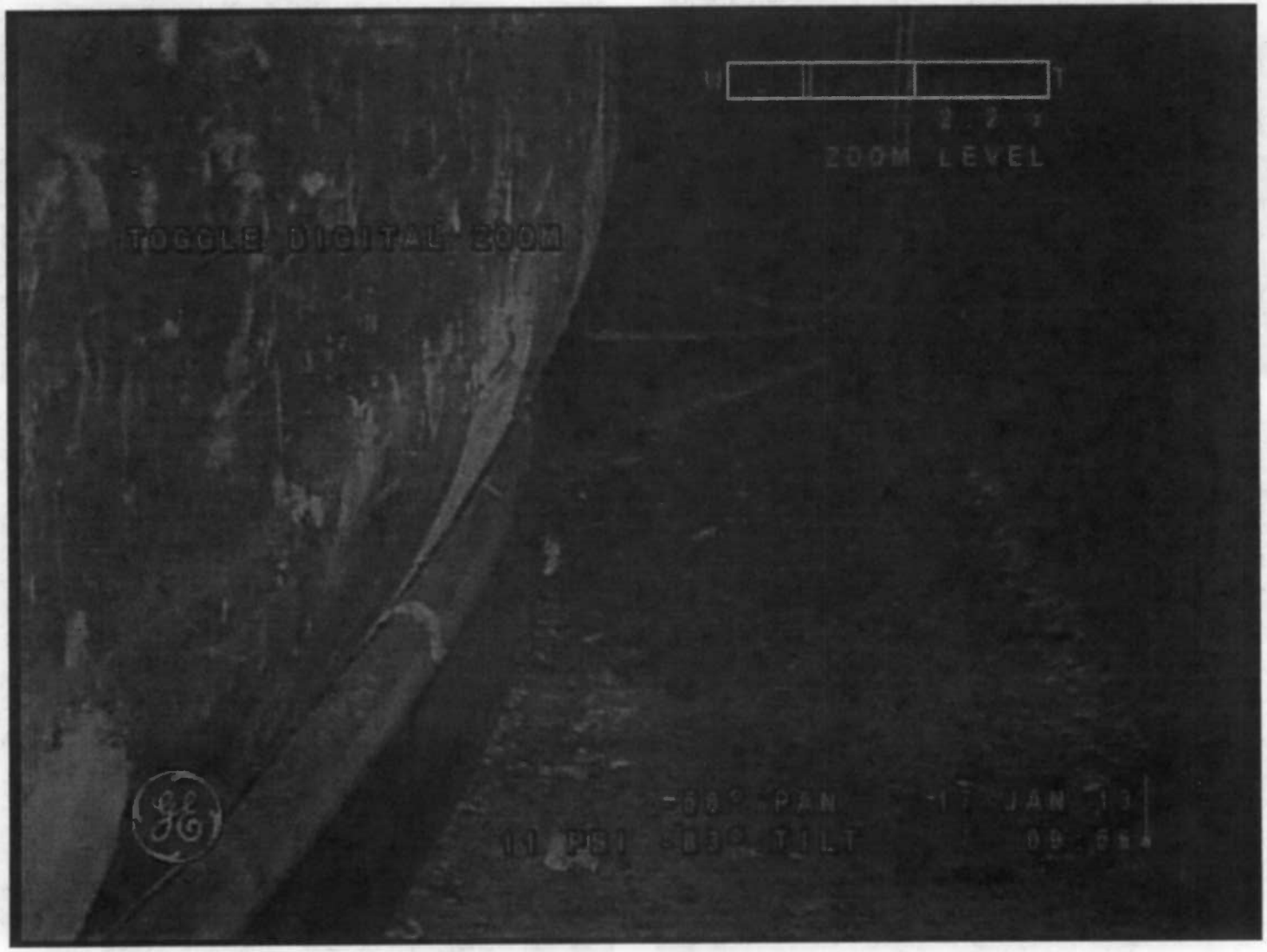

12/27/2012

1/2/2013

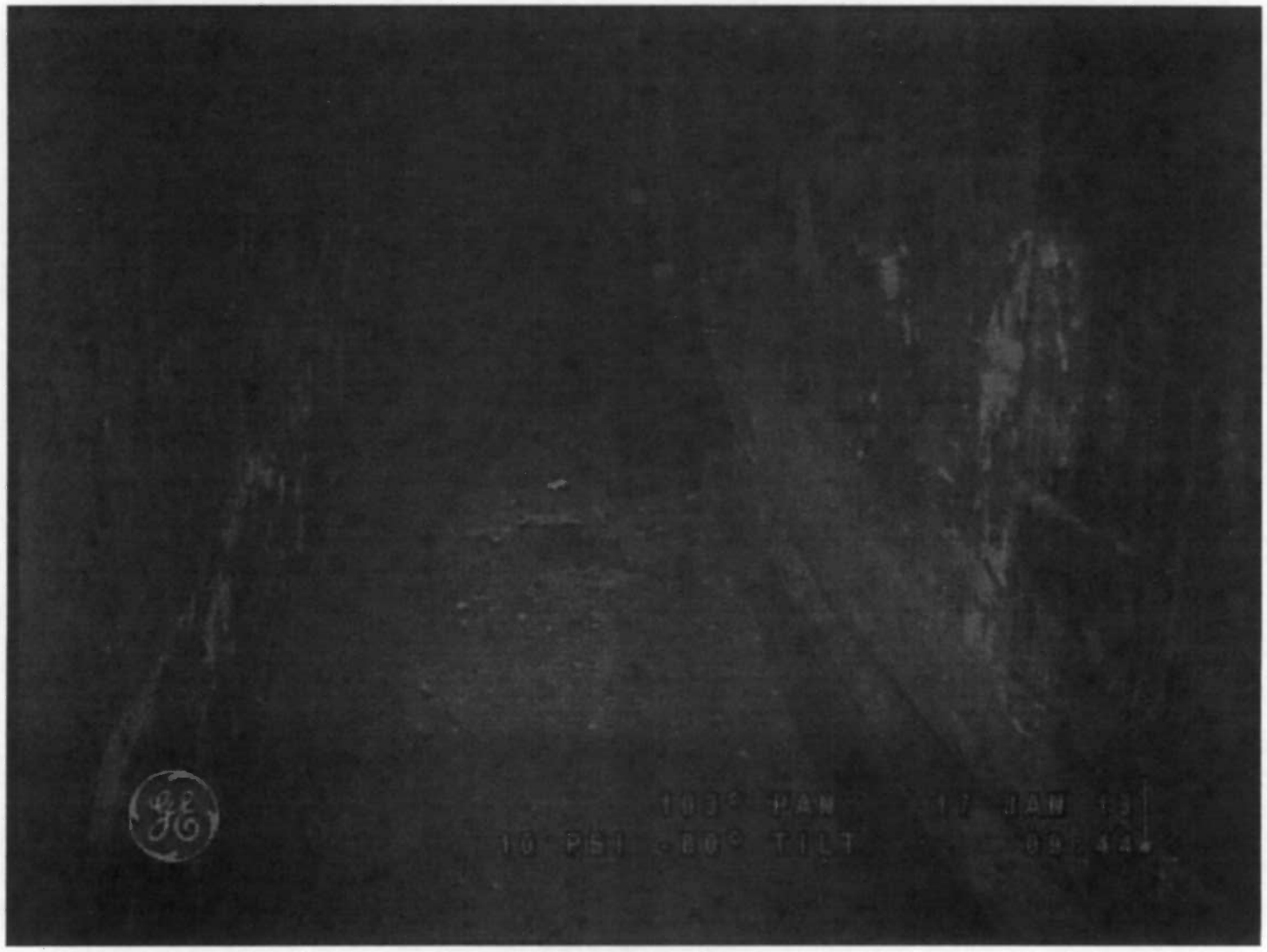
1/8/2013

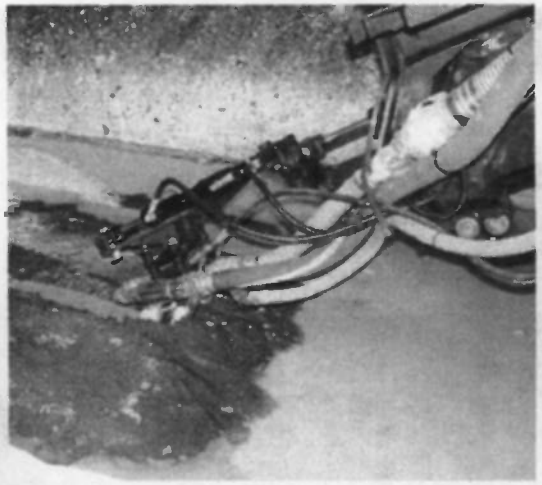

1/17/2013
Additional Material

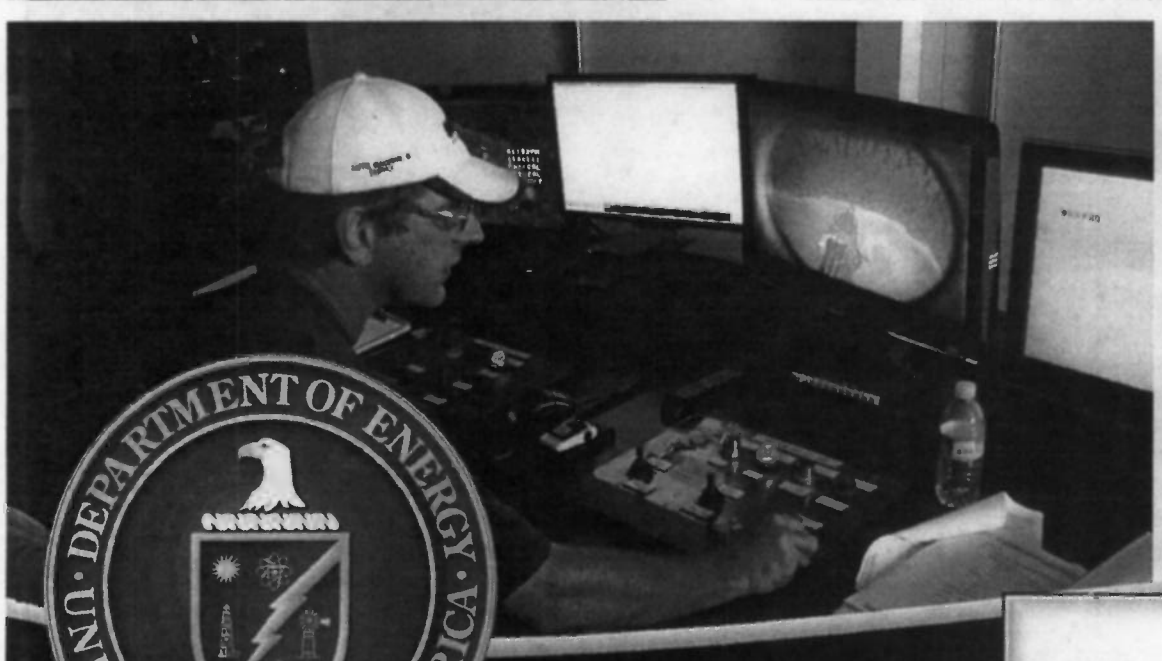
Riser 83 Looking Right



Riser 83 Looking Left







DEPARTMENT OF ENERGY

Office of River Protection

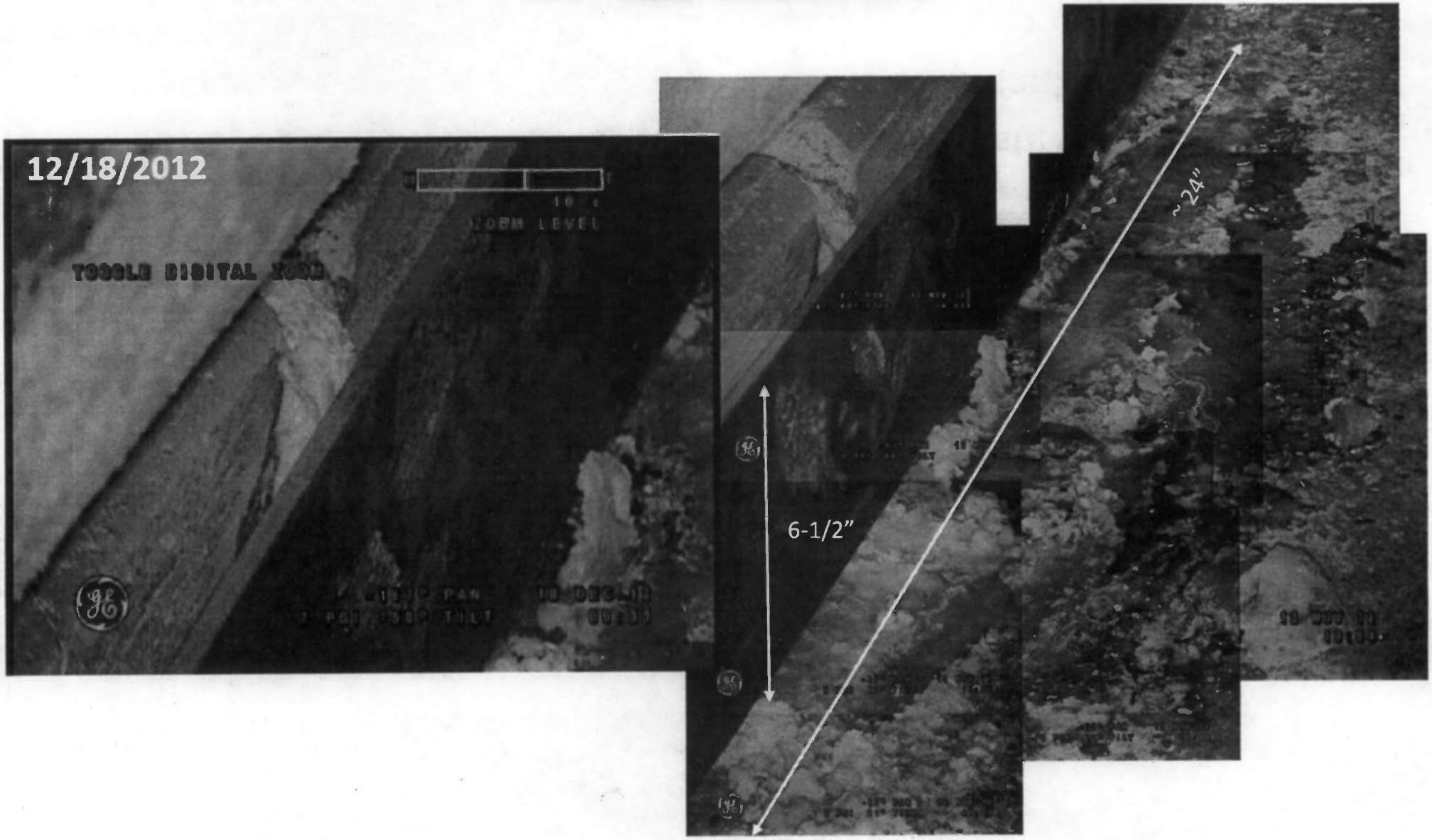
HANFORD SITE

Tank Waste Committee
Double-Shell Tank AY-102 Update

Jeremy Johnson
ORP Tank Integrity Program Manager

January 9, 2013

AY-102 Riser 83



Double-Shell Tank AY-102 Monitoring

- Riser 83 weekly inspections show some sign of slow changes
- Primary tank liquid level is continuously monitored with no abnormal change
- Annulus liquid level monitors show no indication of liquid
- Annulus Continuous Air Monitor (CAM) shows no sign of change
- Leak Detection Pit sampled twice with no indication of waste outside the secondary liner

Extent of Condition Evaluations

- 100% visual inspection of six similar Double Shell Tanks (DSTs)
  - Currently evaluating three of six DSTs
    - AY-101 completed with no anomalies seen
  - Expect to complete spring 2013
- Review of archived construction documentation for all DSTs
  - Expect to complete by end of 2013
- For the remaining DSTs, evaluating changes to frequency and methods of the current visual inspection program

Status of AY-102 Pumping Preparedness

- Liquid Only
- Procedures developed (if equipment is deployed they would require final approvals)
- Primary tank to alternate double-shell tank
  - Power supplied to AY-02A Pump
  - Procuring safety significant rigid jumpers that will allow operational flexibility and keep AY-101 connected to the DST transfer system
- Annulus to primary tank
  - Fabricated and tested general service jumpers
  - Inspected pits and tested transfer line
  - Tested and performed maintenance on pump
  - Equipment staged onsite for quick deployment

AY-102 Integrated Project Team Update

Initial Recommendations

- Maximize tank space availability by accelerating evaporator campaigns and completing AP Tank Farm level rises
  - Maintain space for retrieval of C-Farm and next 9 tanks as well as AY-102
- Deploy equipment capable of removing sludge/supernatant from AY-102
- Secretary's team evaluating Tank Farm Waste Pre-Treatment Requirements/Facilities should consider additional tank space for emergency response and operational considerations
- Additional recommendations are forthcoming
  - Alternatives for providing emergency pumping space

Johnson, Jeremy M

From: McFadden, Daina (ECY) <dmcf461@ecy.wa.gov>
Sent: Wednesday, December 12, 2012 11:03 AM
To: Fletcher, Thomas W; Domnoske-Rauch, Lisa A; Johnson, Jeremy M; Voogd, Jeffry A; Killoy, Steven E; Engeman, Jason K; Washenfelder, Dennis J; davidb@nezperce.org; dirk.a.dunning@state.or.us; ken.niles@odoe.state.or.us; RandallR@dnfsb.gov
Subject: 12-NWP-188 Ecology letter for AY-102
Attachments: 12-NWP-188 Ecology Engr letter for 11-12-12 AY-102.pdf

Here is your copy of the letter.
Thank you,

Daina McFadden | Technical Writer | 509.372.7939 | WA State Department of Ecology |

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
3100 Port of Benton Blvd • Richland, WA 99354 • (509) 372-7950
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

November 12, 2012 12-NWP-188

Mr. Scott L. Samuelson, Manager
Office of River Protection
United States Department of Energy
P.O. Box 450, MSIN: H6-60
Richland, Washington 99352

Re: Washington State Department of Ecology (Ecology) Assessment Report for Field Monitoring Activities conducted November 12, 2012 of the waste material near Riser 83 of the 241-AY-102 Double Shell Tank (DST)

Dear Mr. Samuelson:

On November 12, 2012, Ecology staff visited the 241-AY Farm. The purpose of this visit was to witness the weekly visual inspection of the waste material found near Riser 83 of the 241-AY-102 DST. Ecology staff noted the following:

- The extent of the area of the waste material with respect to the annulus "landmarks" (orange foam pieces, black pebble, the ventilation slot, etc.) appeared to slightly grow as compared to the amount of material viewed during the visual inspection conducted 10/18/12 and 10/25/12.
- The moisture streaks on either side of the waste within the ventilation slot near Riser 83 once again appeared to be wet, indicating that the slow leak is still present and has not "self-healed".
- An increased amount of white mineralization on the outside perimeter of the waste material within the annulus space.
- The waste material near the 6-inch refractory/connector ring had turned color from yellow to white. The size or height of the white waste material appeared to "grow" or crystalize. This increase in waste height, in turn created the appearance of "deeper" waste pools and finger channeling of the green and darker yellow colored waste.
- The waste is in direct contact with tank components. During this inspection Ecology staff could not determine if the 6-inch wide carbon steel refractory ring, annulus floor, primary tank liner, or the refractory/concrete material showed staining, cracking, pitting, etc., at those specific locations, as a result of the direct contact. The lack of visual assessment is due to the increased crystal growth, especially in the lower two-thirds of the leak area within the annulus space near Riser 83.

The United States Department of Energy-Office of River Protection, Washington River Protection Solutions LLC, and Ecology Integrated Project Team (IPT) continue to meet on a weekly basis and use this data to develop and evaluate options for the interim and longer term management of this tank and its contents. Ecology staff also participated in a DST Expert Panel on Corrosion (EPOC) conference call. At this time, the EPOC and IPT are unsure of the impacts this waste will have on the tank components that it is in contact with. Analytical results are pending, but preliminary results indicate that the waste is high in nitrite and hydroxide compounds. This would indicate that additional environmental stress cracking due to the waste should be at a slower rate. The EPOC has proposed to initiate additional corrosion tests using simulant that closely matches interstitial liquid and supernatant in the AY-102 DST based on the preliminary analytical results of the waste material.

Attached are Ecology's assessment report and photographs from the November 12, 2012, field visit. If you have any questions, please contact me at 509-372-7970 or Michelle.Hendrickson@ecy.wa.gov.

Sincerely,

Michelle L. Hendrickson

Michelle L. Hendrickson, CHMM, PE
Tank System Operations and Closure Engineer
Nuclear Waste Program

dbm
enclosures (2)

cc electronic w/enc:

Tom Fletcher, USDOE-ORP
Lisa Domnoske-Rauch, USDOE-ORP
Jeremy Johnson, USDOE-ORP
Jeff Voogd, WRPS
Steve Killoy, WRPS
Jason Engeman, WRPS
Dennis Washenfelder, WRPS
David Bernhard, NPT
Dirk Dunning, ODOE
Ken Niles, ODOE
Randall Robinson, DNFSB

cc w/enc:

Stuart Harris, CTUIR

Gabriel Bohnee, NPT
Steve Hudson, HAB
Russell Jim, YN

Administrative Record: DST/Tank Waste Storage/214-AY-102/S-2-3
Environmental Portal, LMSI
USDOE-ORP Correspondence Control
WRPS Correspondence Control

ASSESSMENT REPORT

Field Monitoring Activities

A. GENERAL INFORMATION

Project:	241-AY-102 Field Monitoring, Riser 83 Video
Project Contact:	Jeremy Johnson (ORP) Phone: (509) 376-1866
Review Date:	11/12/2012
Reviewer:	Michelle Hendrickson, CHMM, PE
USDOE Project:	US Department of Energy-Office of River Protection (USDOE-ORP)
USDOE Contact::	Tom Fletcher/Jeremy Johnson
Prime Contractor:	Washington River Protection Solutions (WRPS)
Project Manager:	Michael Hardesty Phone: (509) 373-4573
Location:	241-AY-102, 200 East Area, Hanford
Scheduled Start Date:	11/12/2012 Actual Start Date: 11/12/2012 Completion Date: 11/12/2012
Contract Amount:	Approximately $75,000 for 4 Riser Visual Inspections
Sub-Contractor:	N/A
Location:	200 East Area, Hanford Nuclear Reservation, Richland, WA

PROJECT DESCRIPTION:

- On an 8/8/12 visual inspection, material was found in the Annulus Space at AY-102. On 10/23/2012, USDOE-ORP reported that the DST was leaking and more material was accumulating in the Annulus Space.
- To monitor the slow leak, WRPS is conducting weekly and often twice weekly video inspections of the material through the AY-102 Tank's Riser #83.

The Pre-job meeting was conducted at 8:00 AM, including the conditions of RWP WTO04399, Rev. 2. The job in the field consisted of:

1. We entered the farm at approximately 9:45 AM. The ventilation exhauster was throttled down in the annulus from -14 inch to a -1 inch vacuum. The ventilation vacuum was lessened as the air currents generated by the vacuum create air currents which cool the sludge. However, these currents also impede the collection of a flammable gas sample and cause the camera to swing and makes its manipulation within the annular space very difficult..

2. A flammable gas sampled was collected and indicated that the annulus space was less than 25% lower flammability limit.

3. The camera was in a plastic bag and wire attached in a sleeve. The sleeve was carefully inspected and then the camera was removed from the bag and lowered into the annulus space. The camera was lowered to the 55-foot mark for the video/photographs. The camera completed a 360-degree scan and was raised and tilted. Also, a zoom of 10-times was used for close-up observation of the waste. Close-ups of the material along the entire area of waste deposition were viewed. The "landmarks" within the tank (black dot or rock, two white pebbles, and ventilation slots) were specifically viewed.

4. Once all of the views were captured, the camera was raised and re-bagged.

5. We surveyed out of the 241-AY Farm.

B. RECORDS AND PROCEDURES

1. Personnel Contacted During Assessment

	Name	Title or Duties/Organization	Phone
a.	Steve Stamper	Camera Operator - WRPS	509-392-3977
b.	Michael Hardesty	Field Work Supervisor	509-373-4573
c.	Roger Hammer	Camera Operator - WRPS	509-373-3355
d.			

2. Progress
   a. Scheduled Percentage 100 %

	Yes	No	NA	See Remarks
3. Stockpiled equipment or materials				
a. Records adequate?	X	☐	☐	☐
b. Protected?	X	☐	☐	☐
4. Monitoring Procedures up to date?	X	☐	☐	☐
5. Work Packages up to date?	X	☐	☐	☐
6. Adequate involvement in changes?	X	☐	☐	☐
7. Change of monitoring procedures appropriate and submitted to Ecology?	☐	☐	X	☐
8. Instrument(s) Calibrated adequately?	X	☐	☐	☐
9. Permit No/TPA Requirement.: DST System Unit RCRA Permit				

C. FIELD MONITORING

- The weather was reported at the Plan of the Day meeting was rain and low winds.
- The video taken of the waste material was near Riser 83 of the 241-AY-102 Annulus Space.
- The video was viewed and camera manipulated in the AY-801 Building.
- As the camera descended to the bottom of the annular space, a thermocouple became visible. The camera zoomed in and the off-riser sampler/crawler's tracks were no longer visible.
- All witnessing the inspection noted that the color of the waste appeared to be changing. The dark green was changing to a lighter green in some locations. The lighter green was becoming a dark yellow. The darker yellow was changing to a lighter yellow. The lighter yellow was turning to a white color along the waste perimeter. This indicates that the waste material may be drying, most likely due to the ventilation.
- The camera viewed the waste in respect to the different in-annular space "landmarks" including the black dot or rock, two white pebbles and ventilation slots. It was noted by all witnessing the video that the size of the area of the waste material did appear to have slightly increased in size, especially in the ventilation slot landmark, as compared to the amount of waste material viewed during the visual inspection conducted on 10/25/12.
- All witnessing the video also noted that there appeared to be moisture streaks indicating that the concrete near the ventilation slot was wet on either side of the waste. This had been viewed during previous visual inspections.
- Ecology noted that there appeared to be an increased amount of white mineralization on the outside perimeter of the waste material in the annulus space.
- Ecology also noted some rust and pitting on the primary tank. It is unclear if this was previously identified or if it is a newer development.
- Ecology also noted that the waste material near the 6-inch refractory/connector ring

had turned from yellow to white and appeared to "grow" in height or crystalize. And as this white waste material appears to increase in height, the finger channels of waste or pools of waste (that are dark green, light green, and yellow) appear to look deeper and slightly extend in length.

- Ecology could not visually distinguish if any visual damage indicators such as staining, cracking, pitting, etc. of the 6 inch wide carbon steel refractory ring, annulus floor, primary tank liner, or the refractory/concrete material where the waste was in direct contact with the tank structures. This lack of visual assessment is due to the increased growth of crystals, especially in the lower 2/3rds of the leak area and increased amount of deposition of mineralization around the perimeter of the leak area within the annulus. It is unknown at this time what influence the waste will have that is contacting the annulus floor and refractory/concrete pedestal.

	Yes	No	NA	See Remarks
1. Comply with Procedures and QA/QC Specifications?	X	☐	☐	☐
2. Field Test Being Accomplished?	X	☐	☐	☐
3. Satisfactory Contractor Quality Control?	X	☐	☐	☐
4. Inspection Documentation Satisfactory?	X	☐	☐	☐
5. Site Condition				
a. Orderly?	X	☐	☐	☐
b. Control room interface adequate?	X	☐	☐	☐
c. Equipment set-up adequate?	X	☐	☐	☐
6. Monitoring bypassing satisfactory?	☐	☐	X	☐
7. Unsafe Conditions/Health Hazards Observed?	☐	X	☐	☐
8. Is Project on Schedule?	X	☐	☐	☐
9. Is the Operations and Maintenance Documentation on Schedule?	☐	☐	X	☐
10. Is the Maintenance Management System on Schedule?	☐	☐	X	☐
11. Traffic control and traffic safety?	☐	☐	X	☐

REMARKS:

Photographs from this field monitoring event are attached.

Assessment Completed:

Project Engineer's Signature *Date* 12/12/12

11/1/2012

11/5/2012

11/8/2012

11/12/2012

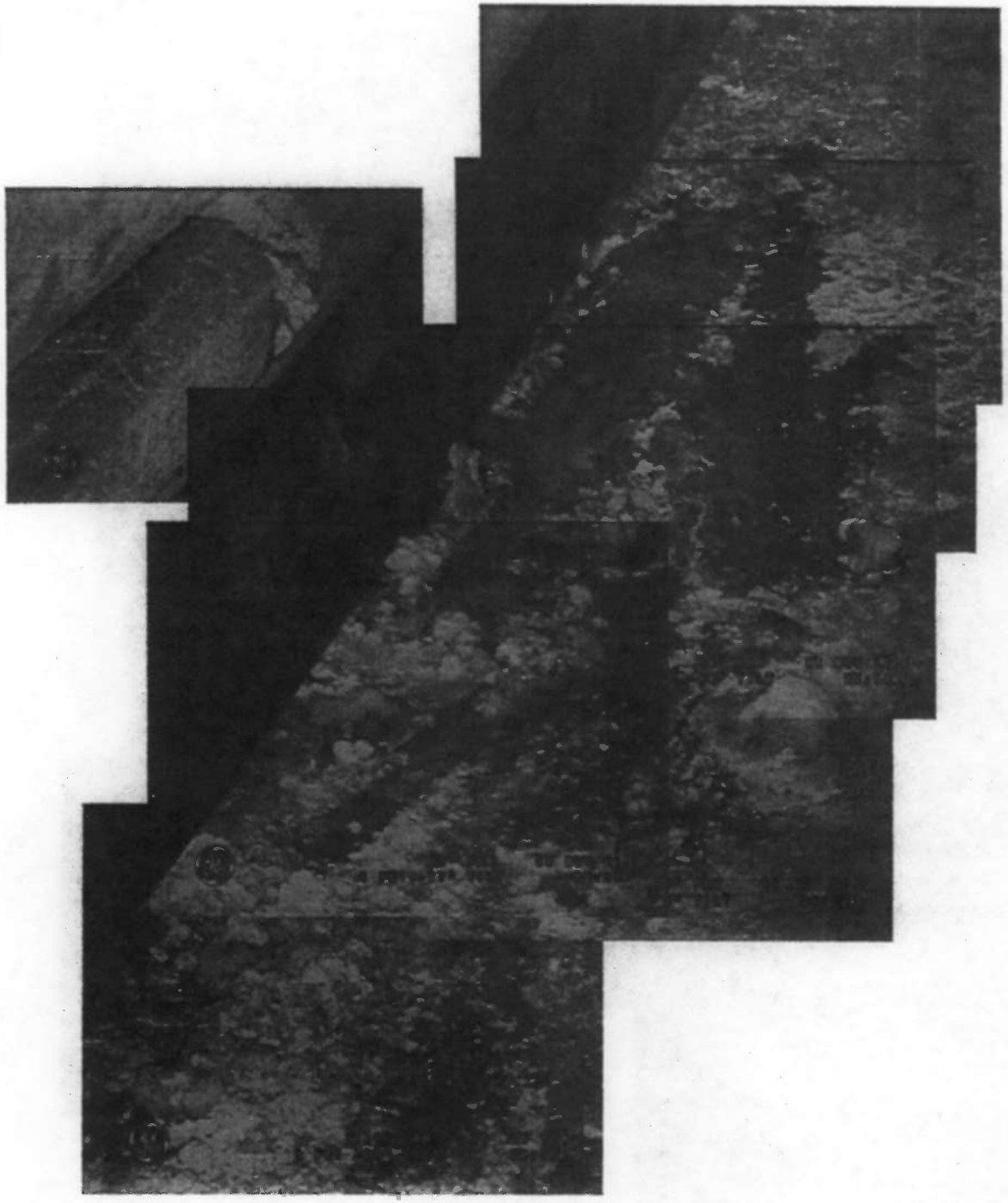
10/25/2012

11/1/2012

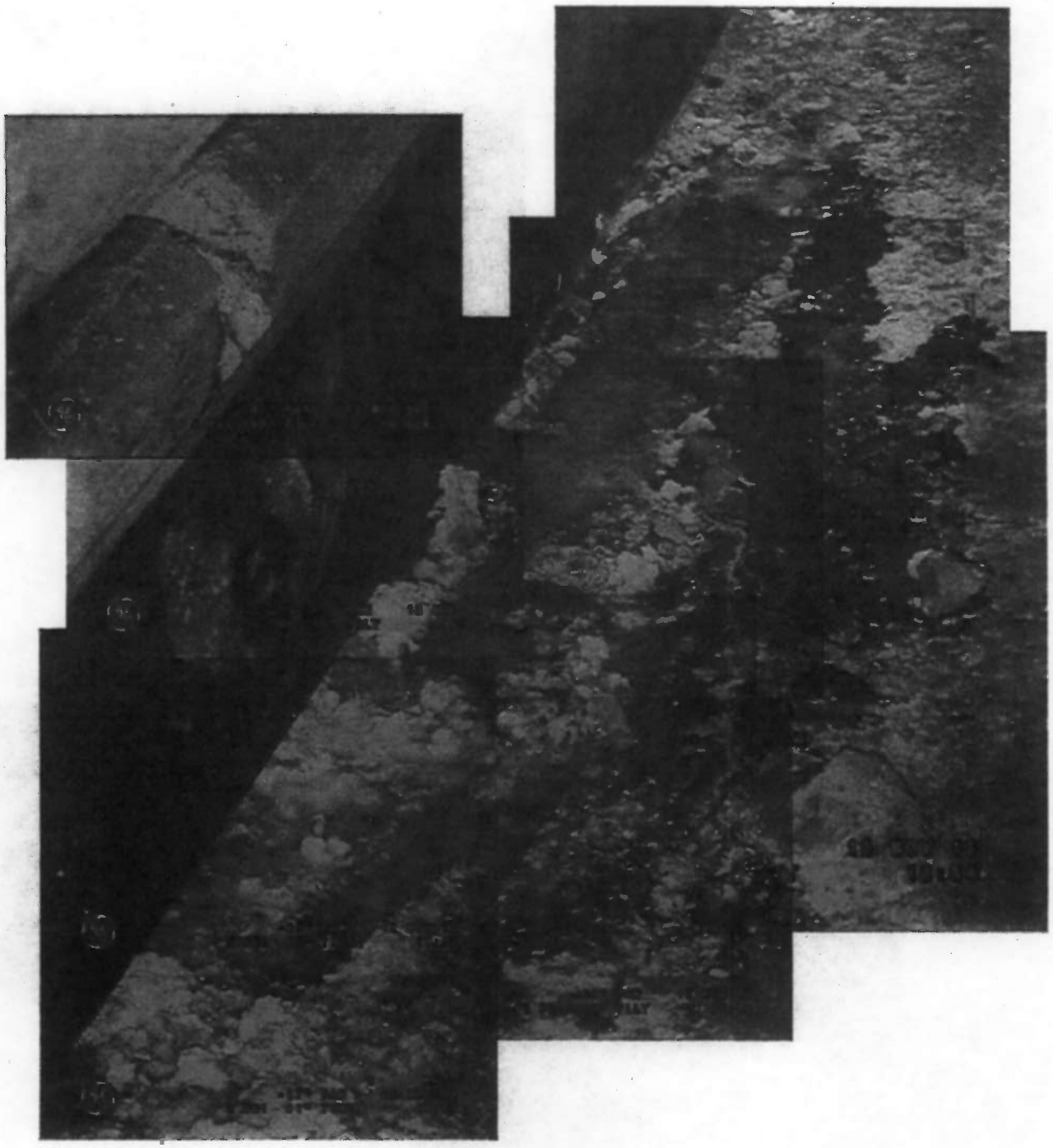
11/8/2012

11/12/2012

11/8/2012



11/12/2012

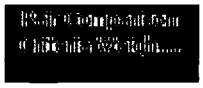


Johnson, Jeremy M

From: Johnson, Jeremy M
Sent: Monday, December 03, 2012 9:57 AM
To: Burandt, Mary E; Irby, Dennis H; Wheeler, Isabelle; Killoy, Steven E; Little, David B; Gregory, Robert E (Rob); Scott, Delmer; Martell, John; Schmidt, John; "CWHA461 @ECY.WA.GOV' (CWHA461@ECY.WA.GOV)'; Dahl-crumpler, Suzanne L; Lyon, Jeffery; Hendrickson, Michelle (Washington State Department of Ecology); 'Schmidt, John W (DOH) (John.Schmidt@doh.wa.gov)'; Domnoske-Rauch, Lisa A
Subject: AY-102 IPT

Team,

As we discussed at the last meeting, below is a comparison criteria table for you to fill out. This table is specifically related to retrieval technologies for the AY-102 sludge. Please try and complete and get your table to me by COB Wednesday. I will combine our results and we can discuss whether this may be useful for the IPT in evaluating different retrieval methods. Give me a call if you have any questions.



Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

Johnson, Jeremy M

From: Johnson, Jeremy M
Sent: Friday, November 30, 2012 2:51 PM
To: Hendrickson, Michelle (Washington State Department of Ecology)
Subject: FW: AY-102 Riser 83 10/25/12 Inspection Results
Attachments: AY-102 Riser 83 10-25-12 Inspection Comparison.pdf

Michelle,

Here's the 10/25 results as requested.

Jeremy

From: Fletcher, Thomas W
Sent: Monday, October 29, 2012 8:32 AM
To: Johnson, Jeremy M; Mattlin, Ellen M
Subject: FW: AY-102 Riser 83 10/25/12 Inspection Results

Fyi

-----Original Message-----
From: Sams, Terry L
Sent: Monday, October 29, 2012 08:26 AM Pacific Standard Time
To: Fletcher, Thomas W; Johnson, Michael D; Wilkinson, Robert E; Gregory, Robert E (Rob); Little, David B
Subject: FW: AY-102 Riser 83 10/25/12 Inspection Results

-----Original Message-----
From: Engeman, Jason K
Sent: Friday, October 26, 2012 04:34 PM Pacific Standard Time
To: Sams, Terry L
Cc: Washenfelder, Dennis J; Strasser, David W
Subject: AY-102 Riser 83 10/25/12 Inspection Results

Terry,

Attached are the comparison images for Riser 83 taken on 10/25/12. It appears that the additional material on the floor and in the slot seen on the 18th and the 21st has not increased in size and is drying up.

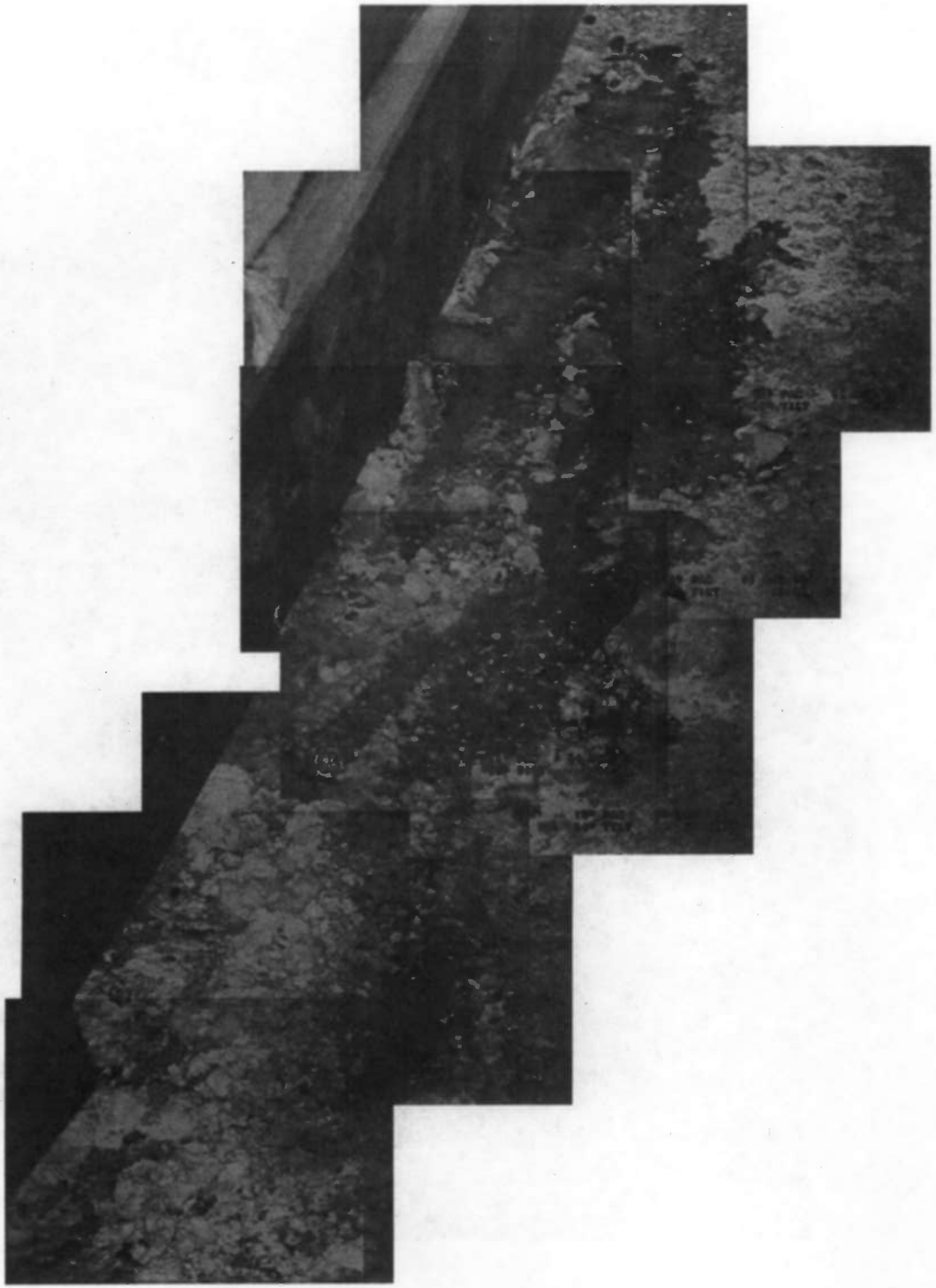
Tom Fletcher asked me on Thursday to please have these images sent to him and Jeremy Johnson. If you could forward these on as appropriate I would appreciate it.

If needed, I can send the raw images/power point file if needed for their status updates to their management.

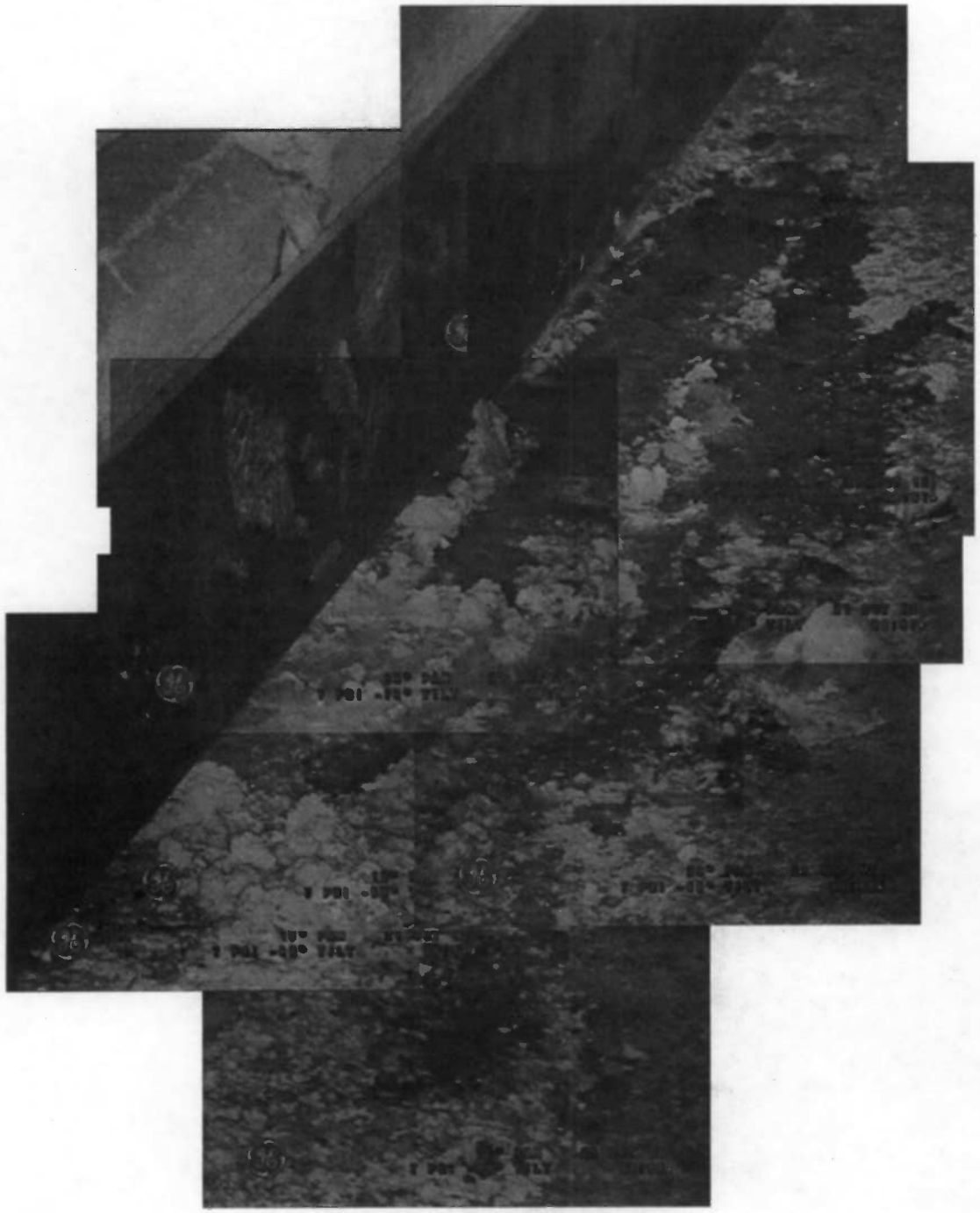
Thanks

Jason

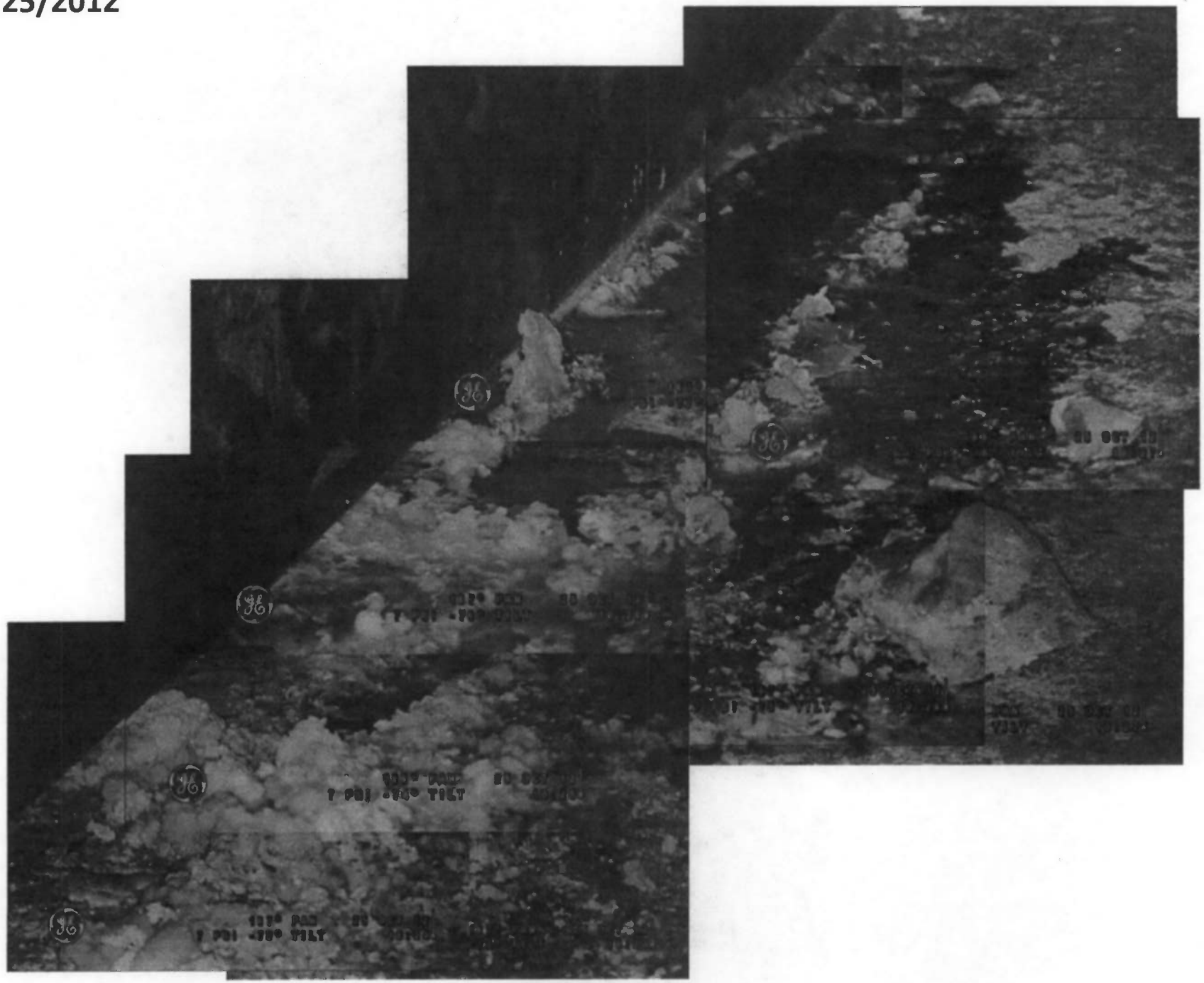
10/1/2012



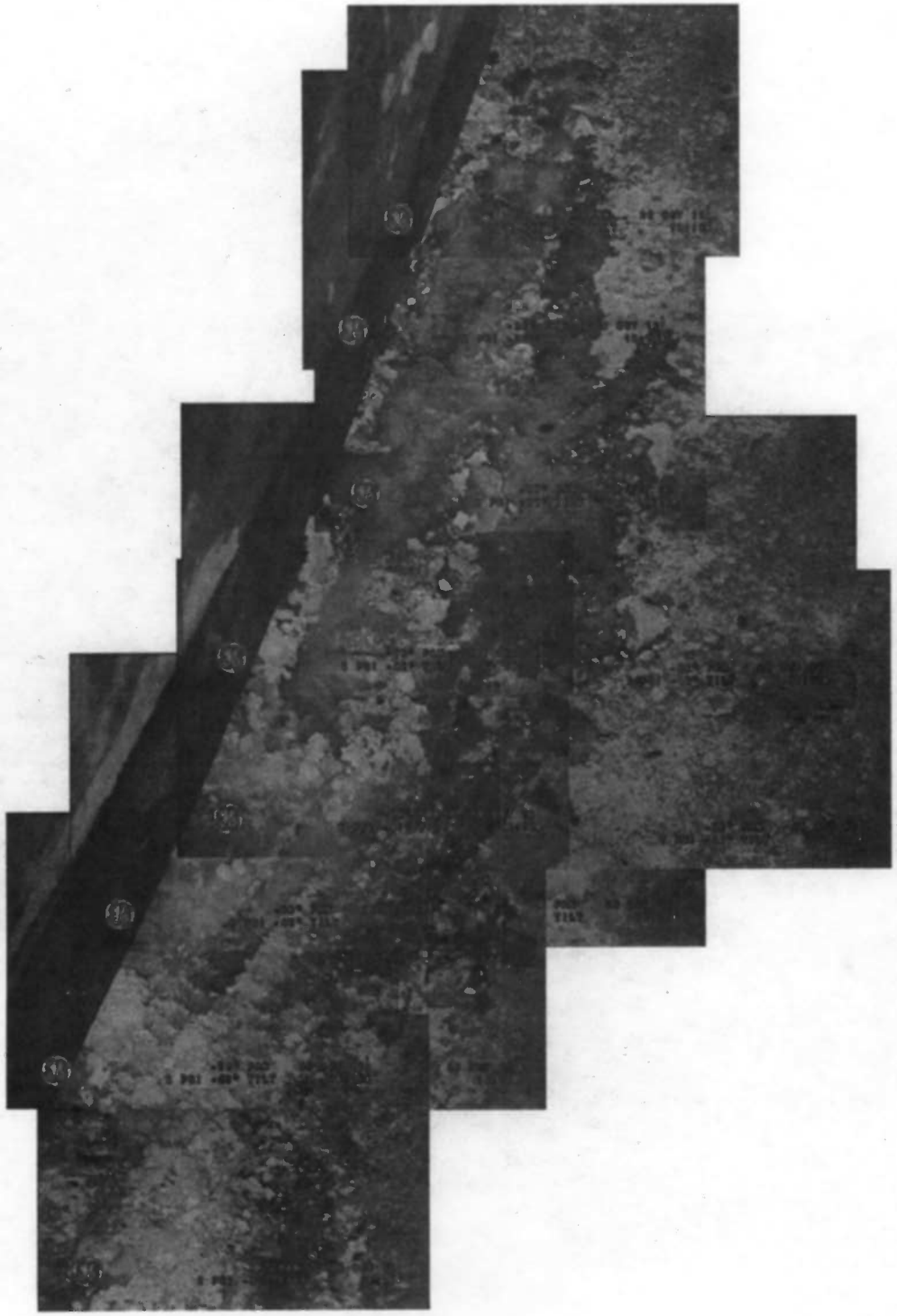
10/21/2012



10/25/2012



10/25/2012



10/8/2012
TOGGLE DIGITAL ZOOM

10/18/2012
TOGGLE DIGITAL ZOOM

10/21/2012
TOGGLE DIGITAL ZOOM

10/25/2012
TOGGLE DIGITAL ZOOM

Johnson, Jeremy M

From: Hendrickson, Michelle (ECY) <MICH461@ecy.wa.gov>
Sent: Friday, November 30, 2012 3:26 PM
To: Johnson, Jeremy M
Subject: RE: AY-102 Riser 83 10/25/12 Inspection Results

Thank you!

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Friday, November 30, 2012 2:51 PM
To: Hendrickson, Michelle (ECY)
Subject: FW: AY-102 Riser 83 10/25/12 Inspection Results

Michelle,

Here's the 10/25 results as requested.

Jeremy

From: Fletcher, Thomas W
Sent: Monday, October 29, 2012 8:32 AM
To: Johnson, Jeremy M; Mattlin, Ellen M
Subject: FW: AY-102 Riser 83 10/25/12 Inspection Results

Fyi

-----Original Message-----
From: Sams, Terry L
Sent: Monday, October 29, 2012 08:26 AM Pacific Standard Time
To: Fletcher, Thomas W; Johnson, Michael D; Wilkinson, Robert E; Gregory, Robert E (Rob); Little, David B
Subject: FW: AY-102 Riser 83 10/25/12 Inspection Results

-----Original Message-----
From: Engeman, Jason K
Sent: Friday, October 26, 2012 04:34 PM Pacific Standard Time
To: Sams, Terry L
Cc: Washenfelder, Dennis J; Strasser, David W
Subject: AY-102 Riser 83 10/25/12 Inspection Results

Terry,

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If needed, I can send the raw images/power point file if needed for their status updates to their management.

Thanks

Jason

U.S. Department of Energy
Office of River Protection
P.O. Box 450, MSIN H6-60
Richland, Washington 99352

12-TPD-0069

NOV 28 2012

Ms. Jane A. Hedges, Program Manager
Nuclear Waste Program
State of Washington
Department of Ecology
3100 Port of Benton Blvd
Richland, Washington 99352

Dear Ms. Hedges:

AY-102 INTEGRATED PROJECT TEAM PARTICIPATION

On behalf of the Department of Energy, Office of River Protection (ORP), please accept my sincere thanks for your ongoing participation in our collaborative efforts to determine the appropriate path forward for Double-Shell Tank (DST) AY-102. As you know, discovery of material in the annulus space between the primary tank liner and secondary tank liner, and the determination that the material is a result of a breach in the primary tank's integrity is a very serious issue.

Since the discovery of this anomaly several months ago, ORP and the Washington State Department of Ecology (Ecology) have met on several occasions to share the available information and discuss the next steps for data collection, analysis, monitoring, and potential responses. Based on my conversations with Mr. Thomas W. Fletcher, ORP's Assistant Manager for Tank Farms Project, it is my understanding that Ecology is not expecting us to begin pumping the primary tank of AY-102 at this time. It is also ORP's understanding that Ecology supports the ongoing evaluation of alternative responses through the AY-102 Integrated Project Team (IPT) to determine the most appropriate path forward based upon more complete information and analysis. Although we do not believe that there is an imminent threat to human health, worker safety, or the environment, ORP remains committed to pump this tank in a safe manner should this become necessary, and agrees with Ecology that a detailed evaluation by the IPT of timing and methods to transfer the waste from AY-102 will minimize these risks.

As you know, this jointly created IPT, whose membership includes Ecology, the Washington State Department of Health, ORP, and Washington River Protection Solutions LLC, initially met on November 8, 2012, and will be key to our continued efforts to ensure the best path forward for AY-102. The purpose of the AY-102 IPT is to provide a forum to identify, discuss, evaluate, and provide recommendations for actions to be taken pertaining to AY-102 to ensure that the tank waste will continue to be stored safely in a manner that is protective of human health, worker safety, and the environment.

Again I would like to thank you for your diligent response and participation in the department of a collaborative solution to such a complex issue. If you have any questions or concerns, please contact me, or your staff may contact Thomas W. Fletcher, Assistant Manager for Tank Farms Project, (509) 376-3434.

Sincerely,

Scott L. Samuelson, Manager
Office of River Protection

TPD: JMJ

cc:
S. Harris, CTUIR
M. L. Hendrickson, Ecology
J. J. Lyon, Ecology
J. B. Price, Ecology
C. L. Whalen, Ecology
D. A. Faulk, EPA
S. L. Leckband, HAB
J. F. Ollero, MSA
R. E. Piippo, MSA
J. G. Vance, MSA
G. Bohnee, NPT
K. Niles, ODOE
J. Martell, WDOH
J. Schmidt, WDOH
R. Jim, YN
Administrative Record
Environmental Portal, LMSI
WRPS Correspondence

Johnson, Jeremy M

From: Johnson, Jeremy M
Sent: Friday, October 05, 2012 12:45 PM
To: Lyon, Jeffery; 'Hendrickson, Michelle (ECY) (MICH461@ECY.WA.GOV)'
Subject: FW: Crawler pics

Here's some pictures of the crawler that will be used to sample below riser 90 in AY-102. It's changed slightly since these were taken.

From: Irwin, Robert M (Mat)
Sent: Friday, September 07, 2012 12:03 PM
To: Domnoske-Rauch, Lisa A; Trenchard, Glyn D
Cc: Wright, Derek L; Johnson, Jeremy M
Subject: RE: Crawler pics

Can you send these in JPEG?

Thanks,

Mat

From: Domnoske-Rauch, Lisa A
Sent: Friday, September 07, 2012 11:08 AM
To: Trenchard, Glyn D; Irwin, Robert M (Mat)
Cc: Wright, Derek L; Johnson, Jeremy M
Subject: FW: Crawler pics

FYI

Lisa Domnoske-Rauch
DOE/ORP
Facility Representative
(509) 438-7620

My Treasures do not Chink or Glitter, They Gleam in the Sun and Neigh in the Night.....

From: Patten, Elester
Sent: Friday, September 07, 2012 8:55 AM
To: Ciola, Ronald J; Domnoske-Rauch, Lisa A; Patel, Dimple H
Subject: FW: Crawler pics

FYI

From: Brown, Rodney J
Sent: Friday, September 07, 2012 8:50 AM

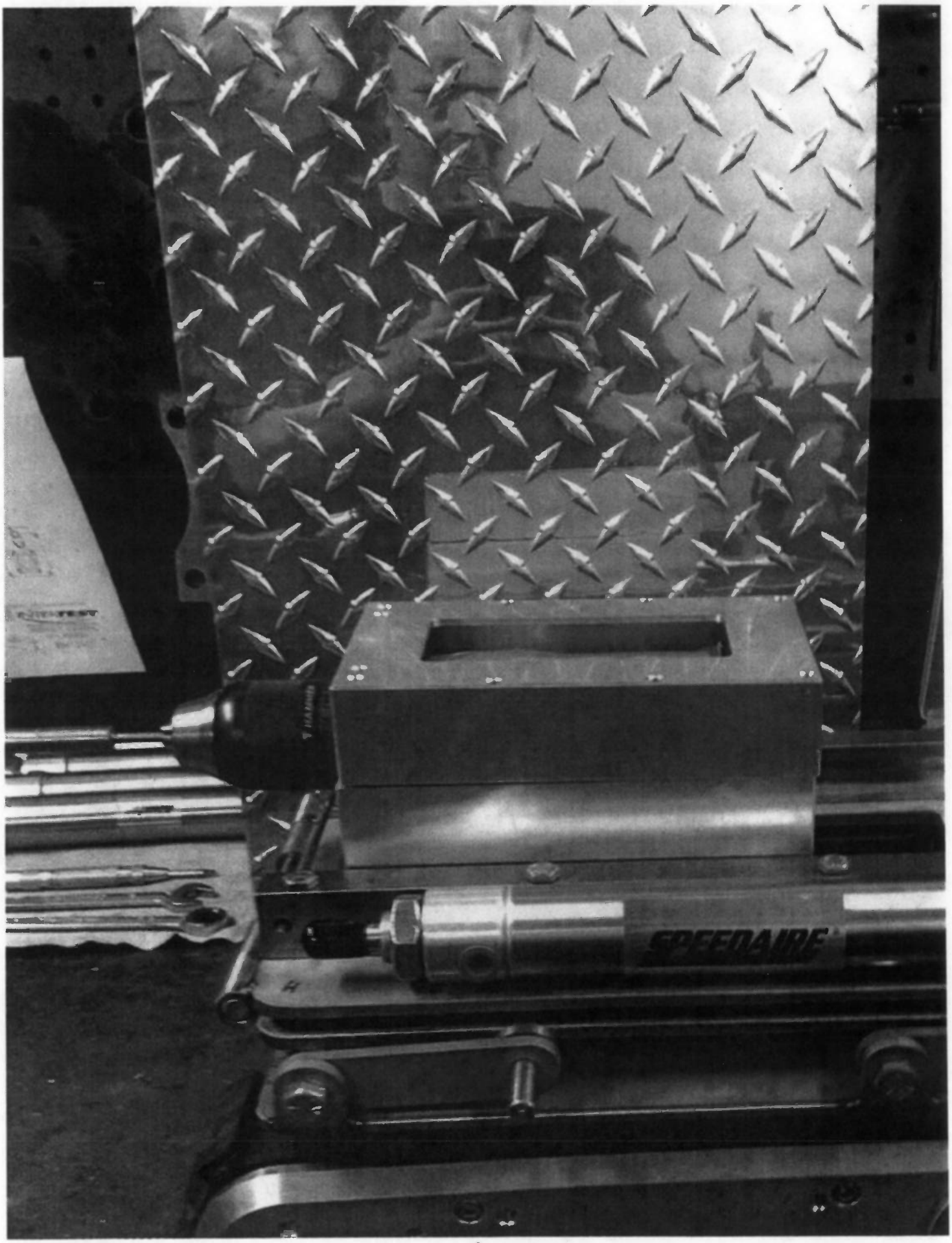
To: Wilkinson, Robert E; Patten, Elester; Strasser, David W
Subject: FW: Crawler pics

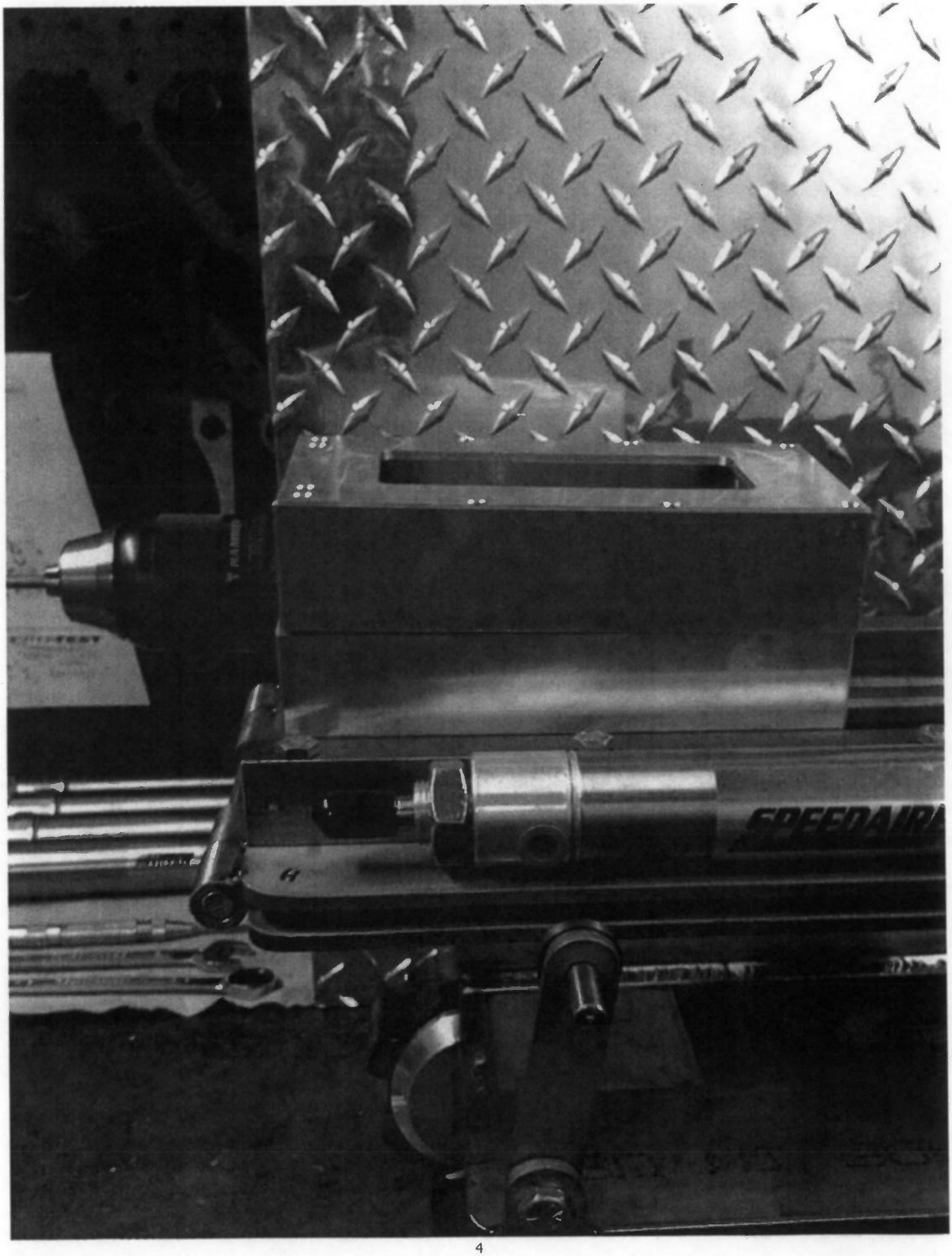
These are pictures of the partial prototype sampler that Sumsion and Ariva are working on for AY-102.

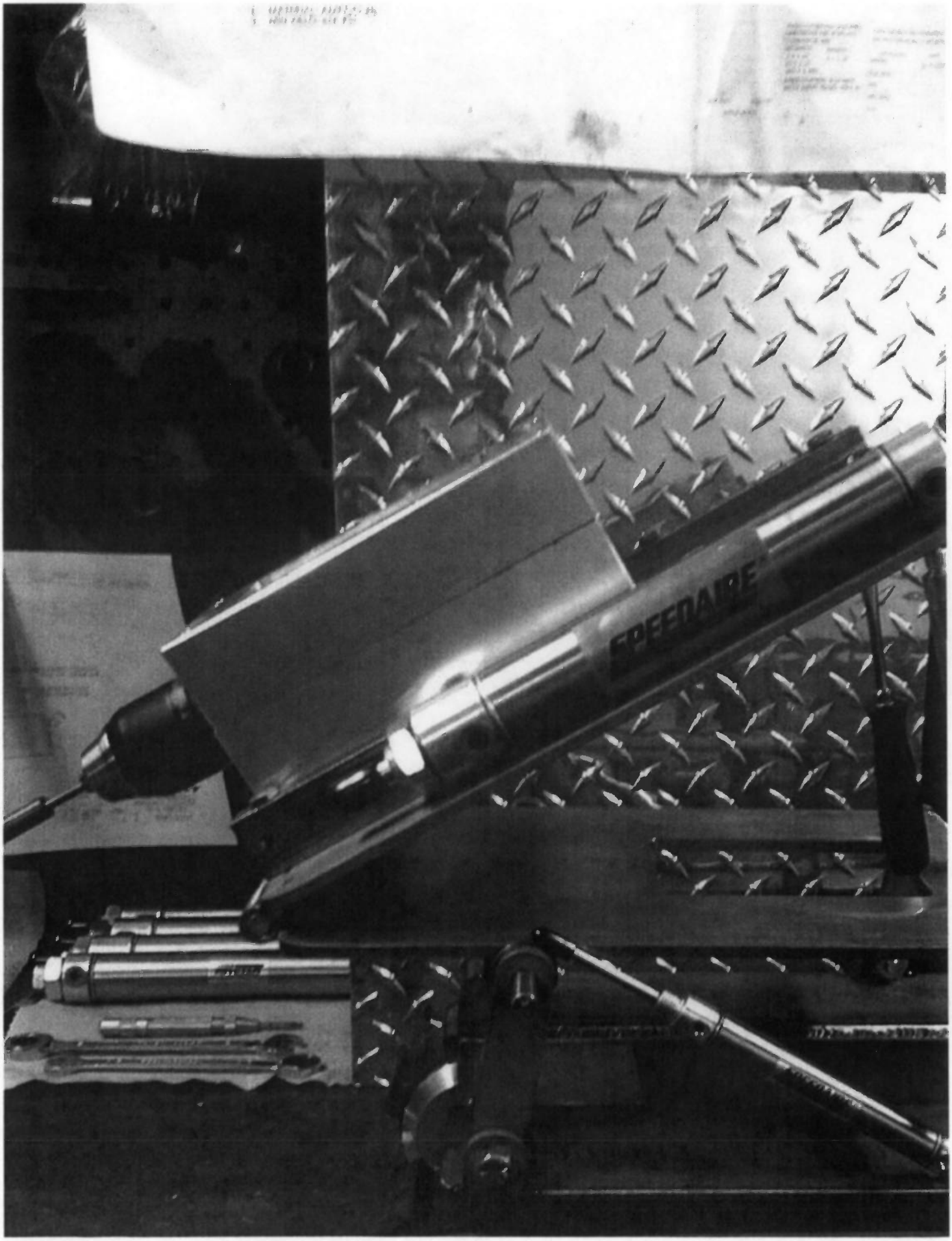
Rod Brown,
373-6947 or 438-9711

Please have a look at some pictures of the partially fabricated crawler. The system is not fully assembled yet and we are still waiting on some of the parts. These photos give a general idea of how the sampler will work. The drill head will have an auger housed in a sleeve (similar to a mortising bit) to capture the sample material. The crawler will then transport the captured sample to a sample jar located on the annulus floor below riser #90, where the auger will then be reversed to deposit the material into the sample bottle. The Sampling folks will retrieve the sample from the riser just like a normal off riser sample and ship it to the lab.

Mike


SPEEDAIRE


SPEEDAIR


SPEEDAIRE

SPEEDAIRE

Johnson, Jeremy M

From: Lyon, Jeffery (ECY) <JLYO461@ecy.wa.gov>
Sent: Monday, January 07, 2013 12:32 PM
To: Johnson, Jeremy M; Whalen, Cheryl (ECY); Hendrickson, Michelle (Washington State Department of Ecology); Dahl-crumpler, Suzanne L; Wheeler, Isabelle; Irby, Dennis H; Burandt, Mary E
Subject: RE: AY-102 HAB TWC Presentation and Recommendations Paper

For the TWC meeting I copied the statements/questions that were poised by the committee for AY-102

1. Update on video inspections and what has been learned to date (e.g. has the level in Tank AY-102 fluctuated and what does that mean about a possible leak in the tank or the ability to monitor for a leak in the tank?).
    - Jeremy presentation is serving this well. USDOE detected a very small leak before it even go to the leak detection probe. We have increased the frequency and will do at least a 95% view of the annulus floor

2. What are the lessons learned from this tank? Based on what DOE knows about Tank AY-102, what do is suspected about the other six tanks of similar age and their potential for failure (and potentially how soon)?
    - I think Jeremy will do fine on this too. The IPT is brief on USDOE review of the other tank data, including history of chemistry, temperature, and use.

3. How is uncertainty communicated (e.g. to the public)? How does DOE and Ecology plan in the face of uncertainty?
    - I did not understand this and ask for clarification on this question. I think they are talking about the tank integrity uncertainty, but want to make sure. Jeremy may want to expand on this if it is integrity since this was part of the IPT recimmendations

4. Does DOE plan to pump this tank and when will they do so? Does DOE have the tank capacity to pump the tank? What does this mean for retrievals?
    - We have had numerous discussion about this issue and I have expressed my concerns. I expect that the IPT will spend some time considering the concerns that WRPS has regarding WTP feed, methods of retrievals, and what removal actions are the minimum. However Ecology has clearly stated we expect them to pump the entire contents. How and when will be solidified sometime soon (in a few months).
    - To date WRPS cannot provide their estimate for time or method to remove the waste sufficiently.
    - I expect USDOE to begin pumping within the year (2013), and to finish before 2016. What that means as far as final state of AY-102, will be determined by the IPT.

5. Are there any other options besides pumping that are being considered? Is Ecology considering using its discretionary authority?
    - No. The only discretion regarding our authority will be consideration of the timing for pumping the sludge and supernatant, and this is a consideration the regulations allow; I expect the IPT to consider the following: what is adequate for a leak response versus what is necessary to complete closure (remove 100% of the waste). These are matters that are being presented to the IPT by WRPS and Ecology expects those issues to be presented within the next month or 2.

Does this look OK Jeremy?

Thanks

From: Lyon, Jeffery (ECY)
Sent: Monday, January 07, 2013 11:00 AM
To: 'Johnson, Jeremy M'; Whalen, Cheryl (ECY); Hendrickson, Michelle (ECY); Dahl, Suzanne (ECY); Wheeler, Isabelle; Irby, Dennis H; Burandt, Mary E
Subject: RE: AY-102 HAB TWC Presentation and Recommendations Paper

I like your presentation, it is brief and pretty clear. Here are my suggestions:

Slide 3 "slow changes" – should you indicate if the changes are "drying" and no new liquids suspected, or there are suspected "additional liquids" being observed?

Slide 4 "Expect to complete spring 2013", this is all 6 right?

Slide 5 "Procedures developed (if equipment is deployed they would require final approvals)" – so this slide seems to be saying that you have plans for both the Annulus and the Primary tank. That seems consistent with what I expect. However the statement that you made about procedures does not clarify your intent. Does USDOE plan to deploy? I had assumed that you were planning to deploy. I would suggest that you add a bullet that follows bullet 2 stating your intent or your plans, including timing.

Slide 6, bullet 2, you may want to indicate that this isn't very quickly, since WRPS and USDOE has not even narrowed down what decade they intent complete the initial deployment or pumping.

I plan to clarify Ecology expectations for this meeting. I will send a separate e-mail for that.

Thanks,

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Monday, January 07, 2013 9:47 AM
To: Lyon, Jeffery (ECY); Whalen, Cheryl (ECY); Hendrickson, Michelle (ECY); Dahl, Suzanne (ECY); Wheeler, Isabelle; Irby, Dennis H; Burandt, Mary E
Subject: AY-102 HAB TWC Presentation and Recommendations Paper

All,

Attached is a presentation I have put together for an update to the HAB Tank Waste Committee on the 9th as well as a paper describing our recommendations we have developed. Please provide me any feedback on the presentation by noon tomorrow as well as any major input on the recommendations paper. I plan to discuss the paper at the next IPT meeting on the 17th but if I'm way off base on anything in it I would like to know before I present to the TWC.

Thanks,

Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

Johnson, Jeremy M

From: Lyon, Jeffery (ECY) <JLYO461@ecy.wa.gov>
Sent: Thursday, April 18, 2013 4:35 PM
To: Johnson, Jeremy M
Cc: Scott, Delmer
Subject: Re: AY-102 pumping

Thanks. I am on my iphone so this may not be totally complete. Talk to Michelle for more information, but for me, when Michelle visits I expect that she will assure that:

-The staged equipment is in place and deployable
-You have design drawings and equipments lists that are aligned and complete
-You have analyzed the way you have defined or evaluated what "rapid" means to you. Remember there are one of 2 choices remove the waste from the annulus within 24 hours or as described in the emergency pumping guide - your choice. So I assume USDOE has some estimate of time/motion expectations, and you are clear about what the potential leak is that will require pumping. I hope that you assume a severe leak.
- regarding the primary pumping issue, I thought you were committed to construct the necessary equipment so that problem would be corrected and that both were implementable.

However, wIthout a written plan that you would provide, then we both get to live on assumptions. I assume the Emergency Pumping Guide applies.

Since the IPT was terminated early, Ecology should be getting some written plan of action with clear implementation and schedule similar to that I the Emergency pumping guide. You recall, we have gotten very little commitments or documentation, since all of the IPT information is in USDOE possession

Sent from my iPhone

On Apr 18, 2013, at 2:44 PM, "Johnson, Jeremy M" <Jeremy_M_Johnson@orp.doe.gov> wrote:

Jeff,

I'm working on accommodating this request. Please note that you will not be able to verify installation of the annulus pump as this equipment is staged on site for rapid installation, as we discussed in the IPT. Recall that once the annulus pumping system is installed, the primary head space is communicating with the annulus space.

Jeremy

From: Lyon, Jeffery (ECY) [mailto:JLYO461@ecy.wa.gov]
Sent: Thursday, April 18, 2013 11:30 AM
To: Johnson, Jeremy M
Cc: Whalen, Cheryl (Washington Department of Ecology); Wold, Kristi (Washington State Department of Ecology); Fletcher, Thomas W
Subject: AY-102 pumping
Importance: High

I would like to have you arrange a time that Michelle can come out and verify the installation and operability of your AY-102 Annulus and Primary Tank Pumping systems. I have ask her to assure herself,

and our program, that these systems are ready for use in the event of a need. Michelle is available the week of week of the April 29th. Since Michelle will be out part of next week, please contact her this week, to initiate the scheduling and to determine what work packages you will make available to facilitate her review. I would appreciate the necessary documentation and accommodations be available, so that she can verify these systems are ready and that USDOE is prepared to pump.

Thanks for your help

Johnson, Jeremy M

From: Hendrickson, Michelle (ECY) <MICH461@ecy.wa.gov>
Sent: Friday, March 22, 2013 2:08 PM
To: Dyekman, Dale L; Wold, Kristi (Washington State Department of Ecology); Whalen, Cheryl (Washington Department of Ecology); Lyon, Jeffery
Cc: Killoy, Steven E; Voogd, Jeffry A; Johnson, Jeremy M; Vanderpol, Jeffrey J; Huffman, Lori A
Subject: RE: ENRAF to Riser 89 from Riser 90 at AY-102

Thanks Dale!

Michelle

From: Dyekman, Dale L [mailto:Dale_L_Dyekman@rl.gov]
Sent: Friday, March 22, 2013 1:54 PM
To: Hendrickson, Michelle (ECY)
Cc: Killoy, Steven E; Voogd, Jeffry A; Johnson, Jeremy M; Vanderpol, Jeffrey J; Huffman, Lori A
Subject: RE: ENRAF to Riser 89 from Riser 90 at AY-102

Michelle,

Jeff Voogd requested I follow up to the questions posed in your e-mail below. Responses are listed below.

Dale Dyekman
Environmental Compliance
(509) 372-2678
river protection
Contractor to the United States Department of Energy

ECOLOGY: Would you send us the notification for moving the AY-102-WSTA-LDT-152 ENRAF again?

> *RESPONSE: No notification was made to Ecology prior to, or after the completion of field work that moved the ENRAF from riser 90 to riser 89.*

ECOLOGY: Also, please correct or add to my historical summary above taken from emails and notifications.

> *RESPONSE: Nothing to correct or add.*

From: Voogd, Jeffry A
Sent: Wednesday, March 20, 2013 6:28 AM
To: Dyekman, Dale L
Cc: Killoy, Steven E
Subject: FW: ENRAF to Riser 89 from Riser 90 at AY-102

Would you please close with Michelle on the historical summary and with copy to ORP and WRPS staff.

Thanks
Jeff

From: Hendrickson, Michelle (ECY) [mailto:MICH461@ecy.wa.gov]
Sent: Tuesday, March 19, 2013 5:05 PM
To: Voogd, Jeffry A
Cc: Lyon, Jeffery; Whalen, Cheryl (Washington Department of Ecology); Wold, Kristi (Washington State Department of Ecology); Johnson, Jeremy M; Vanderpol, Jeffrey J; Killoy, Steven E; Huffman, Lori A
Subject: RE: ENRAF to Riser 89 from Riser 90 at AY-102

Thanks Jeff~

I have checked all of my electronic and written notes and cannot find anything about the change in location for this ENRAF. However, what I did find was that this specific ENRAF (AY-102-WSTA-LDT-152) has been "acting up" for the past couple of years....

- The AY-102 ENRAF 152 was last calibrated on 2/23/2011. It is calibrated annually. ENRAF 152 has received regular annual calibration with no history of repair for the last several years.
- A visual alarm was sent from ENRAF 152 to the TMACS system and was verified on daily rounds on 10/9/11. Liquid was observed when the ENRAF 152 displacer was raised during calibration on 10/12/2011, as part of our trouble shooting effort. No sample was taken, as it was not feasible to do so. The liquid is suspected to be rainwater for the following reasons:
  - ENRAF 152 radiation dose readings during the ENRAF trouble shooting of 10/12/2011 were 2 – 4 mrem. Dose rates found during AY-102 main tank repairs are an order of magnitude higher (e. g. 30 mrem).
  - There were recent precipitation events.
  - The other annulus ENRAFs did not show evidence of liquid accumulation.
  - The in-tank AY-102 ENRAF did not show evidence of a leak.

- The AY-102-WSTA-LDT-152 DST annulus ENRAF was identified out of service on 3/10/2012 with a required repair date of 6/8/2012. During planned repairs conducted 5/24/2012 the ENRAF displacer wire broke and the displacer and wire fell into the annular space. A video camera entered into the annulus June 4, 2012, identified the displacer in a location that would interfere with the performance of the ENRAF. The majority of fallen wire was removed but attempts to retrieve or move the displacer from the bottom of the annulus were unsuccessful. Due to the additional recovery actions needed, the ENRAF is expected to be repaired after the 90 day due date of June 8, 2012. The exact completion date is dependent upon the ability to move or retrieve the displacer. A discussion was held via phone call between the Base Operations Environmental Compliance for Team AZ and the Ecology DST permit writer late in the day on 06/05/2012 concerning the events leading up to this required notification.

We did receive the following notification regarding moving the 153 ENRAF in the AY-102 Annulus space...but I, nor Kristi received a notification for moving the 152 ENRAF.

ENVIRONMENTAL OPERATIONAL ACTIVITIES N

Date: 9/25/12 TOC-ENV-NOT: 20

Name: Ruth Allen Revision No.: 0

Regulatory Requirement: SY Settlement Agreement; WAC 173-303-640(4

RE: Notification of Temporary Removal of the ENRAF from the AY

Notification Information:

To facilitate sampling of material in the annulus of Tank AY-1
AY102-WSTA-LDT-153 was removed from service on 9/24/12. A vid
into the riser to observe the sampling activities. The sampli
on, or near, September 27, 2012. The ENRAF will be reinstalle
that all planned sampling has been completed.

Distribution of this form shall be completed to the follo
Check all applicable distribution lists

- [x] Environmental Records
- [ ] Team Line Management
- [ ] Other:

Attach a copy of original notification email and any applicable information when subn
Document Control.

Would you send us the notification for moving the AY-102-WSTA-LDT-152 ENRAF again? Also, please correct or add to my historical summary above taken from emails and notifications.

Thanks,
Michelle

From: Voogd, Jeffry A [mailto:Jeffry_A_Voogd@rl.gov]
Sent: Tuesday, March 19, 2013 10:59 AM
To: Hendrickson, Michelle (ECY)
Cc: Lyon, Jeffery (ECY); Whalen, Cheryl (ECY); Wold, Kristi (ECY); Johnson, Jeremy M; Vanderpol, Jeffrey J; Killoy, Steven E; Huffman, Lori A
Subject: RE: ENRAF to Riser 89 from Riser 90 at AY-102

Michelle;

The AY-102-WSTA-LDT-152 ENRAF was moved from riser 90 to riser 89 during August 2012 to accommodate the AREVA Off Riser Sampling System, developed to assist in the AY102 annulus investigation. It was recognized that the Off Riser Sampling System may be deployed for an undefined period of time.

Jeff Voogd
373-4101

From: Hendrickson, Michelle (ECY) [mailto:MICH461@ecy.wa.gov]
Sent: Monday, March 18, 2013 3:55 PM
To: Voogd, Jeffry A; Johnson, Jeremy M; Vanderpol, Jeffrey J
Cc: Lyon, Jeffery; Whalen, Cheryl (Washington Department of Ecology); Wold, Kristi (Washington State Department of Ecology)
Subject: ENRAF to Riser 89 from Riser 90 at AY-102

Jeff/Jeremy/Jeff~

I wanted to send this email to follow-up on the question I asked Thursday after the Visual Inspection at AY-102. During that inspection another work crew was in the farm performing ground scans to locate the appropriate place to run wire in conduit to provide permanent power, rather than temporary power for the ENRAF at Riser 89.

I was wondering why the ENRAF was moved from riser 90 to riser 89?

Thanks,
Michelle

Johnson, Jeremy M

From: Johnson, Jeremy M
Sent: Thursday, March 07, 2013 12:56 PM
To: 'Hendrickson, Michelle (ECY)'
Subject: RE: AY-102 IPT - questions

Yes they are monitoring temperature.

From: Hendrickson, Michelle (ECY) [mailto:MICH461@ecy.wa.gov]
Sent: Thursday, March 07, 2013 10:06 AM
To: Johnson, Jeremy M
Subject: RE: AY-102 IPT - questions

Thanks Jeremy! That helps! Bummer! Poor tank is riddled with enough issues...

I am assuming WRPS is monitoring the temperature to ensure we stay within "safe" levels.

Michelle

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Thursday, March 07, 2013 7:21 AM
To: Hendrickson, Michelle (ECY)
Subject: RE: AY-102 IPT - questions

Michelle,

Yes they are separate issues. When you were out on the 18th the vent system was down due to the AZ-301 condensate pump being inoperable. The pump was fixed and the system was brought back online the following day subsequent to the issues below. Hope that helps if not let me know.

Jeremy

From: Hendrickson, Michelle (ECY) [mailto:MICH461@ecy.wa.gov]
Sent: Wednesday, March 06, 2013 2:30 PM
To: Johnson, Jeremy M
Cc: Mattlin, Ellen M
Subject: RE: AY-102 IPT - questions

Thanks Jeremy...I appreciate your responses to my questions.

I guess I am just confused...as I last heard the exhausters went down over the 2/18 weekend. Did they get repair and start operating then? Was it the same or a different incident that caused them to cease operating again?

Thanks,
Michelle

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Wednesday, March 06, 2013 1:03 PM
To: Hendrickson, Michelle (ECY)

Cc: Mattlin, Ellen M
Subject: AY-102 IPT - questions

Michelle,

I will get you a response on the corrosion assessment, but here are answers for your other questions. I plan to send out the latest pictures from AY-102 riser 83 and current schedule tomorrow.

Jeremy

Question	Answer	Repairs needed	Estimated completion date
What is the status of the primary tank's exhauster? (If down why, how long has it been down, and when will it be repaired?)	Currently both primary exhausters have been done since 2/28/13.	CAM and record sampler cabinet were found wired incorrectly, e.g. safety issue.	3/8/13
What is the status of the annulus exhauster? (same as above)	With the exception of the short durations of operation in support of riser 83 videos, this fan has effectively been o/s since 2/19/13.	Rewiring of outlets feeding record sampler and CAM vacuum pumps is required.	4/5/13
Is there any back-up exhausters in use?	There are no backup exhausters available as the CAM and record sampler are single point failure for the primary fans in AY/AZ. There is no back up exhauster for 102-AY annulus fan.		
When was the last Visual Inspection conducted for AY-102?	2/27/13		
When is the next Visual Inspection scheduled for AY-102?	3/8/13		
What are the results of the baseline visual inspections for the other 6 older DSTs?	101-AY- no indication of leaks 101-AZ- no indication of leaks 102-AZ- engineering evaluation continuing 101-SY- engineering		102-AZ and 101-SY evaluations should complete by 3/15/13. Last 2 102-SY video's are scheduled for 3/7/13

	evaluation continuing 102-SY- 2 videos remain 103-SY- no indication of leaks		
What is the status of equipment procurement, fabrication, and construction for pumping of the supernatant and removal of the sludge?	ORP has not yet authorized expenditures on any equipment to remove sludge at this time. As stated in email, ORP(Fletcher) will be meeting with Ecology(Hedges) prior to asking for a WRPS contract proposal. The contract for the design/fabrication of the rigid jumpers for 02A has not been let yet. Further examination of the NQA-1 program for the low bidder had to occur. The rigid jumpers for 02A are designed to allow pumping of 102-AY annulus into primary simultaneous with the capability to pump supernate out of the primary if required.		Contract to be let the week of 3/11/13. Current installation schedule has slipped a month into July.

Johnson, Jeremy M

From: Hendrickson, Michelle (ECY) <MICH461@ecy.wa.gov>
Sent: Thursday, March 07, 2013 10:06 AM
To: Johnson, Jeremy M
Subject: RE: AY-102 IPT - questions

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I am assuming WRPS is monitoring the temperature to ensure we stay within "safe" levels.

Michelle

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To: Hendrickson, Michelle (ECY)
Subject: RE: AY-102 IPT - questions

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Jeremy

From: Hendrickson, Michelle (ECY) [mailto:MICH461@ecy.wa.gov]
Sent: Wednesday, March 06, 2013 2:30 PM
To: Johnson, Jeremy M
Cc: Mattlin, Ellen M
Subject: RE: AY-102 IPT - questions

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I guess I am just confused...as I last heard the exhausters went down over the 2/18 weekend. Did they get repair and start operating then? Was it the same or a different incident that caused them to cease operating again?

Thanks,
Michelle

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Wednesday, March 06, 2013 1:03 PM
To: Hendrickson, Michelle (ECY)
Cc: Mattlin, Ellen M
Subject: AY-102 IPT - questions

Michelle,

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Jeremy

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Is there any back-up exhausters in use?	There are no backup exhausters available as the CAM and record sampler are single point failure for the primary fans in AY/AZ. There is no back up exhauster for 102-AY annulus fan.		
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When is the next Visual Inspection scheduled for AY-102?	3/8/13		
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What is the status of equipment procurement, fabrication, and	ORP has not yet authorized expenditures on any equipment to remove sludge		Contract to be let the week of 3/11/13. Current installation schedule has

construction for pumping of the supernatant and removal of the sludge?	at this time. As stated in email, ORP(Fletcher) will be meeting with Ecology(Hedges) prior to asking for a WRPS contract proposal. The contract for the design/fabrication of the rigid jumpers for 02A has not been let yet. Further examination of the NQA-1 program for the low bidder had to occur. The rigid jumpers for 02A are designed to allow pumping of 102-AY annulus into primary simultaneous with the capability to pump supernate out of the primary if required.		slipped a month into July.

Johnson, Jeremy M

From: Whalen, Cheryl (ECY) <CWHA461@ecy.wa.gov>
Sent: Wednesday, January 30, 2013 3:30 PM
To: Miskho, Anthony G; Lyon, Jeffery
Cc: Hendrickson, Michelle (Washington State Department of Ecology); Johnson, Jeremy M; Burandt, Mary E; Huffman, Lori A
Subject: RE: 102-AY regulatory subteam

We had agreed on Feb 7th for the IPT

Cheryl Whalen
Cleanup Section Manager
Washington State Department of Ecology
(509) 372-7972

From: Miskho, Anthony G [mailto:Anthony_G_Miskho@rl.gov]
Sent: Wednesday, January 30, 2013 3:30 PM
To: Whalen, Cheryl (ECY); Lyon, Jeffery (ECY)
Cc: Hendrickson, Michelle (ECY); Johnson, Jeremy M; Burandt, Mary E; Huffman, Lori A
Subject: RE: 102-AY regulatory subteam

I was under the impression we were a week ahead of the IPT, but Steve was not sure when I talked to him. Did I make a mistake?

From: Whalen, Cheryl (ECY) [mailto:CWHA461@ecy.wa.gov]
Sent: Wednesday, January 30, 2013 3:29 PM
To: Miskho, Anthony G; Lyon, Jeffery
Cc: Hendrickson, Michelle (Washington State Department of Ecology); Johnson, Jeremy M; Burandt, Mary E; Huffman, Lori A
Subject: RE: 102-AY regulatory subteam

Is this in place of the IPT?

Cheryl Whalen
Cleanup Section Manager
Washington State Department of Ecology
(509) 372-7972

-----Original Appointment-----
From: Lyon, Jeffery (ECY) **On Behalf Of** Miskho, Anthony G
Sent: Wednesday, January 30, 2013 3:27 PM
To: Whalen, Cheryl (ECY); Hendrickson, Michelle (ECY)
Subject: FW: 102-AY regulatory subteam
When: Thursday, February 07, 2013 1:00 PM-2:30 PM (UTC-08:00) Pacific Time (US & Canada).
Where: Ecology/ Room 3A

-----Original Appointment-----
From: Miskho, Anthony G [mailto:Anthony_G_Miskho@rl.gov]
Sent: Wednesday, January 30, 2013 3:25 PM
To: Miskho, Anthony G; Killoy, Steven E; Huffman, Lori A; Burandt, Mary E; Johnson, Jeremy M; Voogd, Jeffry A; Lyon, Jeffery (ECY)
Subject: 102-AY regulatory subteam
When: Thursday, February 07, 2013 1:00 PM-2:30 PM (UTC-08:00) Pacific Time (US & Canada).
Where: Ecology/ Room 3A

Meeting to discuss draft DOE letter to Ecology. DOE will email the draft to ECY ahead of the meeting.

Johnson, Jeremy M

From: Hendrickson, Michelle (ECY) <MICH461@ecy.wa.gov>
Sent: Wednesday, January 16, 2013 1:02 PM
To: Lyon, Jeffery; Johnson, Jeremy M; Whalen, Cheryl (ECY); Alzheimer, James (ECY); Mathey, Jared W. (ECY); Wold, Kristi (Washington State Department of Ecology); Barnes, Michael (ECY)
Cc: Washenfelder, Dennis J; Boomer, Kayle D; Venetz, Theodore J; Rosenkrance, Chelsea L
Subject: DST EPOC call this AM
Attachments: RPP-RPT-54099-00.pdf

All~

This morning there was a DST Expert Panel On Corrosion (EPOC) conference call. Below are my notes:

- WRPS asked the EPOC to make a recommendation on how often to remove corrosion probes and coupons. WRPS suggested removing them for inspection and measurement of thicknesses every 6 to 12 years, rather than every 3 years as they do now, due to ALARA in the field and the lab. I have not checked to see what our corrosion regulatory measurement requirements are, what our current Corrosion SAPs and DQOs state, and if there are any SST/DST TPA Milestone requirements or Permitting requirements that would require updating as a result. It was noted that the potential measurements could still be taken in the field to continue to provide some data for the probes and coupons should they be left in place longer. It was also noted that these coupons and probes experience mineralization (Which may or may not) impact their functionality within the tanks. I cautioned that this reduction in data collection frequency could impact the IQRPE's ability to certify the DSTs as "fit for use".
- Chelsea has written an AY-102 report on waste analyticals. I have requested this report and received the report. It is attached. The abstract of the report states...

"Waste has leaked from the primary tank into the annulus of Tank 241-AY-102. The propensity for corrosion of this waste was evaluated to determine if it is corrosive enough and must be promptly removed or if it is benign and may remain in the annulus. Uncertainties in the waste composition, the temperature and the character of the steel complicate the corrosion assessment. It was concluded that the available analytical data and the information about the temperature of the waste in contact with the secondary liner are not sufficient to determine the corrosion threat to the secondary linter with a desired degree of confidence. Recommendations for further testing and analytical data were developed in collaboration with the Expert Panel Oversight Committee."

The recommendations of the report were:

The following recommendations were developed in collaboration with the Expert Panel Oversight Committee, who reviewed the information about the present status of Tank AY-102. It was concluded that the available analytical data and the information about the temperature of the waste in contact with the secondary liner are not sufficient to determine the corrosion threat to the secondary liner with the desired degree of confidence. Consequently, the length of time that the waste may remain in the annulus is inclusive.

The initial recommendations are that Washington River Protection Solutions:

- Initiate efforts to obtain accurate temperature information regarding the temperature in the refractory and regarding the temperature of the wastes in the annular space in contact with the secondary liner.

- Initiate efforts to obtain analytical samples of the leaked waste sufficient to perform the conventional suite of analyses including the water content and the pH as well as the conventional group of anions and metal analytes.

- Assess the compositions of the liquids that form during the evaporation of water from leaked waste and the introduction of carbon dioxide into leaked waste. Experience suggests that this information can be obtained by thermodynamic calculations for the compositions shown in the table below.

Suggested Compositions for Tank AY-102 Waste Calculations

Case	Composition
1	Supernatant
2	Interstitial Liquid
3	50% Supernatant + 50% Interstitial Liquid
4	25% Supernatant + 75% Interstitial Liquid
5	75% Supernatant + 25% Interstitial Liquid

The supernatant and interstitial liquid compositions will be derived from the 2012 Best-Basis Inventory

- Perform slow-strain rate tests to evaluate the propensity for stress corrosion cracking and perform cyclic-potentiodynamic polarization tests to evaluate the propensity for pitting for selected compositions at the limiting high temperature. The tests should be carried out with as received, non-stress-relieved steels that are representative of the steel in the secondary liner of Tank AY-102.

- Investigate the chemical reactions between the waste and the refractory with special emphasis on the assessment of the concentrations of the aggressive ion and the inhibitors.

These tests will indicate whether plausible compositions of the leaked waste are a threat for the pitting or cracking of as-received, non-stress-relieved steel at the temperature of the secondary liner. If corrosion is not observed in these tests, other carefully designed tests may be necessary to determine if the same compositions pose a threat to the liner because of the difficulties, such as low quality welds, that were encountered during construction.

- Also a temperature reading should be taken from AY-102 tomorrow.
- The EPOC then discussed the discrepancy on pH values. Basically, a value of 10.5 for simulant was reported and the other values were steady at 10. It was decided that all 3 labs (SRS, 222-S, and DNV) would mix the simulant solution and report their pH values.
- FOR the SST IP – the progress on testing "Aggressive Layers" was discussed. Most of the work has been completed at 222-S for analysis in coupons of different simulants representing the aggressive layers. Data will be evaluated and a report generated in Jan/Feb.
- Discussion was conducted about the type of steel that would be used to simulate or represent the carbon steel secondary liner (annulus base plate/floor) for the testing suggested by the report above. An EPOC member noted that the type of steel and it's complete thermal history (manufacturing and operational histories both) were very important. Increased temperature enhances corrosion rates by speeding up chemical reactions. The presences and variability of grain sizes, crystal structure, inclusions and other abnormalities also impact corrosion mechanisms and rates. The best steel to test would be that of the annulus its self. However, a substitute will be decided upon.
- Many of our EPOC Members and WRPS folks will be attending the NACE 2013 Conference, in Orlando this June. They will be meeting to discuss DST EPOC issues on June 6th and 7th there.
- The next conference call is next week.

Johnson, Jeremy M

From: Johnson, Jeremy M
Sent: Monday, January 07, 2013 1:06 PM
To: Lyon, Jeffery
Subject: RE: AY-102 HAB TWC Presentation and Recommendations Paper

Looks fine to me. Are you good with the draft SST Integrity change package? I was going to call last week but I couldn't find your number in the site directory any more.

Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

From: Lyon, Jeffery (ECY) [mailto:JLYO461@ecy.wa.gov]
Sent: Monday, January 07, 2013 12:32 PM
To: Johnson, Jeremy M; Whalen, Cheryl (ECY); Hendrickson, Michelle (Washington State Department of Ecology); Dahl-crumpler, Suzanne L; Wheeler, Isabelle; Irby, Dennis H; Burandt, Mary E
Subject: RE: AY-102 HAB TWC Presentation and Recommendations Paper

For the TWC meeting I copied the statements/questions that were poised by the committee for AY-102

1. Update on video inspections and what has been learned to date (e.g. has the level in Tank AY-102 fluctuated and what does that mean about a possible leak in the tank or the ability to monitor for a leak in the tank?).
    - Jeremy presentation is serving this well. USDOE detected a very small leak before it even go to the leak detection probe. We have increased the frequency and will do at least a 95% view of the annulus floor

2. What are the lessons learned from this tank? Based on what DOE knows about Tank AY-102, what do is suspected about the other six tanks of similar age and their potential for failure (and potentially how soon)?
    - I think Jeremy will do fine on this too. The IPT is brief on USDOE review of the other tank data, including history of chemistry, temperature, and use.

3. How is uncertainty communicated (e.g. to the public)? How does DOE and Ecology plan in the face of uncertainty?
    - I did not understand this and ask for clarification on this question. I think they are talking about the tank integrity uncertainty, but want to make sure. Jeremy may want to expand on this if it is integrity since this was part of the IPT recimmendations

4. Does DOE plan to pump this tank and when will they do so? Does DOE have the tank capacity to pump the tank? What does this mean for retrievals?
    - We have had numerous discussion about this issue and I have expressed my concerns. I expect that the IPT will spend some time considering the concerns that WRPS has regarding WTP feed, methods of retrievals, and what removal actions are the minimum. However Ecology has clearly stated we expect them to pump the entire contents. How and when will be solidified sometime soon (in a few months).

- To date WRPS cannot provide their estimate for time or method to remove the waste sufficiently.
- I expect USDOE to begin pumping within the year (2013), and to finish before 2016. What that means as far as final state of AY-102, will be determined by the IPT.

5. Are there any other options besides pumping that are being considered? Is Ecology considering using its discretionary authority?
   - No. The only discretion regarding our authority will be consideration of the timing for pumping the sludge and supernatant, and this is a consideration the regulations allow; I expect the IPT to consider the following: what is adequate for a leak response versus what is necessary to complete closure (remove 100% of the waste). These are matters that are being presented to the IPT by WRPS and Ecology expects those issues to be presented within the next month or 2.

Does this look OK Jeremy?

Thanks

From: Lyon, Jeffery (ECY)
Sent: Monday, January 07, 2013 11:00 AM
To: 'Johnson, Jeremy M'; Whalen, Cheryl (ECY); Hendrickson, Michelle (ECY); Dahl, Suzanne (ECY); Wheeler, Isabelle; Irby, Dennis H; Burandt, Mary E
Subject: RE: AY-102 HAB TWC Presentation and Recommendations Paper

I like your presentation, it is brief and pretty clear. Here are my suggestions:

Slide 3 "slow changes" – should you indicate if the changes are "drying" and no new liquids suspected, or there are suspected "additional liquids" being observed?

Slide 4 "Expect to complete spring 2013", this is all 6 right?

Slide 5 "Procedures developed (if equipment is deployed they would require final approvals)" – so this slide seems to be saying that you have plans for both the Annulus and the Primary tank. That seems consistent with what I expect. However the statement that you made about procedures does not clarify your intent. Does USDOE plan to deploy? I had assumed that you were planning to deploy. I would suggest that you add a bullet that follows bullet 2 stating your intent or your plans, including timing.

Slide 6, bullet 2, you may want to indicate that this isn't very quickly, since WRPS and USDOE has not even narrowed down what decade they intent complete the initial deployment or pumping.

I plan to clarify Ecology expectations for this meeting. I will send a separate e-mail for that.

Thanks,

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Monday, January 07, 2013 9:47 AM
To: Lyon, Jeffery (ECY); Whalen, Cheryl (ECY); Hendrickson, Michelle (ECY); Dahl, Suzanne (ECY); Wheeler, Isabelle; Irby, Dennis H; Burandt, Mary E
Subject: AY-102 HAB TWC Presentation and Recommendations Paper

All,

Attached is a presentation I have put together for an update to the HAB Tank Waste Committee on the 9th as well as a paper describing our recommendations we have developed. Please provide me any feedback on the presentation by noon tomorrow as well as any major input on the recommendations paper. I plan to discuss the paper at the next IPT meeting on the 17th but if I'm way off base on anything in it I would like to know before I present to the TWC.

Thanks,

Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

Johnson, Jeremy M

From: Hendrickson, Michelle (ECY) <MICH461@ecy.wa.gov>
Sent: Wednesday, November 28, 2012 11:30 PM
To: Johnson, Jeremy M; Washenfelder, Dennis J
Subject: FW: DST Expert Panel for Integrity topics of concern

Gentlemen~

These are the questions I have and am hoping you asked the same or similar questions for the EPOC and structural guys to consider. Please if you would let me know.

Thanks Jeremy for the call in info.

Thanks,
Michelle

PS: I'm not sure if Cheryl got any additional feedback from others in our office. If so, I was not copied.

From: Hendrickson, Michelle (ECY)
Sent: Tuesday, November 20, 2012 4:17 PM
To: Whalen, Cheryl (ECY) (CWHA461@ECY.WA.GOV)
Cc: Wold, Kristi (ECY); Lyon, Jeffery (ECY); Alzheimer, James (ECY); Barnes, Michael (ECY)
Subject: DST Expert Panel for Integrity topics of concern

Cheryl~

Per your request, below is a listing of discussion by the Expert Panel that I would like to be a part of. Kristi, Mike, Jeff, or Jim may have other thoughts/ideas and requests.

Thanks,
Michelle

EPOC Discussions:

- Nature of the Waste and its interaction with the annulus
- Chemical corrosion/stress cracking parameters and comparison to the nature of the waste in the annulus
- Possible chemical reactions that the waste in the annulus may undergo due to humidity, concrete, kaolite, etc.
- Results of coupon testing in AY-102 and other DSTs
- Discussion of testing of the actual waste vs. simulate for coupons, corrosion rates, etc.
- Possible leak rate calculations
- Chemicals to add to AY-102 to reduce the leak rate
- Chemicals to add to the supernatant and interstitial liquids to reduce the aggressive layers present
- Chemicals to add to the sludge and mixing/delivery methods to reduce the aggressive layers present
- The presence of other potentially aggressive layers in the other 6 tanks that may cause or enhance corrosion rates
- Calculation of corrosion rates for the other 6 tanks
- Discussion on coupon samples from the other 6 tanks
- Crystalline material found in the haunch region, what it is and what damage it may cause
- Stabilization/repair methods for the primary tank's liner
- Migration of the waste out of the annulus into the environment

Structural Discussions:

- Updated AOR calculations for the primary tank base plate, refractory pedestal, and secondary tank bottom due to the leak in AY-102
- Updated knuckle AOR calculations for the primary and secondary tanks due to the leak in AY-102
- Stabilization/repair methods for the steel and concrete to prevent further damage from contact with the waste material
- Are we still "sound" in the event of an earthquake due to the leak at AY-102

Johnson, Jeremy M

From: Johnson, Jeremy M
Sent: Wednesday, November 21, 2012 7:58 AM
To: 'Schmidt, John W (DOH)'
Subject: RE: AY-102 IPT

No, next Wednesday. Contractors are off today and we leave at noon. Have a great Thanksgiving.

Jeremy

From: Schmidt, John W (DOH) [mailto:John.Schmidt@doh.wa.gov]
Sent: Wednesday, November 21, 2012 7:52 AM
To: Johnson, Jeremy M
Cc: Martell, John
Subject: RE: AY-102 IPT

Are we meeting today?

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Tue 11/13/2012 2:41 PM
To: Whalen, Cheryl (ECY); Steiling, Jeri L; CR - 2440STVCN/2212A/RCHN; Fletcher, Thomas W; Clark, Wyatt C; Burandt, Mary E; Irby, Dennis H; Wheeler, Isabelle; Killoy, Steven E; Little, David B; Gregory, Robert E (Rob); Scott, Delmer; Hedges, Jane (ECY); Dahl, Suzanne (ECY); Lyon, Jeffery (ECY); Hendrickson, Michelle (ECY); Martell, P John (DOH); Schmidt, John W (DOH); Lyon, Jeffery (ECY); Hart, Patricia M (Patti)
Subject: RE: AY-102 IPT

Let's start at 1:00 and I will update the agenda, that will be in your individual binders by COB today to reflect a 1:00-4:00 duration. The binders will be in my office 2440/2461 until I find a better spot. The draft IPT Charter will also be in your binder so please remember to have comments to me COB tomorrow.

From: Whalen, Cheryl (ECY) [mailto:CWHA461@ecy.wa.gov]
Sent: Tuesday, November 13, 2012 2:19 PM
To: Steiling, Jeri L; CR - 2440STVCN/2212A/RCHN; Fletcher, Thomas W; Clark, Wyatt C; Johnson, Jeremy M; Burandt, Mary E; Irby, Dennis H; Wheeler, Isabelle; Killoy, Steven E; Little, David B; Gregory, Robert E (Rob); Scott, Delmer; Hedges, Jane; Dahl-crumpler, Suzanne L; Lyon, Jeffery; Hendrickson, Michelle (Washington State Department of Ecology); Martell, John; Schmidt, John; Lyon, Jeffery; Hart, Patricia M (Patti)
Subject: RE: AY-102 IPT

Ecology is having our Thanksgiving dinner between 12 and 1. Would you mind starting at 1 or 1:30?

Cheryl Whalen
Cleanup Section Manager
Washington State Department of Ecology
(509) 372-7972

-----Original Appointment-----
From: Steiling, Jeri L
Sent: Tuesday, November 13, 2012 1:02 PM
To: Steiling, Jeri L; CR - 2440STVCN/2212A/RCHN; Fletcher, Thomas W; Clark, Wyatt C; Johnson, Jeremy M; Burandt,

Mary E; Irby, Dennis H; Wheeler, Isabelle; Killoy, Steven E; Little, David B; Gregory, Robert E (Rob); Scott, Delmer; Hedges, Jane (ECY); Whalen, Cheryl (ECY); Dahl, Suzanne (ECY); Lyon, Jeffery (ECY); Hendrickson, Michelle (ECY); Martell, P John (DOH); Schmidt, John W (DOH); Lyon, Jeffery (ECY); Hart, Patricia M (Patti)
Subject: AY-102 IPT
When: Thursday, November 15, 2012 12:00 PM-4:00 PM (UTC-08:00) Pacific Time (US & Canada).
Where: CR - 2440STVCN/2212A/RCHN

Johnson, Jeremy M

From: Hendrickson, Michelle (ECY) <MICH461@ecy.wa.gov>
Sent: Monday, November 05, 2012 2:13 PM
To: Nguyen, Duc M
Cc: Johnson, Jeremy M
Subject: RE: Sampling efforts at AY-102

Thanks Duc and Jeremy. It would be good to know what the depth of the tread on the tire imprint would/could be.

If you haven't already, would you pass that question along too?

Thanks,
Michelle

From: Nguyen, Duc M [Duc_M_Nguyen@rl.gov]
Sent: Monday, November 05, 2012 2:02 PM
To: Hendrickson, Michelle (ECY)
Cc: Johnson, Jeremy M
Subject: RE: Sampling efforts at AY-102

Michelle,

Only roughly. I've asked the sampling component to either look it up in the drawings or take a measurement of the width of the tires. Will get an answer to you shortly.

Thanks,
Duc M. Nguyen
Washington River Protection Solutions LLC
Contractor to the United States Department of Energy
(509) 372-3042

From: Hendrickson, Michelle (ECY) [mailto:MICH461@ecy.wa.gov]
Sent: Friday, November 02, 2012 2:59 PM
To: Johnson, Jeremy M; Nguyen, Duc M
Subject: RE: Sampling efforts at AY-102

Jeremy/Duc

Do you know the tread size of of the off-riser sampler/crawler that collected the sample near Riser 83?

Thanks,
Michelle

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Friday, November 02, 2012 1:56 PM
To: Hendrickson, Michelle (ECY); Nguyen, Duc M
Subject: RE: Sampling efforts at AY-102

Michelle,

We have obtained and analyzed material from below riser 83 with the off-riser sampler and below riser 90 with the crawler fabricated at AREVA. I don't believe we have any more sampling planned in the near term. We are in the process of removing the crawlers from the annulus.

Feel free to give me a call if you need anything else.

Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

Jeremy

From: Hendrickson, Michelle (ECY) [mailto:MICH461@ecy.wa.gov]
Sent: Friday, November 02, 2012 1:48 PM
To: Nguyen, Duc M; Johnson, Jeremy M
Subject: Sampling efforts at AY-102

Duc/Jeremy~

Quick question. How many sampling efforts have been conducted at AY-102 thus far? How many more are planned in the near term.

Thanks,
Michelle

Johnson, Jeremy M

From: Voogd, Jeffry A
Sent: Wednesday, October 24, 2012 5:14 AM
To: Lyon, Jeffery
Cc: Sams, Terry L; Trenchard, Glyn D; Grindstaff, Joanne F; Peloquin, Michael G; Killoy, Steven E; Johnson, Jeremy M; Fletcher, Thomas W; Huffman, Lori A
Subject: RE: TOC-ENV-NOT-2012-0110, Operational Notification 241-AY-102 Leak Determination

Jeff L.,

The Ecology discussions for the path forward on AY-102 are being managed through ORP, Tom Fletcher's office. Due to the significant programmatic impacts of this event I will defer to ORP for discussions on AY-102.

Jeff V.

From: Lyon, Jeffery (ECY) [mailto:JLYO461@ecy.wa.gov]
Sent: Tuesday, October 23, 2012 9:39 AM
To: Voogd, Jeffry A; Johnson, Jeremy M
Cc: Sams, Terry L; Strasser, David W; Britton, John C; Miera, Felix R Jr; Trenchard, Glyn D; Grindstaff, Joanne F; Fox, Randal E; Peloquin, Michael G; Killoy, Steven E; Luke, Jeffrey J
Subject: Re: TOC-ENV-NOT-2012-0110, Operational Notification 241-AY-102 Leak Determination

I have not reviewed the attachment.

Please plan a briefing next week to present your detailed schedule for removing waste from AY-102.

Additionally we have a related request to delay a HIHTL removal until February, due to Retrieval pump replacements and AY-102 response.

We will expect a recovery plan as necessary to ensure USDOE will meet all TPA and CD requirements for tank farm operations.

If you do not have a detail schedule by our briefing next week, we expect a status report and delivery date for the detailed schedule and all impacts to your other obligations..

As I understand you do have requirements to pump tank AY-102. If you are planning any other proposals you can provide those details at our briefing.

Regardless, Ecology expects AY-102 to undergo immediate retrieval. And USDOE must provide the required emergency pumping space to offset this lose.

You can contact Daina Mcfadden to schedule the briefing.

Thanks

From: Voogd, Jeffry A [mailto:Jeffry_A_Voogd@rl.gov]
Sent: Monday, October 22, 2012 04:06 PM
To: DL - WRPS-NOT-ECY <DLWRPSNOTECO@rl.gov>; DL - WRPS-NOT-WDOH <DLWRPSNOTWDOH@rl.gov>; DL - WRPS-NOT-ORP <DLWRPSNOTORP@rl.gov>; DL - WRPS-NOT-MGMT <DLWRPSNOTMGMT@rl.gov>
Cc: Sams, Terry L <Terry_L_Sams@rl.gov>; Strasser, David W <David_W_Strasser@rl.gov>; Britton, John C <John_C_Britton@rl.gov>; Miera, Felix R Jr <Felix_R_Jr_Miera@rl.gov>
Subject: TOC-ENV-NOT-2012-0110, Operational Notification 241-AY-102 Leak Determination

The Department of Energy's Office of River Protection (ORP), working with its Hanford tank operations contractor Washington River Protection Solutions, has determined that there is a slow leak of chemical and radioactive waste into the annulus space in Tank AY-102, the approximately 30-inch area between the inner primary tank and the outer tank that serves as the secondary containment for these types of tanks. Attached is an Operational Notification and news release associated with the determination.

Should you have questions feel free to call.

Jeff Voogd
373-4101

Johnson, Jeremy M

From: Johnson, Jeremy M
Sent: Thursday, September 27, 2012 7:44 AM
To: 'Hendrickson, Michelle (ECY)'; Lyon, Jeffery
Subject: RE: Updated AY Farm Integrity Report

Michelle/Jeff,

I have some pictures from the riser 83 video of AY-102 (second material location found in annulus) as well as the video from riser 90 (first observed material, where the mound is) I will bring by this morning. I would ask that you please not actively distribute the video but I will leave you a copy. Crews did get a small sample last night of the material in the photos under riser 83 but the sampler had an issue with the sample scoop so it's being repaired and will be deployed again to get more material as soon as it's fixed. Duc is working Mike Barnes to set up a meeting to go over the DQO/SAP.

Jeremy

From: Hendrickson, Michelle (ECY) [mailto:MICH461@ecy.wa.gov]
Sent: Wednesday, September 26, 2012 10:48 AM
To: Johnson, Jeremy M
Cc: Lyon, Jeffery; Whalen, Cheryl (ECY)
Subject: RE: Updated AY Farm Integrity Report

It would be good if we could have it. We've been asking since August for it and no one has brought it over...Nor provided any updates on the other photos, or the photos, or any sampling efforts or discussions regarding the DQO/SAP.

I know you have been out, and really this is not a reflection of that...many others at ORP and WRPS could have completed these tasks...but haven't. We are beginning to wonder why no one really wants to speak with us regarding AY-102.

Michelle

PS. I compiled a presentation and gave it to the Tribes and Oregon last week. I would be happy to share the information if you would like to see it. It is over 8 MG with all of the figures and photos.

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@rl.gov]
Sent: Wednesday, September 26, 2012 7:47 AM
To: Hendrickson, Michelle (ECY)
Subject: RE: Updated AY Farm Integrity Report

Not sure if I will make the WFD meeting yet or not but no rush on the minutes, thanks for the quick turnaround. No link to video, I take it we never set up a mtg. to bring it over and narrate. I have a copy of the video of the first location material was observed. I would be happy to bring over any time. I will say though the still pictures don't make you dizzy like the video will.

From: Hendrickson, Michelle (ECY) [mailto:MICH461@ecy.wa.gov]
Sent: Tuesday, September 25, 2012 5:33 PM
To: Johnson, Jeremy M
Subject: RE: Updated AY Farm Integrity Report

Thanks for the note Jeremy...is there a link to the video?

Also, Jeff signed the meeting minutes for the first HIHTL meeting. They are at my desk. I will be back in tomorrow shortly after 9 AM. Are you coming to the WFD meeting Thursday? If so, you could pick up the minutes then...or I can deliver them sometime.

Michelle

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@rl.gov]
Sent: Tuesday, September 25, 2012 12:26 PM
To: Hendrickson, Michelle (ECY)
Subject: Updated AY Farm Integrity Report

Michelle,

The farm integrity report for AY has been updated with recent photos from AY-102, RPP-RPT-34311, Rev. 1. It's too large to attach but thought you may be interested in seeing it if you can get it through IDMS.

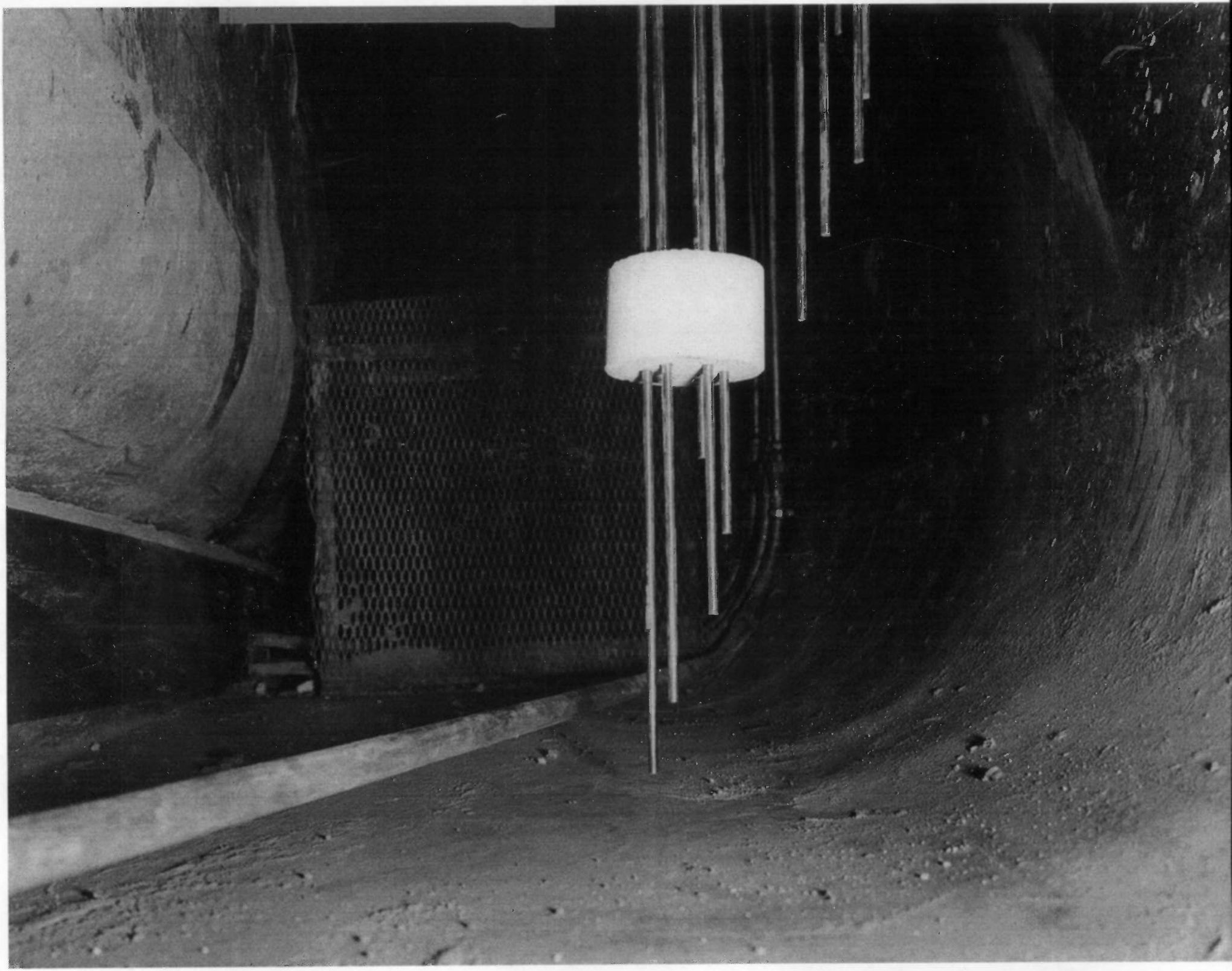
Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

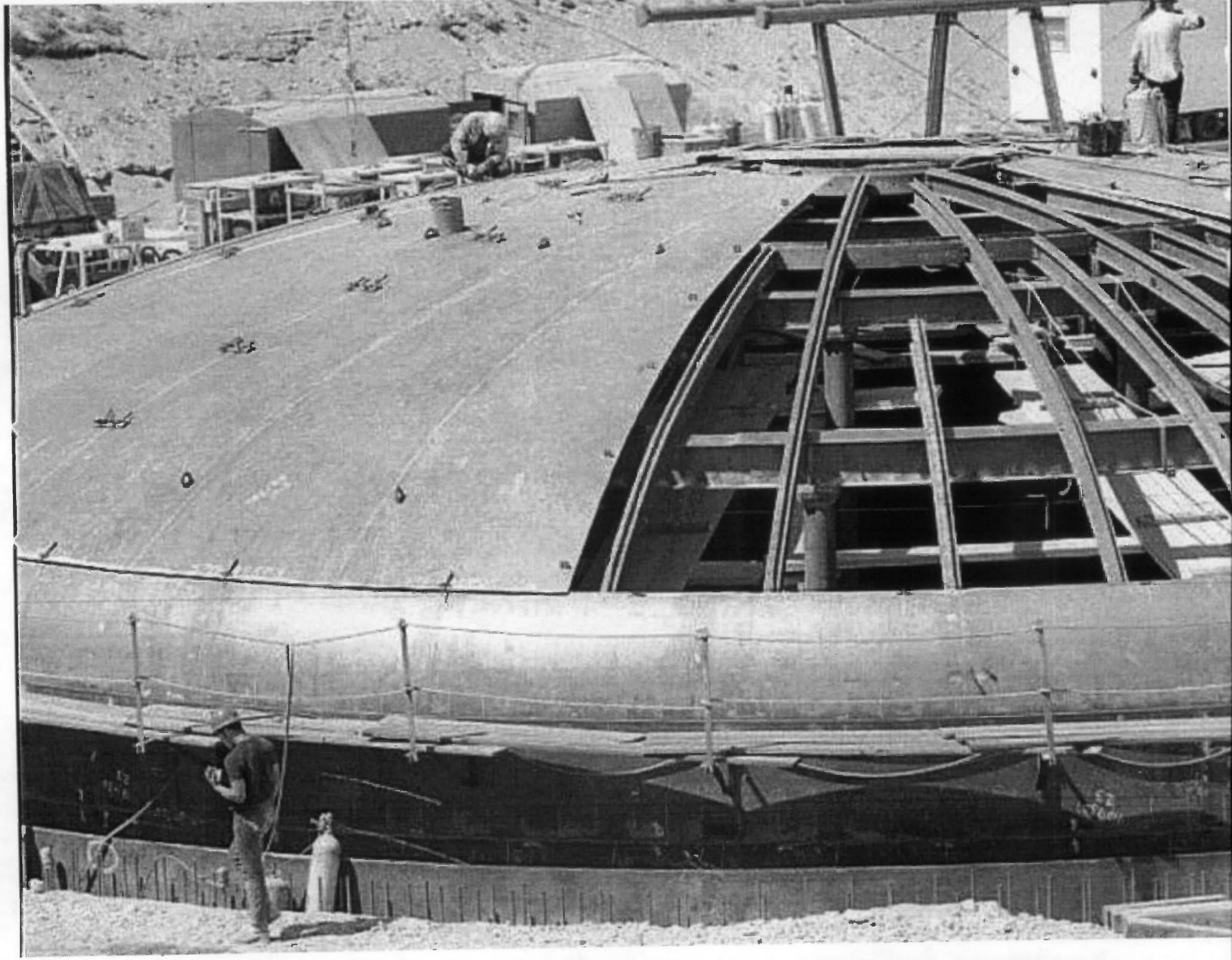
Hildman, Cynthia M

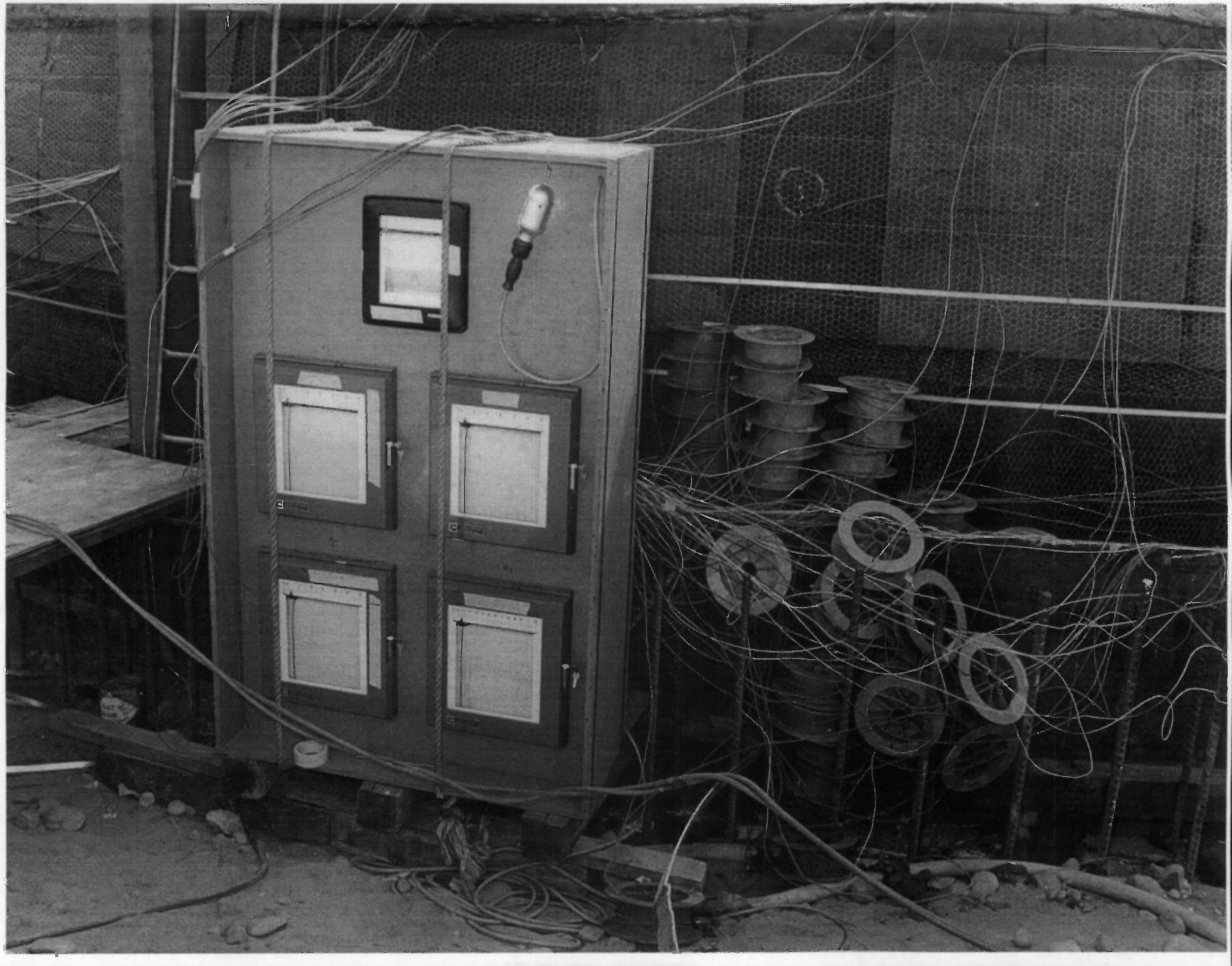
From: Dunning, Dirk A <dirk.a.dunning@state.or.us>
Sent: Friday, September 14, 2012 2:09 PM
To: Dunning, Dirk A; Gamache, Lori M; Fletcher, Thomas W
Subject: Yet more AY-102 construction photo's
Attachments: IAP-614, PUREX TANK FARM EXPANSION, 200-E AREA- TANK 101- CLEARANCE OF LEAK DETECTOR PROBE TIPS 71861.jpg; IAP-614, PUREX TANK FARM EXPANSION, 200-E AREA-EXTENSION OF NOZZLES ON DOME 71793.jpg; IAP-614, PUREX TANK FARM EXPANSION, 200-E AREA-OVERALL VIEW - TANK 102 71772.jpg; SOUTH TANK 241-AY FARM 9229.jpg; IAP-614, PUREX TANK FARM EXPANSION, 200-EAST AREA - THERMOCOUPLE INSTALLATION FOR HEAT TREATMENT OF TANK 102, LOOKING SOUTHEAST 71752.jpg; CONSTRUCTION OF A TANK FARM - LAYING OF TANK FOUNDATIONS 30084.jpg; IAP-614, PUREX TANK FARM EXPANSION, 200-E AREA-TANK 101 AIR SUPPLY PIPE 71864.jpg; IAP-614, PUREX TANK FARM EXPANSION, 200-E AREA- TANK 101 CONNECTORS 71866.jpg

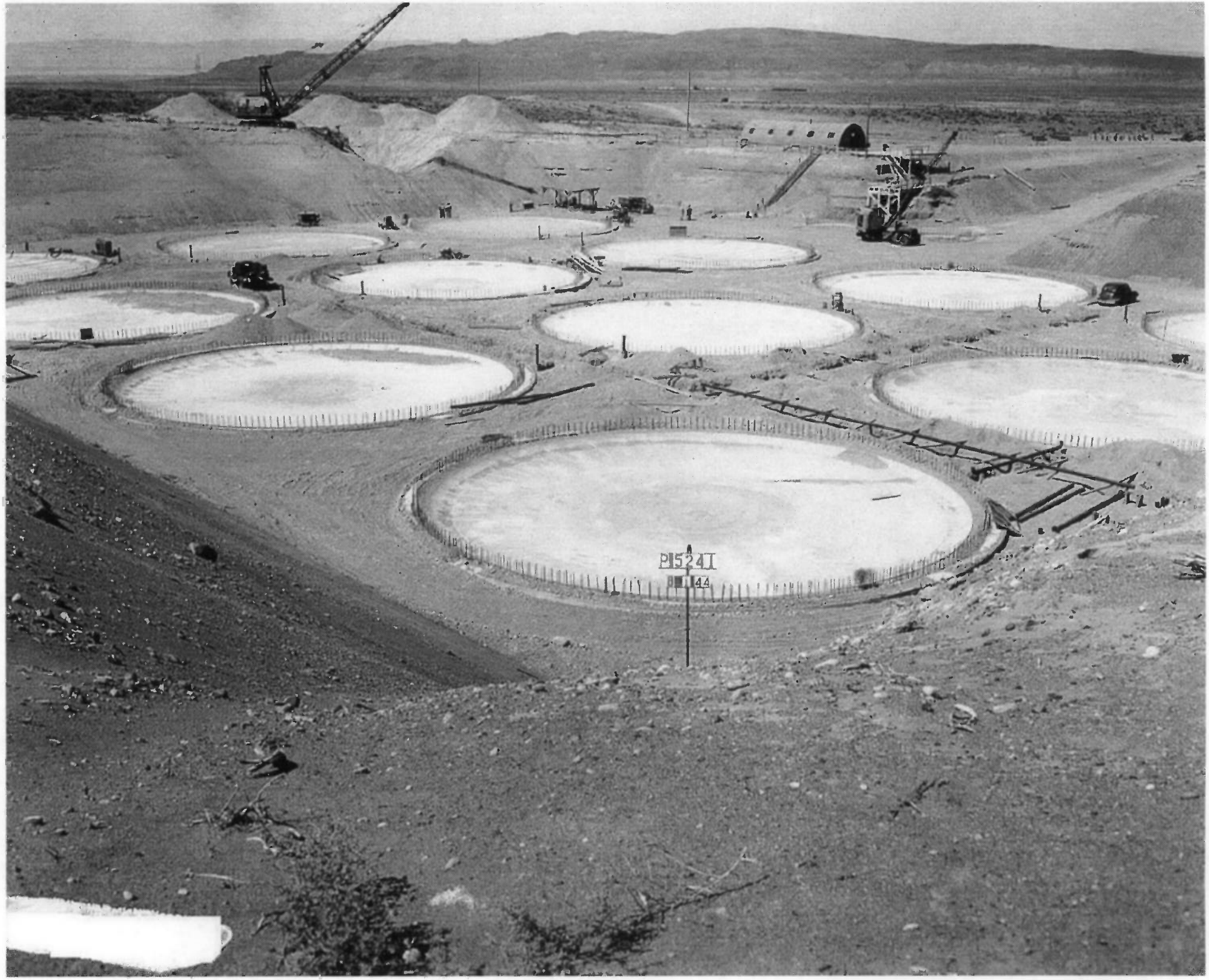
And just a few more showing the banding strap, the thermocouple setup etc... Apologies if I've duplicated a few.

Dirk








P1524I
144

Hildman, Cynthia M

From: Chittim, Gary <gchittim@king5.com>
Sent: Monday, September 17, 2012 9:31 AM
To: Gamache, Lori M
Subject: RE: Update on Tank AY-102 Material Discovery

Lori,
Thanks for the update. Do we know if the two pools of material discovered in the annulus are at roughly the same elevation on the tank?

Gary Chittim
King 5 News
(206) 604-0584

From: Gamache, Lori M [Lori_M_Gamache@rl.gov]
Sent: Wednesday, September 12, 2012 11:11 AM
To: Chittim, Gary
Subject: Update on Tank AY-102 Material Discovery

Hi Gary,

I thought you'd be interested in the latest information on tank AY-102 at Hanford (see below). We have completed visual inspections and no additional material was found.

Thanks,
Lori
****

Work continues at tank AY-102 to understand the source of the material found within the annulus and determine the appropriate next steps.

Visual inspections of the annulus through 10 risers are complete and provide video footage for approximately 95 percent of the annulus. As previously shared, material had been discovered near two risers. During the final visual inspections, no additional material was found. Crews are preparing to take samples of the material on the floor of the annulus later this month.

In addition, crews are preparing to move the camera for bi-weekly inspections to Riser 83, the location of the annulus where the last discovery of material was found. This work should be complete this week.

Liquid from the tertiary leak detection pit was sampled. Results show radioactivity at background levels, which is consistent with previous samples, indicating there are no leaks in the secondary containment.

Investigation activities will continue through September.

Hildman, Cynthia M

From: Mike Nartker <nartker@exchangemonitor.com>
Sent: Wednesday, September 26, 2012 12:08 PM
To: Gamache, Lori M
Subject: RE: AY-102 Status Briefing

Thanks!

From: Gamache, Lori M [mailto:Lori_M_Gamache@rl.gov]
Sent: Wednesday, September 26, 2012 3:06 PM
To: Mike Nartker
Subject: RE: AY-102 Status Briefing

Mike,

There has not been any changes to the level in the tank or leak detection pit. In regards to the other seven tanks – that will be included in the extent of condition. I am checking on the status of that for you and will let you know what I find out.

Thanks,
Lori

From: Mike Nartker [mailto:nartker@exchangemonitor.com]
Sent: Wednesday, September 26, 2012 7:11 AM
To: Gamache, Lori M
Subject: RE: AY-102 Status Briefing

Thanks Lori. Has there been any recent sign of changes in the waste level in the tank or of material in the leak detection pit? Where do things stand with the extent of condition analysis? Has DOE begun visual inspections at any of the other seven tanks that were seen as potential candidates for this type of occurrence?

Best,
Mike

From: Gamache, Lori M [mailto:Lori_M_Gamache@rl.gov]
Sent: Tuesday, September 25, 2012 5:14 PM
To: Mike Nartker
Subject: RE: AY-102 Status Briefing

Additional mockups were completed to ensure risks to the workers are minimized and we can take a sample to complete a comprehensive analysis.

From: Mike Nartker [mailto:nartker@exchangemonitor.com]
Sent: Tuesday, September 25, 2012 10:46 AM
To: Gamache, Lori M
Subject: RE: AY-102 Status Briefing

Thanks. Can DOE then provide more info as to why it needs additional time from what was previously planned? It sounds like there was a small delay in getting the samples.

Mike

From: Gamache, Lori M [mailto:Lori_M_Gamache@rl.gov]
Sent: Tuesday, September 25, 2012 1:45 PM
To: Mike Nartker
Subject: RE: AY-102 Status Briefing

Hi Mike,

I hope you had a good weekend, too. We are taking the sample through one of the risers this week and then taking the sample through the other riser next week. We won't have the results until we complete the analysis.

It sounds like it might be mid-October before we know more.

Thanks,
Lori

From: Mike Nartker [mailto:nartker@exchangemonitor.com]
Sent: Tuesday, September 25, 2012 10:14 AM
To: Gamache, Lori M
Subject: RE: AY-102 Status Briefing

Hi Lori,

Hope you had a nice weekend. I wanted to check in with you about the status of the AY-102 material sampling results. Are those going to be known this week, or will DOE need more time? Thanks for your help.

Mike

From: Gamache, Lori M [mailto:Lori_M_Gamache@rl.gov]
Sent: Friday, September 07, 2012 1:44 PM
To: Mike Nartker
Subject: AY-102 Status Briefing

Hi Mike,

As we discussed earlier this week, attached is the briefing Tom Fletcher gave to the HAB this morning. We do have updated information on the third slide – risers 90, 88, 91, 83, 89, and 87 have been inspected, to date. Video from risers 88, 91, 89, and 87 show no material in the annulus. As you know, we did find the material near risers 90 (initial find) and 83 (which you and I discussed late last week).

Please reply to let me know you got this – I know you don't always get my emails.

Thanks,
Lori

Lori Gamache
Public Affairs Specialist
U.S. Department of Energy
(509) 372-9130

Hildman, Cynthia M

From: Niles, Ken <ken.niles@state.or.us>
Sent: Thursday, October 11, 2012 2:06 PM
To: Gamache, Lori M
Subject: Re: Update on Tank AY-102 Status

Thanks

Sent from my iPhone

On Oct 11, 2012, at 3:03 PM, "Gamache, Lori M" <Lori_M_Gamache@rl.gov> wrote:

Ken and Dirk

Below is a message that was sent out to our employees today on the status of AY-102.

Thanks,
Lori

From: ^ORP Office of Communications
Sent: Thursday, October 11, 2012 1:56 PM
Subject: Update on Tank AY-102 Status

ANNOUNCEMENT

Department of Energy	ORP No. 12-102
Office of River Protection	
P.O. Box 450	
Richland, Washington 99352	Issued: 10/11/12

To: All ORP Employees
Subject: Update on Tank AY-102 Status

Preliminary test results from samples taken from material found within the annulus of double-shell tank AY-102 indicate that the material is largely consistent with the type of material found in that tank. However, the result of our investigation into the material in the annulus of AY-102 will not be complete until sampling and laboratory analysis of the remaining material in the annulus are also completed.

The material was discovered in August during regular video surveillance of the annulus of tank AY-102. Since then video inspections of the annulus through all 10 risers has been completed, with material discovered near two of the risers (Risers 83 and 90). The annulus is the air space

between the inner steel wall of the tank and the outer steel shell. The outer shell is covered with steel-reinforced concrete and the tank is buried underground.

It is important to remember that the material within the annulus is stable, no material has been found outside of the annulus, and there is no indication of radioactive contamination in the leak detection pit outside this double-shell tank. We have been performing visual inspections of the material located near Riser 83 twice a week and have seen no changes. We will continue to perform these bi-weekly inspections at AY-102. Monitoring activities at other double-shell tanks continues.

Additional laboratory test results will be evaluated by a Washington River Protection Solutions (WRPS) technical panel. A final decision on the status of this tank could be made as early as the end of next week.

Tank AY-102 is among the oldest of Hanford's double-shell tanks and has been in operation for over 40 years. It contains about 850,000 gallons of waste.

If you have any questions or concerns, please don't hesitate to contact me.

Tom Fletcher

Hildman, Cynthia M

From: Braswell, Sharon M
Sent: Thursday, October 11, 2012 2:48 PM
To: shayman@enviroissues.com; 'SusieQ Leckband'; 'HAB Facilitation Team'
Cc: Gamache, Lori M; Nguyen, Tifany L; Wise, Barbara K; Braswell, Sharon M
Subject: FW: Update on Tank AY-102 Status

Susan or Tammie,

Would you please distribute the below employee announcement on double-shell tank AY-102 to the HAB members/alternates. If you have any questions, please let me know.

Thank you,

Sharon Braswell
509-376-9292

From: ^ORP Office of Communications
Sent: Thursday, October 11, 2012 1:56 PM
Subject: Update on Tank AY-102 Status

ANNOUNCEMENT

Department of Energy
Office of River Protection
P.O. Box 450
Richland, Washington 99352

ORP No. 12-102

Issued: 10/11/12

To: All ORP Employees
Subject: Update on Tank AY-102 Status

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It is important to remember that the material within the annulus is stable, no material has been found outside of the annulus, and there is no indication of radioactive contamination in the leak detection pit outside this double-shell tank. We have been performing visual inspections of the material located near Riser 83 twice a week and have seen no changes. We will continue to perform these bi-weekly inspections at AY-102. Monitoring activities at other double-shell tanks continues.

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Tank AY-102 is among the oldest of Hanford's double-shell tanks and has been in operation for over 40 years. It contains about 850,000 gallons of waste.

If you have any questions or concerns, please don't hesitate to contact me.

Tom Fletcher

Hildman, Cynthia M

From: Cary, Annette <acary@tricityherald.com>
Sent: Tuesday, November 13, 2012 3:46 PM
To: Gamache, Lori M
Subject: Re: AY102 Leak Assessment Report - Executive Summary

Hi Lori,
The report looks pretty interesting. I'm planning to write a story on it for tomorrow.
Thanks, Annette

On Tue, Nov 13, 2012 at 2:32 PM, Gamache, Lori M <Lori_M_Gamache@orp.doe.gov> wrote:

Annette,

The link to the full report can be found at http://www.hanford.gov/files.cfm/RPP-ASMT-53793%20-%20Rev%2000.PDF.

Thanks,

Lori

From: Gamache, Lori M
Sent: Tuesday, November 13, 2012 1:49 PM
To: Annette Cary
Subject: AY102 Leak Assessment Report - Executive Summary

Hi Annette,

We will be posting the AY102 Leak Assessment Report to the hanford.gov website today. I've attached the Executive Summary for you. I would have sent the whole report, but it is a very large file. This report details the facts on AY-102 the team found during their assessment.

Thanks,

Lori

U.S. DEPARTMENT OF ENERGY

MEDIA CONTACTS:
Lori Gamache, ORP, (509) 372-9130
John Britton, WRPS, (509) 376-5561

FOR IMMEDIATE RELEASE:
October 22, 2012

HANFORD DETERMINES DOUBLE-SHELL TANK LEAKED WASTE FROM INNER TANK

Testing found no indication of leaks outside the outer tank

RICHLAND -- The Department of Energy's Office of River Protection (ORP), working with its Hanford tank operations contractor Washington River Protection Solutions, has determined that there is a slow leak of chemical and radioactive waste into the annulus space in Tank AY-102, the approximately 30-inch area between the inner primary tank and the outer tank that serves as the secondary containment for these types of tanks. This is the first time a double-shell tank (DST) leak from the primary tank into the annulus has been identified. There is no indication of waste in the leak detection pit outside the DST, which means that no waste has leaked out of the annulus and into the environment.

Since the material in the annulus was discovered in August, ORP has conducted a video surveillance of more than 95% of the walls and floor of the annulus through 10 risers, or pipes, that extend from within the interior of the tank annulus up through the tank dome to ground level. The surveillance video revealed material in two locations near Riser 90 and one location near Riser 83. In addition to the video surveillance, DOE has taken samples from all locations and performed sample analysis.

Through the sample analysis, DOE has confirmed that one of the areas of material located near Riser 90 is a 2 foot by 2 foot by 8 inch mound of soil, and is not waste. The Department suspects the soil fell into the annulus during construction repairs to the ventilation system. The additional analyses have also allowed DOE to confirm that the material in the remaining two locations in the tank's annulus is waste. The waste is primarily crystalline in form and does not include any pumpable liquid.

ORP is continuing to conduct regular visual inspections of the tank. Based on the most recent inspections located near Riser 83, there is indication that the inner tank is slowly leaking.

"We will continue to perform visual inspections twice a week of the material inside the annulus, using cameras. In addition, liquid levels inside the primary tank and annulus will continue to be monitored. Liquid level monitors, although they cannot detect small changes like those that have

occurred in Tank AY-102, would record any significant changes in the liquid levels of the tank," said Tom Fletcher, Assistant Manager for the Tank Farms Project. "We are working collaboratively with Washington State Department of Ecology to determine the most effective path forward for AY-102 and ensure that we are effectively protecting the public and the environment."

The material was discovered in the tank annulus space during a regularly scheduled DST Integrity Inspection. The area of the annulus floor is approximately 600 square feet. DOE estimates that the waste near Riser 83 covers an area of about three square feet that is less than ½ inch thick. The waste located near Riser 90 covers an estimated 40 square feet and is less than ¼ inch thick.

The underground DSTs include built-in secondary containment, with the outer shell surrounded by steel-reinforced concrete. There is no indication of waste in the leak detection pit outside the DST, which means that no waste has leaked out of the annulus and into the environment.

Since the discovery of material, ORP has kept the Washington State Department of Ecology and other Hanford stakeholders updated on the status of tank AY-102.

Remote-controlled sampling devices were modified and deployed into the annulus to take several samples of the material. ORP completed analysis of the samples and the results were reviewed by a panel of experts and senior managers who made the determination that the inner shell of tank AY-102 had leaked.

There have been no indications of abnormal events or leaks detected in any of the other double-shell tanks through routine monitoring. ORP monitors liquid level indicators within the primary tank and the annulus of the DSTs and continuously monitors for airborne contamination within the annulus. In addition, DST Integrity Program inspections that already occur will be accelerated and expanded to perform visual inspections on six other tanks that have similar construction as well as operating and process histories. These tanks are located in the AY, AZ, and SY tank farms.

Tank AY-102 was the first double-shell tank constructed at Hanford and has been in operation for more than 40 years. It contains about 850,000 gallons of sludge and liquid waste from the past production of plutonium for the nation's nuclear arsenal.

###

Hildman, Cynthia M

From: Niles, Ken <ken.niles@state.or.us>
Sent: Monday, October 22, 2012 4:19 PM
To: Dirk A Dunning; 'Ken Niles'; Gamache, Lori M
Subject: RE: Final Release on DST AY102

Thanks Lori,

I have shared this information with my Director and the Governor's Office.

I have also forwarded it on to our Hanford Cleanup Board members.

We would definitely like to have ORP discuss this with our Cleanup Board at their next meeting, November 29-30 in Cascade Locks.

From: Gamache, Lori M [mailto:Lori_M_Gamache@rl.gov]
Sent: Monday, October 22, 2012 3:55 PM
To: 'Ken Niles'; Dirk A Dunning
Subject: Final Release on DST AY102

Ken,

Per Tom's voicemail, attached is the release on AY102.

Thanks,
Lori

Lori Gamache
Public Affairs Specialist
U.S. Department of Energy
(509) 372-9130

Hildman, Cynthia M

From: Gamache, Lori M
Sent: Friday, April 12, 2013 9:54 AM
To: Jones, Colin J; Trummell, Candice S
Cc: Smith, Kevin W (ORP); Charboneau, Stacy L; Fletcher, Thomas W; Trenchard, Glyn D; Olds, Theodore E (Erik)
Subject: Leak Assessment Timeline
Attachments: PER 2011-2120; PER-2012-1654

Colin and Candice,

As we discussed yesterday, below is a timeline of events related to AY-102. I've attached the two PERs referenced in the timeline.

I've included the link to the Leak Assessment Report is below. It's a very large document so I'll flag a few sections in the document you should review:

Executive Summary
pg 1-3 – Prior Annulus Conditions 2011 and 2012
pg 4-55 – Water Intrusion
pg 4-59 – ENRAF Leak Detector Liquid Level
pg 4-64 – Continuous Air Monitor (Alarms and Decay Count)
pg 4-70 – Video Inspections

Thanks,
Lori

****

- **Historical Context (extracted from AY-102 Leak assessment report - link below)**
  - The Tank AY-102 annulus has been subjected to numerous cross-contamination events over the years. The first event occurred in October 1976 when a transfer of waste lowered the Tank AY-102 primary tank level to below 60 in. At this level, the leak detection pit drain, the central pump pit drain, the annulus pump pit drain, and the sluice pit drains were uncovered, exposing the pits to the primary tank vapor space. When the annulus is operated at a lower pressure than the primary ventilation, airborne contamination can be drawn into the annulus via the annulus pump pit or the leak detection pump pit. The primary tank liquid level was below 60 in. on multiple occasions during the tank's operation. (Leak Assessment Report, Section 4.2.5.2) (See diagram below)
- **Timeline of events**
  - October 2011 -- More than ½" of rain falls over a six-day period in an area that receives an average of less than seven inches of precipitation a year.

- October 9, 2011 -- 1 of 3 ENRAF alarms due to elevated reading (>0.25"); other 2 ENRAFs are reading normal; declared out of service; workers scheduled to inspect instrument.
    - Workers deployed to tank AY-102 and find the annulus about ½" up the ENRAF plummet assumed to be rainwater. Also find radiation dose rate of 2 to 4 millirem per hour (Radiological work plan action limits set at >15 millirem).
    - Washington State Department of Ecology notified (TOC-ENV-NOT-2011-0012 "AY-102 Annulus ENRAF).
- October 13, 2011 -- Ecology representative visits the work site and is briefed on situation.
- October 13, 2011 -- Maintenance team reports that the cap on a riser leading into the annulus on tank AY-102 had missing bolts. The loose flange could have been a source of water intrusion into the annulus. A gasket and bolts were installed to seal the riser and prevent any leakage into the annulus. A Problem Evaluation Request (PER) written by a System Engineer recommending a camera be inserted into the AY-102 annulus "to see if the water intrusion could be pinpointed." (WRPS-PER-2011-2120 "Water intrusion into the AY-102 annulus", see attached)
- October 17, 2011 -- WRPS responds to Ecology questions from October 13th.
- October 24, 2011 -- ENRAF was flushed with 10-gal water due to reading on October 9, 2011 (standard maintenance protocol). Radiation dose rate is approximately 5 millirem per hour before flush; 1.5 millirem per hour after flush.
- October 26, 2011 -- Two days after the ENRAF was flushed, the continuous air monitor (CAM) alarmed (set point >2000 cpm). The CAM sample collected during this time had a field count of 4,200 cpm. (less than historical peaks – page 4-66 of Leak Assessment Report, section 4.2.5.3)
- October 27, 2011 -- ENRAF recalibrated and returned to service, post flushing.
- March 10, 2012 -- The same ENRAF was declared out of service again.
- May 24, 2012 -- During planned repairs, the ENRAF displacer wire broke while attempting to retrieve the displacer and fell into the annulus of Tank AY-102.
- June 4, 2012 -- A camera was deployed into the annulus, which identified that the displacer was in a location that would interfere with the performance of a replacement ENRAF. During this time, it was reported the drum and reel contamination readings were 20,000 dpm/100 cm^2. (As a reference, actual Tank Waste would have been in the hundreds of millions of dpm)
- June 5, 2012 -- Attempts to retrieve the stuck ENRAF displacer were unsuccessful; thus, the displacer remains suck on the annulus floor. (Note: Analysis and still video shot indicates it is stuck in the ENFAF wash)
- July 24, 2012 -- The upper flange of the riser was rotated to avoid the displacer and debris on the annulus floor and a replacement ENRAF 152 drum and displacer were installed on Riser 90. The ENRAF was functionally tested and returned to service.

- August 1 & 5, 2012 -- Visual inspections were performed on August 1 (Risers 87 and 89), and August 5, 2012 (Risers 77 and 80). The selection of these risers was based on a recommendation identified in PER-2011-2120 (see attached). The PER documented suspected water intrusion into the annulus based on an annulus ENRAF leak detector level increase in Riser 90 following a period of rain in October 2011. Inspections using Risers 77 and 87 identified unexpected material on the annulus floor that was not present in earlier inspections. After these initial observations, additional risers were selected as part of a comprehensive annulus visual inspection with emphasis placed on the annulus floor and refractory. Ten risers were accessed to complete the inspection.

- August 7, 2012 -- ORP was notified of discovery of material located on the annulus floor of AY-102.

- August 10, 2012 -- Survey swabs of material on the annulus floor underneath Riser 90 was retrieved. The particles adhered to the duct tape had a measurable dose rate when retrieved from the annulus space, and a surface contamination reading of 800,000 dpm was reported with a detector near the sample material. (surface contamination still several orders of magnitude less than what would be expected for tank waste)

- August 17, 2012 -- ORP announcement of discovery of material in annulus of AY-102, including notification to regulators, key stakeholders and public.

- August – October 2012 -- AY-102 formal leak assessment process

- September 26, 2012 -- A sample of the material under Riser 83 was taken.

- August 27, 2012 -- The day after the sampling activity, the CAM alarmed (likely due to disturbance of the material on the annulus floor during sampling). In addition, a WRPS employee issued a Stop Work on work activities in AY-Farm due to AY-102 Annulus Leak Detection CAM in alarm. A Problem Evaluation Request (PER) was written to document a stop work. (WRPS-PER-2012-1654 "Stop Work due to AY-102 Annulus Leak Detection CAM in alarm without alarm response procedure", see attached)

- October 11, 2012 -- ORP provided status that material is largely consistent with the type of material found in the tank but result of investigation into the material on the annulus floor wouldn't be complete until remaining sampling and laboratory analysis is complete. This status included notification to regulators, key stakeholders and public.

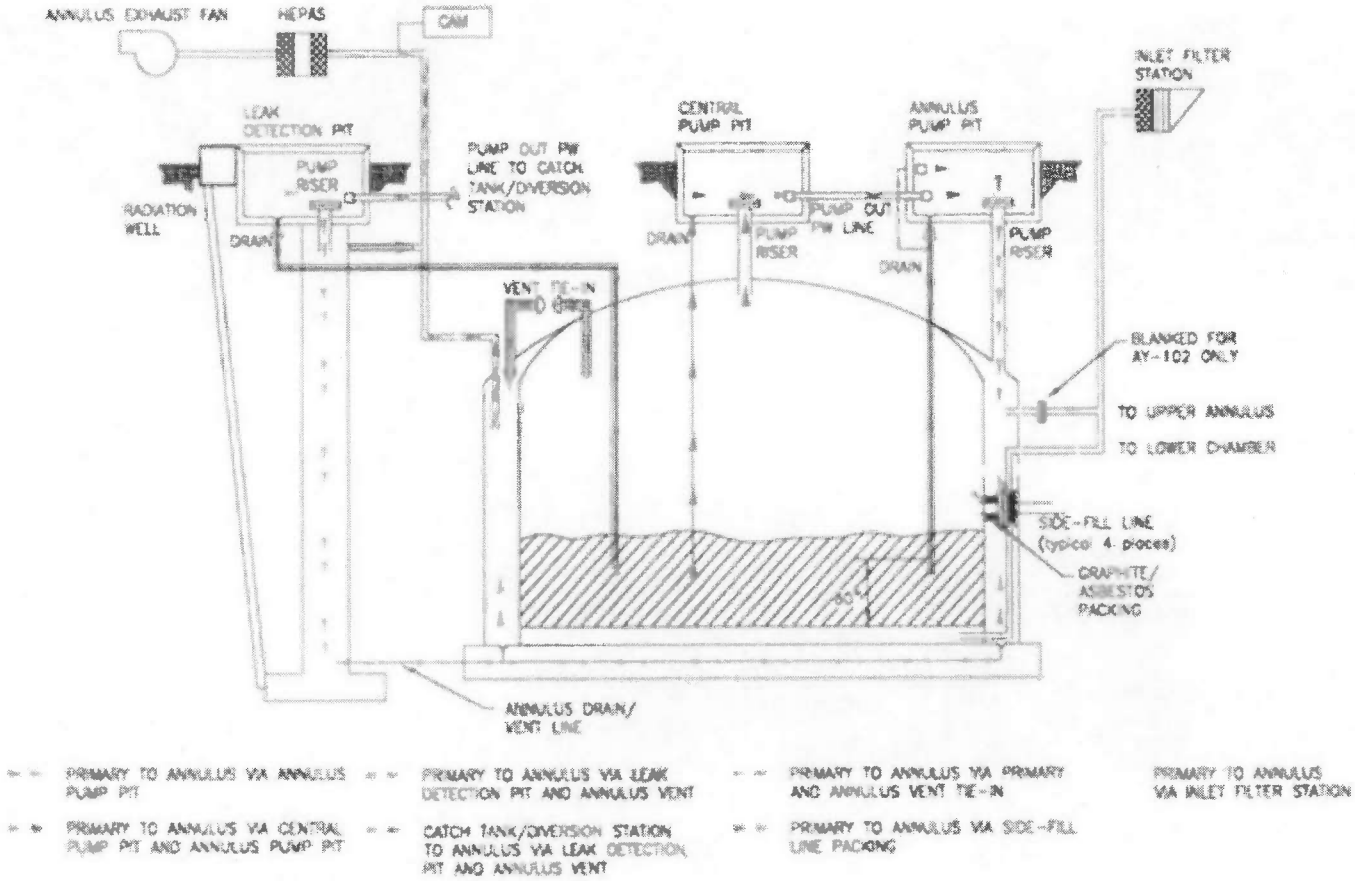
- October 15 & 17, 2012 -- Samples of the material under Riser 90 was taken from multiple locations.

- October 22, 2012 -- ORP determines primary tank of AY-102 is slowly leaking waste (corroborating evidence is sample analysis, chemistry and tank construction) into the annulus, including notification to regulators, key stakeholders and public.

- November 15, 2012 -- Tank 241-AY-102 Leak Assessment Report Issued – found at http://www.hanford.gov/files.cfm/RPP-ASMT-53793%20-%20Rev%2000.PDF.

- March 2013 -- Completed extent of condition on 6 tanks with similar construction and process history, as well as operational upsets. (AY, AZ & SY Farms). Visual inspection into the annulus of these six double-shell tanks found no leaks.

- Currently modifying DST integrity program based on the extent of condition review and the lessons learned consistent with investigation and response plan.



POTENTIAL CROSS CONNECTIONS BETWEEN PRIMARY AND ANNULUS HEADSPACE
AGING WASTE FACILITY TANKS (TYPICAL)

Hildman, Cynthia M

From: Britton, John C
Sent: Thursday, April 11, 2013 3:31 PM
To: Gamache, Lori M
Subject: PER 2011-2120

Save

Problem Evaluation Request (PER)WRPS-PER-2011-2120

Closed 04/01/2012 17:51

PER No	Date of Discovery	Time of Discovery (24:00)	Project
WRPS-PER-2011-2120	10/13/2011	15:30	Base Ops

Location

AY Farm

How Was Problem Discovered

Field Observation

Description of Concern or Problem

Water was detected in AY-102 annulus via an increase in liquid level (and high level alarm at TMAC) from the AY102-WSTA-LDT-152 leak detector on October 9, 2011. When personnel went out to calibrate the instrument on10/12/11, to determine if the instrument was work properly, water was observed approximately 1/2" up on the displacer. At this point in time it would have be beneficial to insert a camera into the annulus to see if the water intrusion could be pinpointed. When Engineering requested a camera to be installed, the AZ Team indicated it would take several days just to plan the work package and would most likely not be in time to determine the source of the water intrusion.

Requirement Not Satisfied	Source Document Number
Potential Tank Inintegrity Issue	
Equipment Identification Number	**System Identification**
AY102-WSTA-LDT-152	Ventilation Tank Annulus

Immediate actions Taken or Planned

Discussed problem with some of the AZ Team members, Area Engineering and manager . Then initiated work package request (TFC-WR-11-0924) and issued this PER.

Recommended Corrective actions

1.Develop a pre-approved work package to be able to look into any DST annulus tank in the event of a real water intrusion event in the future.
2. Install video camera into the north and east sections of 241-AY-102 to look for possible intrusion points. Recommend that we investigate the AY-102 annulus tank during the wet winter months (October thru March).

Originator Contact

I would like to help in investigating the cause

Originators Name	Originators ID	Originators Phone	Date Initiated
Tardiff, Gary R	H0039579	(509) 373-5539	10/19/2011

SHIFT OPERATIONS REVIEW

Title

Create Pre-planned work package to investigate annulus water intrusion

How Discovered	Agency
self-ID prior to event	

Reportability	SSC Operability	Operability Review	Comp Measures Req
Non-Reportable	N/A	N/A	

Describe actions Taken or Recommended			
no additional actions taken or recommended by CSO			
SO Reviewer Name	**SO Reviewer ID**	**SO Reviewer Phone**	**SO Review Date**
Alms, Joshua A	H5297860	(509) 373-1985	10/19/2011
SCREENING			
PER Significance Level			
TUF			
Independent Assessment Review	**Occurrence Report Number**	**Externally Identified**	**DOE CAP Required?**
No		No	No
Assigned Responsible Manager	**Facilities Rep / SSO**	**Safety Management Rep**	
Ellis, Martin W			
Program		**Safety Management Program**	
• N/A		• Engineering Configuration Management • In-Service Surveillance & Maintenance	
PER Screening Comments			
cc: Dave Strasser (10/20/11)			
Causal Code			
MGT/Comm/Train	**Human Performance**	**GEMS**	**Equip/Eng/Other**
Failed Barrier	**ORPS Code**	**Functional Area**	**Work Process**
	Not Applicable	Operations	• Engineering Evaluation
ISMS	**Consequence Code**		
Perform work within the controls	• Engineering Requirement - Lack of/not adequately implemented or identified requirement		
PER Screening Chair	**PER Screening Chair ID**	**PER Screening Chair Phone**	**PER Screening Date**
Brown, Nancy L	H0088797	(509) 373-0992	10/20/2011
PAAA REVIEW			
PAAA Screening	**PAAA Codes**	**Function Codes**	
Not subject to PAAA			
NTS Report Number	**NTS Report Date**		
Repetitive / Recurrent	**Programmatic**	**Intentional Violation / Misrepresentation**	
No	No	No	
PAAA Screening Comments			
Approval per procedure TFC-ESHQ-PAAA-D-08, dated 6/27/2011 (paragraph 4.1.5-7).			
PAAA Reviewer Name	**PAAA Review Date**		
Bruce, Phyllis H	10/21/2011		
PAAA Approver Name	**PAAA Approve Date**		

Bruce, Phyllis H	10/21/2011	

CAUSE ANALYSIS

Description of Occurrence

Extent of Condition

N/A

Safety Significance

Generic Implications

Remedial Corrective Action

Causal Analysis, Apparent Cause and/or Root Cause Analysis

Track Until Fixed (TUF)

Action Taken

Revision to TFC-OPS-MAINT-C-01, "Tank Operations Contractor Work Control" has been completed and issued which allows for using previously approved work instructions from planned work activities as the template for a new Level 2 work package. The review and approval process for Level 2 work documents will allow for more timely development and field implementation of these work activities. This process addressess the the issue identified in this PER.

Corrective Action Resulting from Action Taken

Revision to TFC-OPS-MAINT-C-01, "Tank Operations Contractor Work Control" has been completed and issued which allows for using previously approved work instructions from planned work activities as the template for a new Level 2 work package. The review and approval process for Level 2 work documents will allow for more timely development and field implementation of these work activities. This process addressess the the issue identified in this PER.

ATTACHMENTS

Link to PER

TFC-OPS-MAINT-C-01,_Tank_Operations_Contractor_Work_Control.pdf

Supervisor_C-01_Work Control Training.pdf

WRPS-PER-2011-2120 - PER Closure.msg

AUDIT HISTORY

Change Date	Auditor	Comments
10/19/2011 10:25	Tardiff, Gary R	Initiator Tab initial submission.
10/19/2011 12:11	Alms, Joshua A	SO Tab initial submission.
10/20/2011 13:05	Brown, Nancy L	Screening Tab initial submission.
10/21/2011 09:09	Sievers, Fredrich	Responsible Manager Task Launched by Sievers, Fredrich
10/21/2011 09:39	Bruce, Phyllis H	PAAA Tab initial submission.
01/16/2012 10:06	Metzger, Stephen L	TUF Tab initial submission.

-- End of Report --
04/01/2012 05:53 PM

Hildman, Cynthia M

From: Britton, John C
Sent: Thursday, April 11, 2013 3:26 PM
To: Gamache, Lori M
Subject: PER-2012-1654

Save

Problem Evaluation Request (PER)WRPS-PER-2012-1654

Closed 11/26/2012 14:38

PER No	Date of Discovery	Time of Discovery (24:00)	Project
WRPS-PER-2012-1654	09/27/2012	09:40	Base Ops

Location

AY Farm

How Was Problem Discovered

Routine Work

Description of Concern or Problem

This PER was written to document a Stop Work.

The following was taken from the Base Operations Central Shift Manager Logbook Number BOSO-010.

0946 [Stop Work Originator] issued a Stop Work on work activities in AY-Farm due to AY-102 Annulus Leak Detection CAM in alarm without alarm response procedure. SOEN Sent and radio announcement made.

Requirement Not Satisfied	Source Document Number

Equipment Identification Number	System Identification

Immediate actions Taken or Planned

1. Work in AY Farm was stopped, and the Farm was evacuated and access restricted
2. The AZ Team Area Dayshift Manager assumed responsibility for managing the actions required to resolve the issues associated with the Stop Work
3. A Stop Work discussion meeting was held to identify additional immediate actions and other, less time-urgent corrective actions
3a. The Stop Work Originator, AZ Team Area Dayshift Manager, and HAMTC Safety Representative agreed that HPTs were authorized to go into AY-Farm to change out the filter papers on AY-102 Annulus Leak Detection CAM & Record Sampler under the Stop Work
3b. The Record Sampler filter paper was counted and verified that it read < 0.2 DAC
3c. Base Operations Standing Order OPS-12-005, "Response to Activation of AY-102 Annulus CAM Alarm," was issued to provide direction for consistent response to activation of the AY-102 annulus leak detection CAM alarm.
4. The Stop Work Originator lifted the Stop Work at 1411.

Recommended Corrective actions

During the Stop Work discussion meeting, the following recommended corrective actions were identified:

1. Issue a company-wide communication on the purpose of the annulus leak detection CAM and the pre-planned response to an alarm condition
2. Evaluate increasing the scope of HPT routine surveys in AY Farm
3. Evaluate the installation of a CAM downstream of the annulus HEPA filters
4. Institutionalize the CAM alarm response requirements and cancel the standing order
5. Evaluate the existing values for the normal range of the annulus vacuum and implement changes, if appropriate.

Originator Contact

No

Originators Name	Originators ID	Originators Phone	Date Initiated
Moser, Dave R	H0008068	(509) 373-0988	09/27/2012

SHIFT OPERATIONS REVIEW

Title			
Stop Work On Work Activities in AY-Farm Due to AY-102 Annulus Leak Detection CAM in Alarm Without Alarm Response Procedure			
How Discovered		**Agency**	
self-ID prior to event			
Reportability	**SSC Operability**	**Operability Review**	**Comp Measures Req**
Non-Reportable	N/A	N/A	
Describe actions Taken or Recommended			
No additional actions taken or recommended by the BOSO at this time.			
SO Reviewer Name	**SO Reviewer ID**	**SO Reviewer Phone**	**SO Review Date**
Harrison, Dale	H0001919	(509) 373-2689	09/27/2012

SCREENING

PER Significance Level			
PER with Resolution			
Independent Assessment Review	**Occurrence Report Number**	**Externally Identified**	**DOE CAP Required?**
No		No	No
Assigned Responsible Manager	**Facilities Rep / SSO**	**Safety Management Rep**	
Ellis, Martin W		Synoground, Todd C	
Program		**Safety Management Program**	
• N/A		• ^N/A^	

PER Screening Comments
PER w/ Resolution with informal apparent cause analysis. (10/01/12)

Causal Code			
A3B2C05	Human Performance LTA Rule Based Error Situation incorrectly identified or represented resulting in wrong rule used		
A5B4C01	Communications LTA Verbal Communication LTA Communication between work groups LTA		
MGT/Comm/Train	**Human Performance**	**GEMS**	**Equip/Eng/Other**
Failed Barrier	**ORPS Code**	**Functional Area**	**Work Process**
	Not Applicable	Operations	• ^N/A
ISMS	**Consequence Code**		
Perform work within the controls	• CONOPS - 2.a (6) - Organization and Administration (Work Planning: Hazards Analysis/Implementing Controls) • CONOPS - 2.g (1) - Notifications • Stop Work Authority - Employee "Stop Work Authority" used because of actual		

	or potential unsafe conditions.		
PER Screening Chair	**PER Screening Chair ID**	**PER Screening Chair Phone**	**PER Screening Date**
Brown, Nancy L	H0088797	(509) 373-0992	10/01/2012
PAAA REVIEW			
PAAA Screening	**PAAA Codes**	**Function Codes**	
PAAA, Non-NTS Reportable	• 10 CFR 830.122 (d)(1)	• Procedure Quality	
NTS Report Number	**NTS Report Date**		
Repetitive / Recurrent	**Programmatic**	**Intentional Violation / Misrepresentation**	
No	No	No	
PAAA Screening Comments			
1) Basis for PAAA screening is in file attached to PER. In file, see highlighted green text for non-compliance. 2) Approval per procedure TFC-ESHQ-PAAA-D-08 dated 7/19/2012 (paragraph 4.1.5-7).			
PAAA Reviewer Name	**PAAA Review Date**		
Thom, Barry	10/01/2012		
PAAA Approver Name	**PAAA Approve Date**		
Thom, Barry	10/01/2012		
CAUSE ANALYSIS			
Task Demands	**Work Environment**	**Individual Capabilities**	**Natural Tendencies/ Human Nature**
Description of Occurrence			
Shift Manager at the request of [Stop Work Originator] issued a Stop Work on work activities in AY-Farm due to AY-102 Annulus Leak Detection CAM in alarm without alarm response procedure. SOEN Sent and radio announcement made.			
Extent of Condition			
1. What is the cause, condition, or factor being considered? Stop work was issued in response to a belief there was not adequate procedure for field crews to respond to an Annulus Leak Detector CAM alarm. 2. What are the other instances of the cause, condition, or factor? None at this time. 3. What are the instances of the same type or similar cause, condition or factor? There is the potential to impact other tank farm operations without properly identifying procedures directing crews about the proper response to alarms. 4. What are the direct factors resulting in the cause, condition or factor? Crews were pulled out of the field and work suspended until the area was adequately cleared. 5. What are the previously unidentified effects of the cause, condition or factor? There are no unidentified effects.			
Safety Significance			
Actual – No actual consequences occurred. Expected – No consequences are expected as a result of the identified issue. Potential – No potential consequences are expected as a result of the identified issues.			
Generic Implications			

Remedial Corrective Action

1. Work in AY Farm was stopped, and the Farm was evacuated and access restricted

2. The AZ Team Area Dayshift Manager assumed responsibility for managing the actions required to resolve the issues associated with the Stop Work

3. A Stop Work discussion meeting was held to identify additional immediate actions and other, less time-urgent corrective actions

3a. The Stop Work Originator, AZ Team Area Dayshift Manager, and HAMTC Safety Representative agreed that HPTs were authorized to go into AY-Farm to change out the filter papers on AY-102 Annulus Leak Detection CAM & Record Sampler under the Stop Work

3b. The Record Sampler filter paper was counted and verified that it read < 0.2 DAC

3c. Base Operations Standing Order OPS-12-005, "Response to Activation of AY-102 Annulus CAM Alarm," was issued to provide direction for consistent response to activation of the AY-102 annulus leak detection CAM alarm.

4. The Stop Work Originator lifted the Stop Work at 1411.

Causal Analysis, Apparent Cause and/or Root Cause Analysis

At the time the event took place, field work crews followed the steps of the procedure to acknowledge the alarm and notify the Shift Manager of the alarm. Because it was thought to be a lack of proper procedure directing the crew, the [Stop Work Originator] requested the Shift Manager to issue a stop work. Further evaluation of the continuous use document ARP-T-041-00002 indicated the crew had adequate instructions to follow in the field and did not require a formal Stop Work.

No further action is necessary since proper procedures are in place directing field work crews how to handle Annulus Leak Detector CAM Alarms. Subsequent findings regarding leaks of the primary tank of AY-102 have launched further evaluation of CAM alarms and multiple Tank Farms issues well beyond the scope of this PER regarding Stop Work.

Cause Codes: A3B2C05 – Situation incorrectly identified or represented resulting in wrong rule used. Although the most conservative approach was implemented as a precaution, a Stop Work was not necessary had ARP-T-041-00002, Rev. C-1 been properly identified and explained to the [Stop Work Originator] at the time the question was raised.

A5B4C01 – Communications between work groups LTA. The [Stop Work Originator] agreed after being briefed on ARP-T-041-00002, Rev. C-1, this procedure provides adequate direction for the field crew and no new procedures are required. No further action required.

ATTACHMENTS

Link to PER

PAAA_Screen_10-1-12.pdf

CONOPS codes.msg

Suggested wording.msg

AUDIT HISTORY

Change Date	Auditor	Comments
09/27/2012 14:33	Moser, Dave R	Initiator Tab initial submission.
09/27/2012 22:41	Harrison, Dale	SO Tab initial submission.
10/01/2012 14:22	Thom, Barry	PAAA Tab initial submission.
10/01/2012 15:08	Brown, Nancy L	Screening Tab initial submission.
10/02/2012 09:56	Brown, Nancy L	Responsible Manager Task Launched by Brown, Nancy L
11/15/2012 12:54	Hadley, Ryan M	Apparent Cause Tab initial submission.
11/16/2012 10:18	Synoground, Todd C	Apparent Cause Tab initial submission.

-- End of Report --
11/26/2012 03:07 PM

Tank Farms

Derek Wright | **CO**

Rpt #:	Date Entered:	Date Observed:	Last Modified Date:
15160	10/13/2011	10/13/2011	10/13/2011

Entry Type: Routine Oversight | Include in CIR: No | Hours in Field:

Title:

Investigate AY-102 annulus ENRAF anomoly

Summary:

The FR investigated a high reading on the AY-102 ENRAF.

Issue Type: None | **Significance Level:** 0

Statement:

Investigate AY-102 annulus ENRAF anomoly

Discussion:

The FR investigated a high reading on the AY-102 ENRAF. Double shell tank 241-AY-102 annulus ENRAF 152 was discovered reading above the expected operating range on 10/9/2011. The other two annulus ENRAFs were both within the expected operating range and ENRAF 152 was declared out of service.
During maintenance and troubleshooting work conducted on 10/12/2011, the ENRAF 152 displacer was discovered to be visually wet and weighing more than expected.
Rainwater intrusion is thought to be the cause of the wetness. A video will be taken of the annulus space near this ENRAF and additional maintenance work will be planned to restore the ENRAF to normal operations.
A review of the TF-OPS-005 - Daily CAM and Record Sampler Inspections showed that the AY-102 annulus CAM was not in alarm.

Funct. Area:	Trend Code:	ISMS Funct.:	Causal Code:	
OPS	Operations-PROCS	WORK	OpExcel	Issue Number: 9829

Tank Farms

Joe Sondag | **BO**

Rpt #:	Date Entered:	Date Observed:	Last Modified Date:
15172	10/17/2011	10/17/2011	10/17/2011

Entry Type: Routine Oversight | Include in CIR: No | Hours in Field: 1

Title:

ORP On-Call FR Notifications for the week of October 11, 2011

Summary:

1. SOEN: The WDOH was notified of the 241-AY-102 annulus ENRAF 152 reading above expected range. (Thursday, October 13, 2011 at 1101 hours)
"Double shell tank 241-AY-102 annulus ENRAF 152 was discovered reading above the expected operating range on 10/9/2011. The other two annulus ENRAFs were both within the expected operating range and ENRAF 152 was declared out of service. During maintenance and troubleshooting work conducted on 10/12/2011, the ENRAF 152 displacer was discovered to be visually wet and weighing more than expected. Rainwater intrusion is thought to be the cause of the wetness. A video will be taken of the annulus space near this ENRAF and additional maintenance work will be planned to restore the ENRAF to normal operations."

2. SOEN: Due to a potential electrical hazard in AW Farm, access is restricted (Thursday, October 13, 2011 at 1606 hours)
The EV team electricians discovered a ground fault on the ENRAF power supply system during connection of temporary power to AW-Farm. The ground fault was isolated to a transformer in 271-AW, a work package was developed and the condition was corrected. AW-Farm is no longer on restricted access.

3. The ONC notified the BO Shift Office at 0907 hours on 10/15/11 that a magnitude 3.4 earthquake had occurred at 0030 hours on 10/15/11, epicenter north of Richland. No impact to Tank Farms facilities. The FR On-Call FR was notified at about 1118 on 10/15 and followed up with a call to the Tank Farms CSM.

4. SOEN: Entered and exited AOP-005 for high temp (81 degrees F) received on one TIC for AW-104. (Sunday, October 16, 2011 at 0121 hours)
Entered and exited AOP-005 for high temperature alarm received for AW-104 TC-037. Thermocouple was reading 81 degrees F at the time of the alarm, other thermocouples for AW-104 were reading 74 to 77 degrees F. TC-037 has dropped to 79 degrees F and the alarm has cleared.

Tank Farms

Derek Wright | **CO**

Rpt #:	Date Entered:	Date Observed:	Last Modified Date:
17261	08/10/2012	08/10/2012	08/10/2012

Entry Type: FR Log | Include in CIR: No | Hours in Field:

Title:

Observed video and survey of the AY-102 annulusand follow up actions after voided RWP

Summary:

The FR observed the video and survey of the AY-102 annulus after identifying some unknown material from past videos (TFC-12-4563 - AY-102 annulus inspection).

Issue Type: Discussion **Significance Level:** 0

Statement:

Observed video and survey of the AY-102 annulus and follow up actions after voided RWP

Discussion:

The AY-102 annulus was inspected today based on some anomalies identified in an annulus inspection conducted on August 5th. For this evolution an annulus ENRAF was removed in order to install a camera and get a better look at the area in question. The camera identified a dried white substance which looked as if it come from underneath the tank and ran down the side of the insulating pad. Some of this white material was also seen along the annulus floor. Also a large pile of an unknown material was identified in the immediate area but we could not determine if the "pile" was directly related to the white dried substance on the insulating pad and the annulus floor. After the filming was complete a sample was taken from the annulus floor and upon retrieval of the sample it was determined to be at HCA levels which voided the RWP for this job. A planning meeting is being held at 1230 today to come up with a path forward for exiting the AOP. The plan for today is to stabilize the area by double bagging the survey equipment and securing the annulus riser. WRPS engineering will review the video and a meeting is planned for Monday to discuss the path forward. The place and time has not been identified yet. The FRs were present at the job and will be present at the planning meeting. I have attached a photo of the area in question from the August 5th inspection.

The planning meeting was held and the path forward is to double bag the survey apparatus and secure the riser. This was conducted. No spread of contamination was detected. The sample is planning to be sent to the lab for analysis.

Funct. Area:	Trend Code:	ISMS Funct.:	Causal Code:	
OPS	Operations-PROCS	WORK	OpExcel	Issue Number: 10943

Tank Farms

Dimple Patel | **BO**

Rpt #:	Date Entered:	Date Observed:	Last Modified Date:
17280	08/14/2012	08/13/2012	08/15/2012

Entry Type: Routine Oversight | Include in CIR: No | Hours in Field:

Title:
AY-102 Annulus Information

Summary:
Information about material found in the annulus of tank AY-102.

Issue Type: Discussion **Significance Level:** 0

Statement:
At 8am today, WRPS met to discuss the status of the material found in the annulus of tank AY-102 and create a path forward. Below are highlights from that meeting.

Discussion:
Status of annulus:
-Sample collected on Friday was 800k dpm beta/gamma (large area swipe, measured through plastic bag)
-Lab analysis will be available after noon today
-Two separate materials were found in annulus, likely two separate events/causes:
-Brown/rust colored pile approximately 8 inches tall, near the annulus vent line that goes into the concrete pad between the primary and annulus tanks.
-White material has come out of one of the airflow channels at the top of the concrete pad between the primary and annulus tanks, the channel now seems to be clogged with this material.
-The CAM is currently not calibrated, it is not required to be calibrated. The shop-cals will be completed today, field install expected for tomorrow.
-Work in the annulus will now have IH sampling as if this were primary tank work.
-Annulus ventilation is currently operational.

Actions to be taken by contractor:
-Create a timeline of operational and radiological information about AY-102 (transfers, alarms, etc).
-Complete camera inspections twice weekly (Mondays and Thursdays) and use alternate methods for annulus leak detection because the camera is using the ENRAF riser. Move the ENRAF to a different riser based on Environmental requirement of 3 functioning ENRAFs as annulus leak detectors.
-Change/test the CAM filter paper every 2 weeks.
-Additional inspections in the area of the material using a UT crawler.
-Additional annulus video inspections as close to 360 degrees as possible (will likely be able to see approximately 95%).
-Explore possibilities for inspecting the inside of the 4 inch annulus vent line.
-Use RUTI equipment to inspect other airflow channels channels in the concrete pad between the primary and annulus.
-Perform a dome benchmark survey.
-Create a contingency plan, to be used only if necessary, for moving AY-102 waste to other tanks.
-Pump leak detection pit; liquid level is above OSD maximum authorized limit, but below the structural limit.

Additional Information:
-The last camera inspections done in 2006, 2001, and 1992 did not inspect this area.
-In October 2011 when the ENRAF in riser 90 was calibrated, the displacer was flushed because it had debris stuck to it. This was the first time an annulus ENRAF was flushed, approximately 40 gallons of water was used to do this. After this plummet was lowered back into the annulus, it got stuck to the bottom. Since then a new plummet was used in the ENRAF and it did not get stuck.
-In the Oct/Nov 2011 timeframe, AY-102 ENRAF and annulus CAM (uncalibrated) alarmed and cleared.
-UT was last completed in 2006, did not contaminate the crawler.

Funct. Area:	Trend Code:	ISMS Funct.:	Causal Code:	
OPS	N/A-N/A	N/A	N/A	Issue Number: 10951

Issue Type: Discussion **Significance Level:** 0

Statement:

Preliminary information about sample collected on 8/10/12 and analyzed by 222-S. Please note that this is preliminary data and could change upon further review.

Discussion:

These results represent the amount of each nuclide that could be acid leached from one portion of the duct tape sample.

Cs-137: Result each 3.9E+00µCi, MDA 9.8E-04µCi, Gamma spectroscopy
Sr-90: Result each 1.0E-01µCi, MDA 4.1E-03µCi, Separation and beta count
Pu-239/240: Result each 4.1E-05µCi, MDA 2.1E-05µCi, Separation and alpha spectroscopy
Am-241: Result each 1.6E-04µCi, MDA 8.3E-06µCi, Separation and alpha spectroscopy

No isotopes of curium were detected.

It should be observed that the Pu/Am results are near the detection limit, and therefore will lack precision. It may be possible to improve these results by analyzing a larger aliquot of digest.

Funct. Area:	Trend Code:	ISMS Funct.:	Causal Code:	
OPS	N/A-N/A	N/A	N/A	Issue Number: 10952

Tank Farms

Joe Sondag | **CO**

Rpt #:	Date Entered:	Date Observed:	Last Modified Date:
17658	10/01/2012	09/26/2012	10/01/2012

Entry Type: Routine Oversight | Include in CIR: No | Hours in Field: 6

Title:

(Backshift) Tank AY-102 Annulus Sampling using the Off Riser Sampling System (ORSS)

Summary:

The FR observed the pre-job briefing and field work for sampling the tank AY-102 annulus using the ORSS.

Issue Type: Discussion **Significance Level:** 0

Statement:

Conduct of the pre-job briefing

Discussion:

The pre-job briefing was well attended (35+ individuals) and included engineering management representatives (D. Little) and rad con (J. Crockett, G. Bachaud). The tank coordinator and TSAP author, S. Harrington was also present. The FWS conducted a thorough pre-job briefing by discussing the status of the ORSS and glovebag configuration, scope of work planned JHA, and the precautions and limitations. He also referred to the Tank Sampling and Analysis plan's sampling requirements and this was noteworthy given that previous pre-job briefings typically did not contain any of the pertinent details from the sample plan. The FWS stated that a one-time procedure change for TO-080-720 was in effect to address sampling in a double-shell tank annulus. The RWP and IH sampling plan were thoroughly briefed. The work area radiological conditions were briefed as well as the worst case dose rate on the sample container. Revision 2 to RWP WTP-0188 was briefed and included the assumption that up to three samples could be obtained. Overall, the FWS orchestrated a good pre-job briefing.

The FWS mentioned that if the sample had "high" dose rates that it would be loaded into a steel pig; otherwise it would go into a Hedgehog container. The FR discussed with the two HPT leads the dose rate that would be used to determine what shipping container would be selected. It appeared that the were somewhat unsure; however, the rad con first line supervisor suggested that if an on-contact dose rate of 1.5 R/hr was observed, then the steel pig would be used. An upper bounding dose rate should be identified up front so that workers do not have to handle (i.e., remove from one shipping container and place in another) a sample unnecessarily.

Funct. Area:	Trend Code:	ISMS Funct.:	Causal Code:	
OPS	Operations-PROCS	WORK	N/A	Issue Number: 11109

Issue Type: Discussion **Significance Level:** 0

Statement:

Conduct of field work

Discussion:

Sampling was performed using the work instruction (TFC-WO-12-5318), procedure TO-080-720 and the TSAP (RPP-PLAN-53352). The glovebag used was modified to include a sleeve and port assembly for a camera which was placed down riser 91. The camera was used to ensure that the sample material was loaded properly into the sample bottle. The use of camera in the same raiser as the sample carrier is not typical but the work instruction controlled the camera installation.

The collected sample consisted of two, small (~1/2 inch) pebble-like pieces. The uncorrected dose rate over the top of the open sample container was 45 mrem/hr BWO and 10 mrem/hr BWC. The dose rate over the capped container was 10 mrem/hr BWO/BWC. No additional sample was collected due to failure of hinged-connections on the sample vehicle's scoop. The operator was able to break up some of the material on the annulus floor with the defective scoop. A replacement arm/scoop will be installed after work planning efforts. No issues were observed with the sampling activity; however, there was an approximately 40 minute delay due to the ORSS control van's gas tank level getting too low. An operator reported to the FR that once the tank level reaches ¼ full the generator shuts down. The generator was needed to power the video equipment in the van as well as the controls for the ORSS vehicle. Gas cans (~5 gallons) had to be brought into the farm to refuel the van. This delay was entirely avoidable and the contractor should note in their post-job review activities that this issue occurred. The collected sample was sealed out and packaged in the steel, inner shipping container (Hedgehog) and staged in the AY-Farm instrument building. The material will be shipped to the lab on Thursday, September 27, 2012.

Funct. Area:	Trend Code:	ISMS Funct.:	Causal Code:	
OPS	Operations-PROCS	WORK	N/A	Issue Number: 11110

Tank Farms

Derek Wright | **CO**

Rpt #:	Date Entered:	Date Observed:	Last Modified Date:
15160	10/13/2011	10/13/2011	10/13/2011

Entry Type: Routine Oversight | Include in CIR: No | Hours in Field:

Title:
Investigate AY-102 annulus ENRAF anomoly

Summary:
The FR investigated a high reading on the AY-102 ENRAF.

Issue Type: None | **Significance Level:** 0

Statement:
Investigate AY-102 annulus ENRAF anomoly

Discussion:
The FR investigated a high reading on the AY-102 ENRAF. Double shell tank 241-AY-102 annulus ENRAF 152 was discovered reading above the expected operating range on 10/9/2011. The other two annulus ENRAFs were both within the expected operating range and ENRAF 152 was declared out of service.
During maintenance and troubleshooting work conducted on 10/12/2011, the ENRAF 152 displacer was discovered to be visually wet and weighing more than expected.
Rainwater intrusion is thought to be the cause of the wetness. A video will be taken of the annulus space near this ENRAF and additional maintenance work will be planned to restore the ENRAF to normal operations.
A review of the TF-OPS-005 - Daily CAM and Record Sampler Inspections showed that the AY-102 annulus CAM was not in alarm.

Funct. Area:	Trend Code:	ISMS Funct.:	Causal Code:	
OPS	Operations-PROCS	WORK	OpExcel	Issue Number: 9829

Tank Farms

Joe Sondag | **BO**

Rpt #:	Date Entered:	Date Observed:	Last Modified Date:
15172	10/17/2011	10/17/2011	10/17/2011

Entry Type: Routine Oversight | Include in CIR: No | Hours in Field: 1

Title:

ORP On-Call FR Notifications for the week of October 11, 2011

Summary:

1. SOEN: The WDOH was notified of the 241-AY-102 annulus ENRAF 152 reading above expected range. (Thursday, October 13, 2011 at 1101 hours)
"Double shell tank 241-AY-102 annulus ENRAF 152 was discovered reading above the expected operating range on 10/9/2011. The other two annulus ENRAFs were both within the expected operating range and ENRAF 152 was declared out of service. During maintenance and troubleshooting work conducted on 10/12/2011, the ENRAF 152 displacer was discovered to be visually wet and weighing more than expected. Rainwater intrusion is thought to be the cause of the wetness. A video will be taken of the annulus space near this ENRAF and additional maintenance work will be planned to restore the ENRAF to normal operations."

2. SOEN: Due to a potential electrical hazard in AW Farm, access is restricted (Thursday, October 13, 2011 at 1606 hours)
The EV team electricians discovered a ground fault on the ENRAF power supply system during connection of temporary power to AW-Farm. The ground fault was isolated to a transformer in 271-AW, a work package was developed and the condition was corrected. AW-Farm is no longer on restricted access.

3. The ONC notified the BO Shift Office at 0907 hours on 10/15/11 that a magnitude 3.4 earthquake had occurred at 0030 hours on 10/15/11, epicenter north of Richland. No impact to Tank Farms facilities. The FR On-Call FR was notified at about 1118 on 10/15 and followed up with a call to the Tank Farms CSM.

4. SOEN: Entered and exited AOP-005 for high temp (81 degrees F) received on one TIC for AW-104. (Sunday, October 16, 2011 at 0121 hours)
Entered and exited AOP-005 for high temperature alarm received for AW-104 TC-037. Thermocouple was reading 81 degrees F at the time of the alarm, other thermocouples for AW-104 were reading 74 to 77 degrees F. TC-037 has dropped to 79 degrees F and the alarm has cleared.

Tank Farms

Derek Wright | **CO**

Rpt #:	Date Entered:	Date Observed:	Last Modified Date:
17261	08/10/2012	08/10/2012	08/10/2012

Entry Type: FR Log | Include in CIR: No | Hours in Field:

Title:

Observed video and survey of the AY-102 annulusand follow up actions after voided RWP

Summary:

The FR observed the video and survey of the AY-102 annulus after identifying some unknown material from past videos (TFC-12-4563 - AY-102 annulus inspection).

Issue Type: Discussion **Significance Level:** 0

Statement:

Observed video and survey of the AY-102 annulus and follow up actions after voided RWP

Discussion:

The AY-102 annulus was inspected today based on some anomalies identified in an annulus inspection conducted on August 5th. For this evolution an annulus ENRAF was removed in order to install a camera and get a better look at the area in question. The camera identified a dried white substance which looked as if it come from underneath the tank and ran down the side of the insulating pad. Some of this white material was also seen along the annulus floor. Also a large pile of an unknown material was identified in the immediate area but we could not determine if the "pile" was directly related to the white dried substance on the insulating pad and the annulus floor. After the filming was complete a sample was taken from the annulus floor and upon retrieval of the sample it was determined to be at HCA levels which voided the RWP for this job. A planning meeting is being held at 1230 today to come up with a path forward for exiting the AOP. The plan for today is to stabilize the area by double bagging the survey equipment and securing the annulus riser. WRPS engineering will review the video and a meeting is planned for Monday to discuss the path forward. The place and time has not been identified yet. The FRs were present at the job and will be present at the planning meeting. I have attached a photo of the area in question from the August 5th inspection.

The planning meeting was held and the path forward is to double bag the survey apparatus and secure the riser. This was conducted. No spread of contamination was detected. The sample is planning to be sent to the lab for analysis.

Funct. Area:	Trend Code:	ISMS Funct.:	Causal Code:	
OPS	Operations-PROCS	WORK	OpExcel	Issue Number: 10943

Tank Farms

Dimple Patel | **BO**

Rpt #:	Date Entered:	Date Observed:	Last Modified Date:
17280	08/14/2012	08/13/2012	08/15/2012

Entry Type: Routine Oversight | Include in CIR: No | Hours in Field:

Title:
AY-102 Annulus Information

Summary:
Information about material found in the annulus of tank AY-102.

Issue Type: Discussion **Significance Level:** 0

Statement:
At 8am today, WRPS met to discuss the status of the material found in the annulus of tank AY-102 and create a path forward. Below are highlights from that meeting.

Discussion:
Status of annulus:
-Sample collected on Friday was 800k dpm beta/gamma (large area swipe, measured through plastic bag)
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-Brown/rust colored pile approximately 8 inches tall, near the annulus vent line that goes into the concrete pad between the primary and annulus tanks.
-White material has come out of one of the airflow channels at the top of the concrete pad between the primary and annulus tanks, the channel now seems to be clogged with this material.
-The CAM is currently not calibrated, it is not required to be calibrated. The shop-cals will be completed today, field install expected for tomorrow.
-Work in the annulus will now have IH sampling as if this were primary tank work.
-Annulus ventilation is currently operational.

Actions to be taken by contractor:
-Create a timeline of operational and radiological information about AY-102 (transfers, alarms, etc).
-Complete camera inspections twice weekly (Mondays and Thursdays) and use alternate methods for annulus leak detection because the camera is using the ENRAF riser. Move the ENRAF to a different riser based on Environmental requirement of 3 functioning ENRAFs as annulus leak detectors.
-Change/test the CAM filter paper every 2 weeks.
-Additional inspections in the area of the material using a UT crawler.
-Additional annulus video inspections as close to 360 degrees as possible (will likely be able to see approximately 95%).
-Explore possibilities for inspecting the inside of the 4 inch annulus vent line.
-Use RUTI equipment to inspect other airflow channels channels in the concrete pad between the primary and annulus.
-Perform a dome benchmark survey.
-Create a contingency plan, to be used only if necessary, for moving AY-102 waste to other tanks.
-Pump leak detection pit; liquid level is above OSD maximum authorized limit, but below the structural limit.

Additional Information:
-The last camera inspections done in 2006, 2001, and 1992 did not inspect this area.
-In October 2011 when the ENRAF in riser 90 was calibrated, the displacer was flushed because it had debris stuck to it. This was the first time an annulus ENRAF was flushed, approximately 40 gallons of water was used to do this. After this plummet was lowered back into the annulus, it got stuck to the bottom. Since then a new plummet was used in the ENRAF and it did not get stuck.
-In the Oct/Nov 2011 timeframe, AY-102 ENRAF and annulus CAM (uncalibrated) alarmed and cleared.
-UT was last completed in 2006, did not contaminate the crawler.

Funct. Area:	Trend Code:	ISMS Funct.:	Causal Code:	
OPS	N/A-N/A	N/A	N/A	Issue Number: 10951

Issue Type: Discussion **Significance Level:** 0

Statement:

Preliminary information about sample collected on 8/10/12 and analyzed by 222-S. Please note that this is preliminary data and could change upon further review.

Discussion:

These results represent the amount of each nuclide that could be acid leached from one portion of the duct tape sample.

Cs-137: Result each 3.9E+00µCi, MDA 9.8E-04µCi, Gamma spectroscopy
Sr-90: Result each 1.0E-01µCi, MDA 4.1E-03µCi, Separation and beta count
Pu-239/240: Result each 4.1E-05µCi, MDA 2.1E-05µCi, Separation and alpha spectroscopy
Am-241: Result each 1.6E-04µCi, MDA 8.3E-06µCi, Separation and alpha spectroscopy

No isotopes of curium were detected.

It should be observed that the Pu/Am results are near the detection limit, and therefore will lack precision. It may be possible to improve these results by analyzing a larger aliquot of digest.

Funct. Area:	Trend Code:	ISMS Funct.:	Causal Code:	
OPS	N/A-N/A	N/A	N/A	Issue Number: 10952

Tank Farms

Joe Sondag | **CO**

Rpt #:	Date Entered:	Date Observed:	Last Modified Date:
17658	10/01/2012	09/26/2012	10/01/2012

Entry Type: Routine Oversight | Include in CIR: No | Hours in Field: 6

Title:

(Backshift) Tank AY-102 Annulus Sampling using the Off Riser Sampling System (ORSS)

Summary:

The FR observed the pre-job briefing and field work for sampling the tank AY-102 annulus using the ORSS.

Issue Type: Discussion **Significance Level:** 0

Statement:

Conduct of the pre-job briefing

Discussion:

The pre-job briefing was well attended (35+ individuals) and included engineering management representatives (D. Little) and rad con (J. Crockett, G. Bachaud). The tank coordinator and TSAP author, S. Harrington was also present. The FWS conducted a thorough pre-job briefing by discussing the status of the ORSS and glovebag configuration, scope of work planned JHA, and the precautions and limitations. He also referred to the Tank Sampling and Analysis plan's sampling requirements and this was noteworthy given that previous pre-job briefings typically did not contain any of the pertinent details from the sample plan. The FWS stated that a one-time procedure change for TO-080-720 was in effect to address sampling in a double-shell tank annulus. The RWP and IH sampling plan were thoroughly briefed. The work area radiological conditions were briefed as well as the worst case dose rate on the sample container. Revision 2 to RWP WTP-0188 was briefed and included the assumption that up to three samples could be obtained. Overall, the FWS orchestrated a good pre-job briefing.

The FWS mentioned that if the sample had "high" dose rates that it would be loaded into a steel pig; otherwise it would go into a Hedgehog container. The FR discussed with the two HPT leads the dose rate that would be used to determine what shipping container would be selected. It appeared that the were somewhat unsure; however, the rad con first line supervisor suggested that if an on-contact dose rate of 1.5 R/hr was observed, then the steel pig would be used. An upper bounding dose rate should be identified up front so that workers do not have to handle (i.e., remove from one shipping container and place in another) a sample unnecessarily.

Funct. Area:	Trend Code:	ISMS Funct.:	Causal Code:	
OPS	Operations-PROCS	WORK	N/A	Issue Number: 11109

Issue Type: Discussion **Significance Level:** 0

Statement:

Conduct of field work

Discussion:

Sampling was performed using the work instruction (TFC-WO-12-5318), procedure TO-080-720 and the TSAP (RPP-PLAN-53352). The glovebag used was modified to include a sleeve and port assembly for a camera which was placed down riser 91. The camera was used to ensure that the sample material was loaded properly into the sample bottle. The use of camera in the same raiser as the sample carrier is not typical but the work instruction controlled the camera installation.

The collected sample consisted of two, small (~1/2 inch) pebble-like pieces. The uncorrected dose rate over the top of the open sample container was 45 mrem/hr BWO and 10 mrem/hr BWC. The dose rate over the capped container was 10 mrem/hr BWO/BWC. No additional sample was collected due to failure of hinged-connections on the sample vehicle's scoop. The operator was able to break up some of the material on the annulus floor with the defective scoop. A replacement arm/scoop will be installed after work planning efforts. No issues were observed with the sampling activity; however, there was an approximately 40 minute delay due to the ORSS control van's gas tank level getting too low. An operator reported to the FR that once the tank level reaches ¼ full the generator shuts down. The generator was needed to power the video equipment in the van as well as the controls for the ORSS vehicle. Gas cans (~5 gallons) had to be brought into the farm to refuel the van. This delay was entirely avoidable and the contractor should note in their post-job review activities that this issue occurred. The collected sample was sealed out and packaged in the steel, inner shipping container (Hedgehog) and staged in the AY-Farm instrument building. The material will be shipped to the lab on Thursday, September 27, 2012.

Funct. Area:	Trend Code:	ISMS Funct.:	Causal Code:	
OPS	Operations-PROCS	WORK	N/A	Issue Number: 11110

Hildman, Cynthia M

From: Dunning, Dirk A <dirk.a.dunning@state.or.us>
Sent: Friday, September 14, 2012 2:04 PM
To: Fletcher, Thomas W; Gamache, Lori M
Subject: FW: AY-102 construction photo's
Attachments: iap-614, purex tank farm expansion, 200-e area-workman cleaning out station 228 71824.jpg; IAP-614, PUREX TANK FARM EXPANSION, 200-EAST AREA - CONCRETE BASE FOR TANK NO. 241-AY-102 LOOKING NORTH IN DENSE FOG 72320.jpg; IAP-614, PUREX TANK FARM EXPANSION, 200-EAST AREA - CRIBBING AND CLEANING OF FLOOD DRAINS, TANK 101, 241-AY TANK FARM LOOKING SOUTH 72370 - Workers UNDER tank.jpg; IAP-614, PUREX TANK FARM EXPANSION, 200-EAST AREA - DRAINAGE SYSTEM IN BASE OF TANK NO. 241-AY-102 LOOKING WEST 72322 .jpg

Tom,

I was putting together some historic photos of AY-102 for my boss (Ken). I thought you might be able to use some of them in your presentations for explaining how the tanks are built, and hence what it is people are seeing in the photo's

Dirk

From: Dunning, Dirk A
Sent: Friday, September 14, 2012 8:32 AM
To: Niles, Ken
Subject: AY-102 construction photo's

Ken,

Here are the photo's of AY-102 during construction. The checkerboard of material is Kaiolite (presumably kaolin clay) that was lain down inside the exterior tank. The inner tank was then constructed on top of it. I have been told that the sequence was this. (I have not found the documents detailing this sequence.)

- Set the clay drainage system in place
- Build the bottom part of the inner tank on it
- Lift the inner tank
- Crawl under it and cleanup and repair any damage to the drainage channels
- Install the thermocouples
- Set the tank
- Repair the edge areas
- Install a large circumferential banding strap

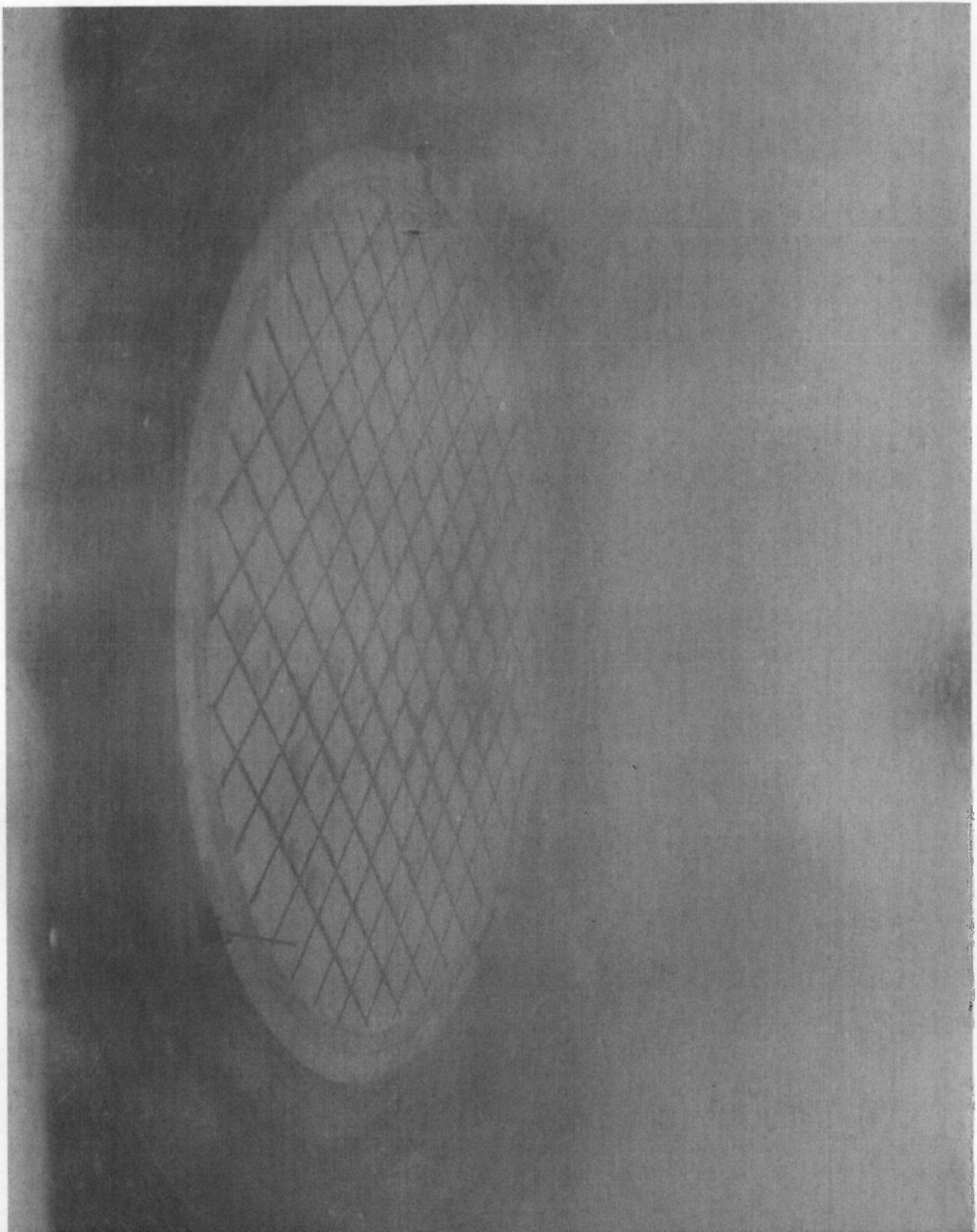
The photo's show the checkerboard clay structure before the tank was built, the workers fixing it after the tank was built, and a worker repairing an area of the outside prior to the strap installation.

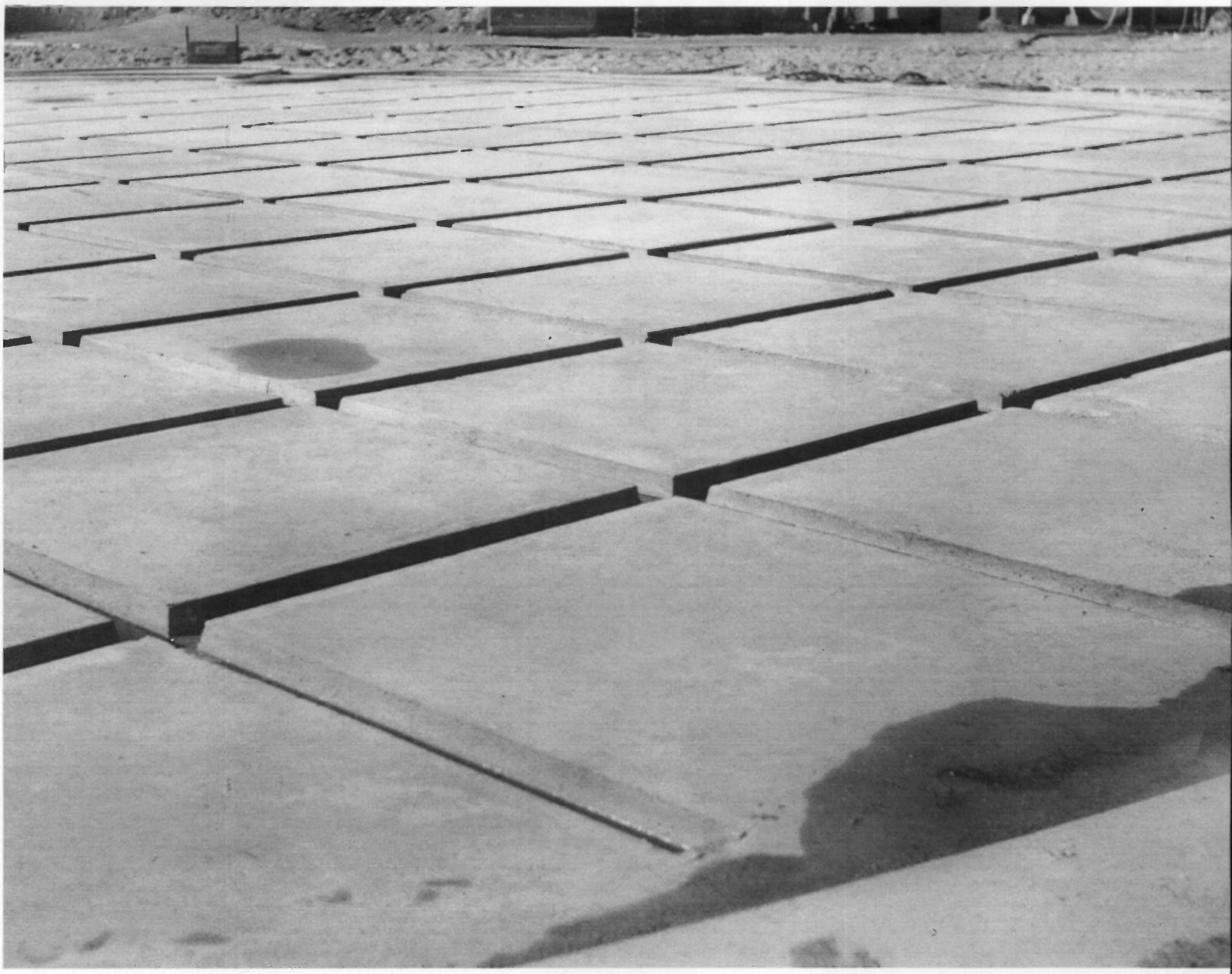
Dirk Dunning, PE ChE NPE

Oregon Department of Energy
Nuclear Safety and Energy Emergency Preparedness Division
625 Marion St. NE
Salem, Oregon 97301-3737

Email: Dirk.A.Dunning@odoe.state.or.us
Web: Oregon.gov/ENERGY
(503) 378-3187
(503) 378-4040 (Front Desk)
(503) 378-6457 (Fax)
(800) 735-2900 (TTY)
(800) 221-8035 (toll free inside Oregon)

OREGON
DEPARTMENT OF
ENERGY





Hildman, Cynthia M

From: Braswell, Sharon M
Sent: Thursday, September 13, 2012 4:49 PM
To: 'Susan Hayman'
Cc: Braswell, Sharon M; Gamache, Lori M; Nguyen, Tifany L
Subject: FW: Update on Tank AY-102 Material Discovery

Susan,

Would you please share with the HAB members the below message.

Thank you,
Sharon
509-376-9292

ANNOUNCEMENT

Department of Energy
Office of River Protection
P.O. Box 450
Richland, Washington 99352

ORP No. 12-087

Issued: 9-11-2012

To: All ORP Employees
Subject: Update on Tank AY-102 Material Discovery

Work continues at tank AY-102 to understand the source of the material found within the annulus and determine the appropriate next steps. Late last week, I briefed Tom D'Agostino and the Hanford Advisory Board on the status of AY-102. I wanted to share the briefing with you and provide the most current information.

Visual inspections of the annulus through 10 risers are complete and provide video footage for approximately 95 percent of the annulus. As previously shared with you, material had been discovered near two risers. During the final visual inspections, no additional material was found. Crews are preparing to take samples of the material on the floor of the annulus later this month.

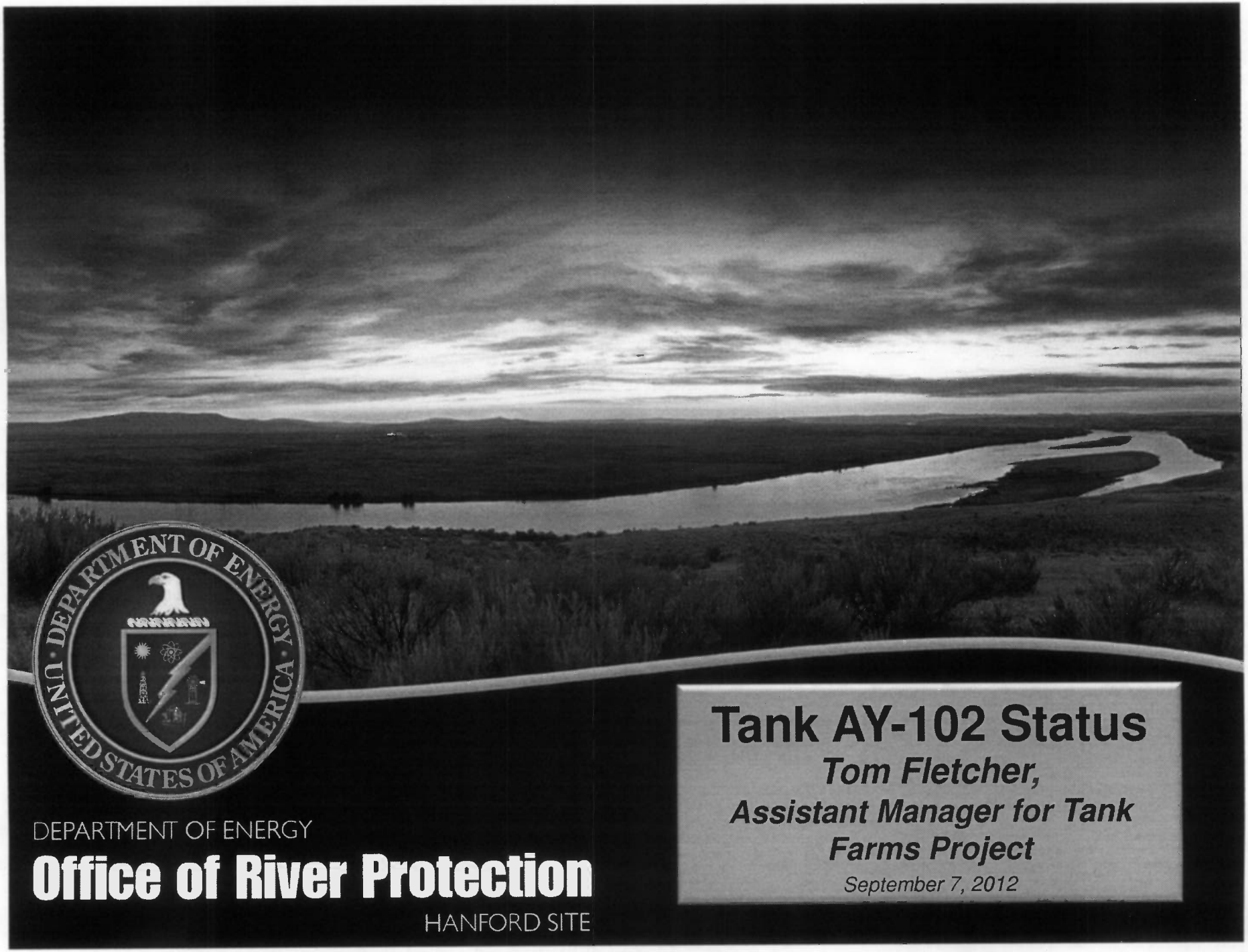
In addition, crews are preparing to move the camera for bi-weekly inspections to Riser 83, the location of the annulus where the last discovery of material was found. This work should be complete this week.

Liquid from the tertiary leak detection pit was sampled. Results show radioactivity at background levels, which is consistent with previous samples, indicating there are no leaks in the secondary containment.

Investigation activities will continue through September. I will continue to share information with you as it becomes available. As always, please feel free to contact me if you have any questions.

Tom Fletcher

AY102 Update.pdf



DEPARTMENT OF ENERGY

Office of River Protection

HANFORD SITE

Tank AY-102 Status

Tom Fletcher,

Assistant Manager for Tank Farms Project

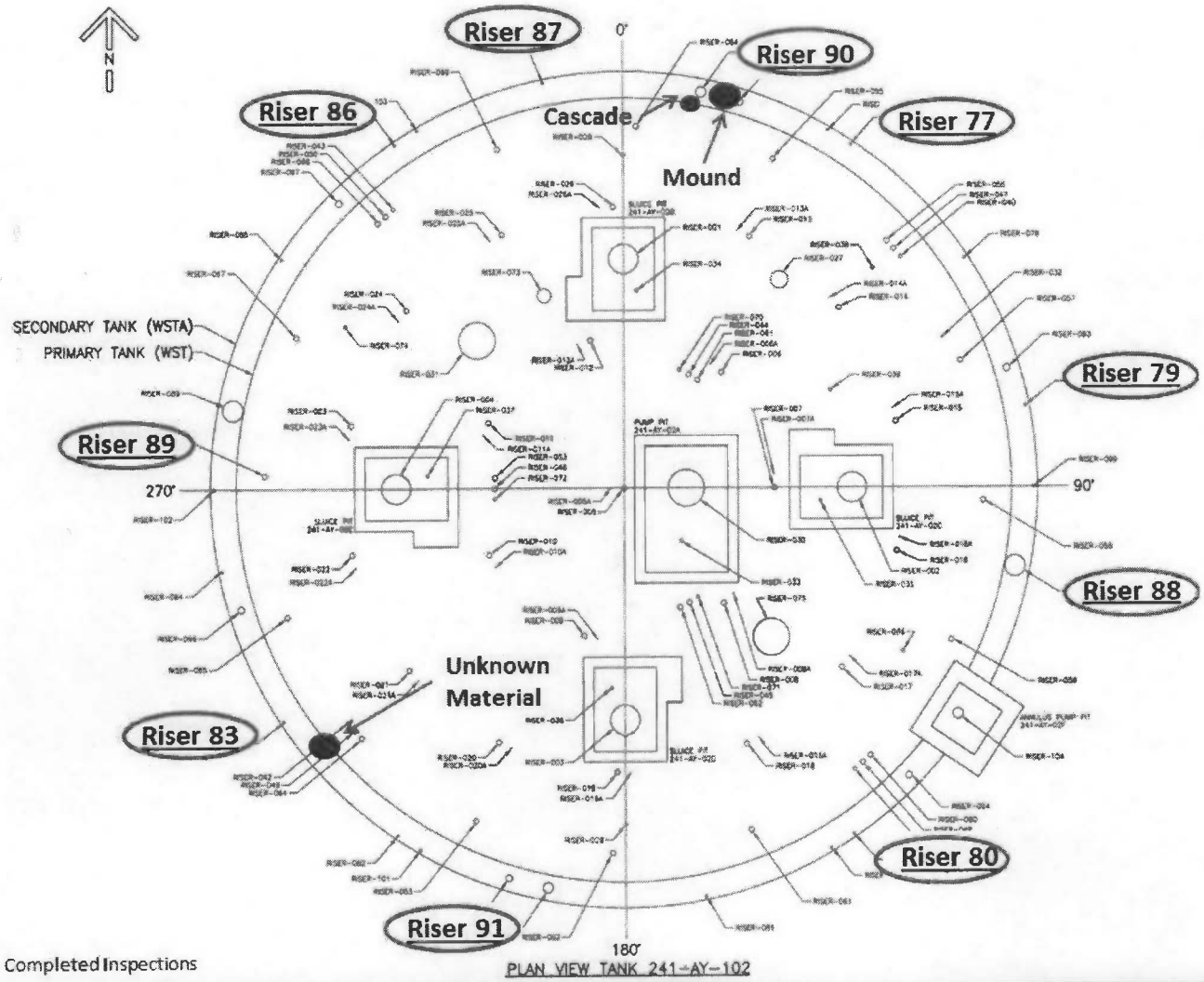
September 7, 2012

Summary

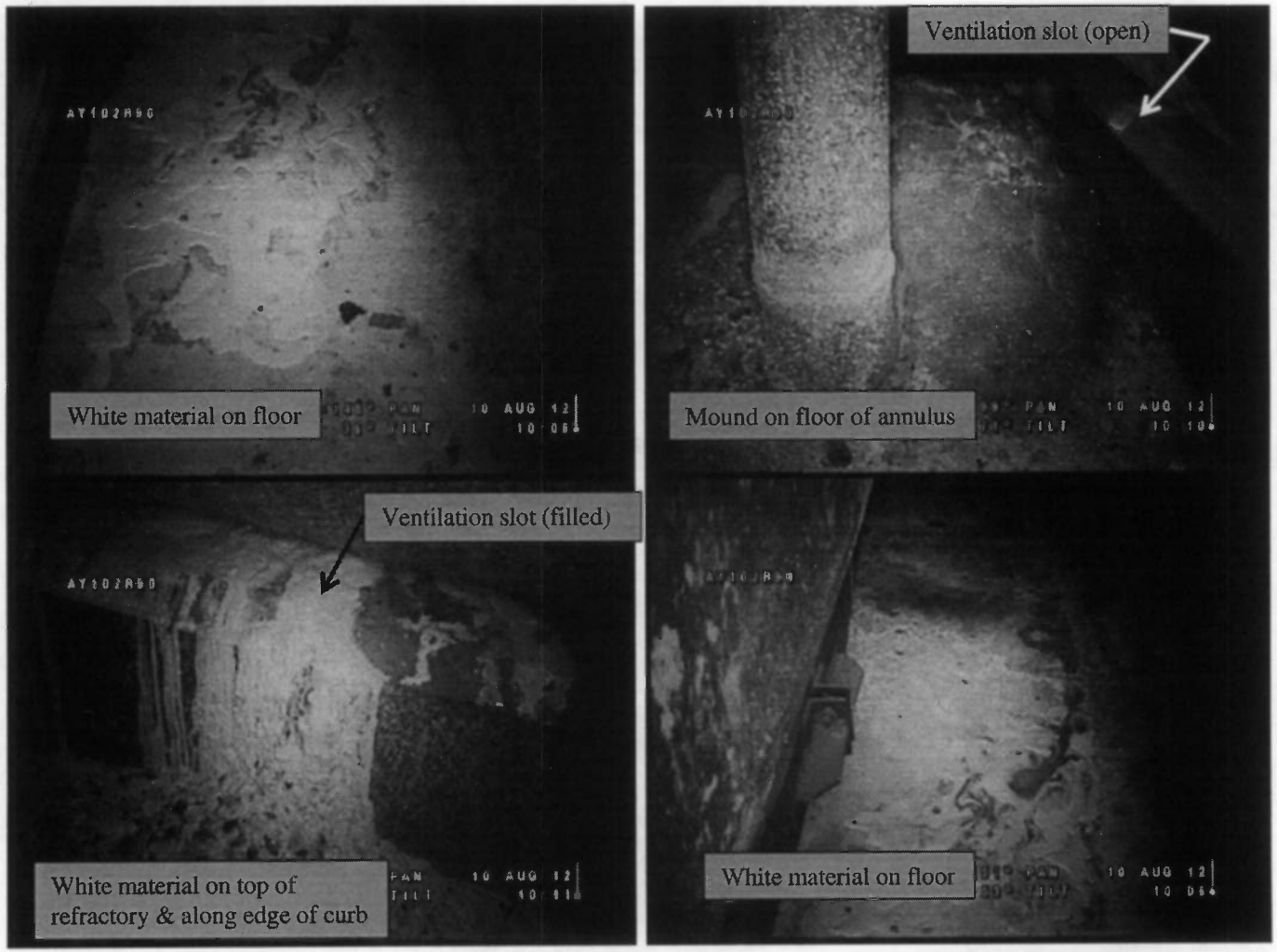
Routine periodic visual monitoring (via camera) of the AY-102 annulus found material that was never before seen. Inspection of the annulus to date have noted the following:

- Material found in three locations (risers 83 & 90) – source unknown
  - Dark brown mound (approximately 2 ft. x 3 ft. x 8 inches) – riser 90
  - White material on both the refractory (tank sits on refractory) and annulus floor – riser 90
  - Unknown material adjacent to ring – riser 83
- Material is dry (i.e., no standing water or indications of moisture)
- Leak Detection and Continuous Air Monitor (CAM) operable in annulus (real time monitoring)
- Camera equipment removed from annulus without incident (i.e., no contamination on equipment)
- Contamination present when annulus floor sample was taken from riser 90

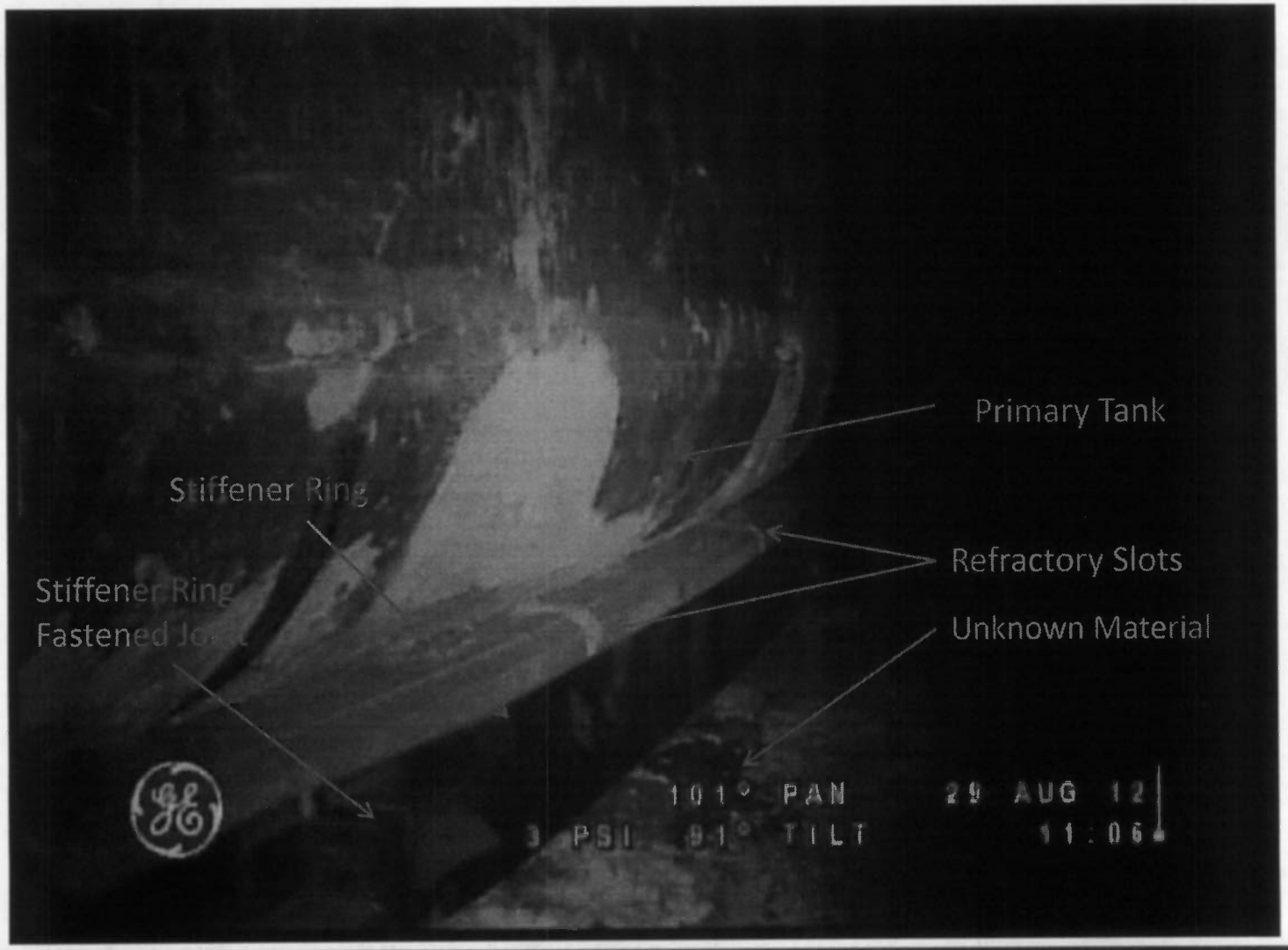
AY-102 Annulus Inspections



Inspection Photographs from Riser 90 – August 10, 2012

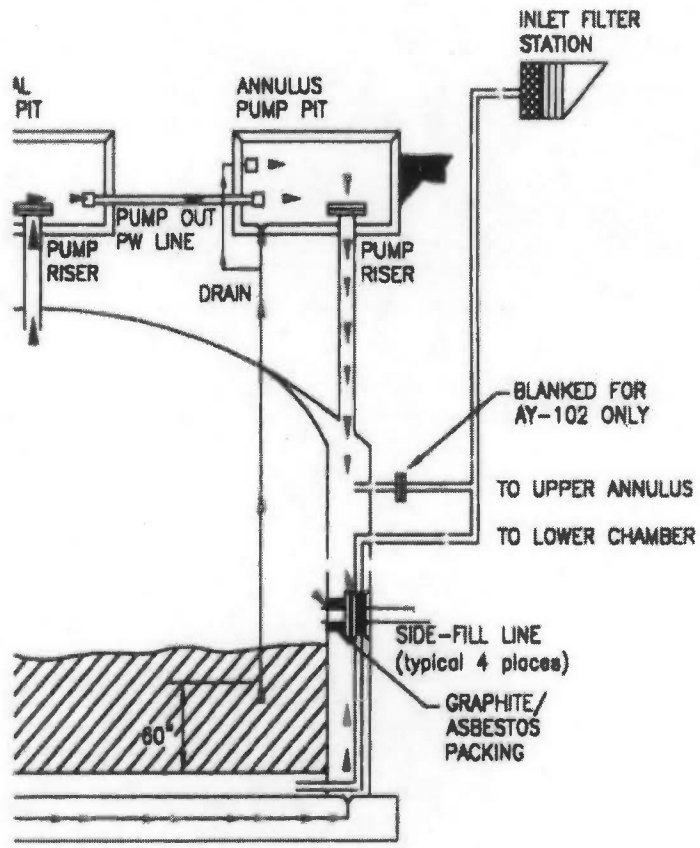


Overview of Region Viewed from Riser 83 – August 29, 2012



AY-102 Background

- Double-Shell Tank (DST) AY-102 built in 1970 and placed into service in 1971 as an aging waste spare tank and received waste in 1977
- Annulus ventilation used to remove tank residual heat
- Liner provides secondary containment of waste
- Primary waste types are B Plant evaporated waste and Sludge from single-shell tank (SST) C-106 Sluicing
- No other Hanford waste tank closely approximates this composition of sludge
  - High H_2 Generation
  - Sludge contains solution low in Nitrate, Nitrite, and pH < 12
  - High heat generation
- Current volume 857,000 gallons of sludge and supernatant
- No unexplained primary tank level changes



DST Integrity Monitoring

Two elements make-up the DST Integrity Monitoring Program – Inspections and Tank Waste Chemistry Control

Inspections

- Annulus videos are performed on a nominal 5 year cycle, not to exceed 7 years
  - AY-102 last performed in 2006
    - » No indications of material in annulus
- Ultrasonic (UT) wall thickness testing is performed on the primary tank wall from the annulus on an 8 to 10 year cycle
  - WRPS averages completing 3 to 4 tank UT scans each year
  - AY-102 UT last performed in 2007 (no abnormalities noted)

Tank Waste Chemistry Control

- Corrosion monitoring probes are installed in many DSTs with removal and analysis of the probe every 3 years
  - AY-102 corrosion probe installed in 2009
- Tank waste samples are taken on a nominal 5 year cycle for chemistry control, or more frequently when transfers are being made into or out of a tank (e.g., SST retrievals)

Ongoing Investigatory Actions

Action	Status
• Initiate camera installation in Riser 90	COMPLETE
– Monitoring twice per week per monitoring plan	
• Increased level monitoring of Annulus	COMPLETE
– Monitor each Shift	
• Perform bi-weekly monitoring of CAM	COMPLETE
• Initiate activities to obtain samples of materials	IN PROGRESS
– Data Quality Objective (DQO) and Sample Plan under development	
– Obtain annulus samples mid to late September (on schedule)	
• Initiate Tank Assessment Process	IN PROGRESS
– Use Tank Leak Assessment Process	
– Complete assessment about 1 week after sample results are reported	
• Document near term and long term actions in Engineering Path Forward	IN PROGRESS

Near Term Actions

- **Initiate tank annulus inspection (accessible areas)**
  - Develop list of accessible risers – Complete
  - Develop Work Package and Inspection Criteria – Complete
  - Annulus inspection initiated week of August 27, 2012 – Complete
  - Inspection scheduled for completion mid-September
- **Develop contingency plan to transfer AY-102 contents**
  - Developing transfer procedure – In Progress
  - Developing work packages to verify transfer system components are operational (motors, valves, piping) – In Progress
  - Task Ready to Transfer – draft schedules prepared
- **Sample & pump tertiary leak detection pit (Confirms secondary liner integrity)**
  - Review procedure and issue sample request – Complete
  - Ready to sample by September 7
  - Prepare to pump contents by mid-September

Long Term Actions

- **Determine Extent of Condition (i.e., applicability to other tanks)**
  - Developing list of tanks for accelerated inspection (up to 7 tanks)
    - » Similar tank construction and operating history
    - » Similar process history
- **Initiate planning to inspect ventilation piping and adjacent ventilation slots to assess cause**
  - Determining feasibility to perform inspection of ventilation piping
  - Developing work package to inspect ventilation slots
    - » Evaluating ability to perform concurrent with annulus inspection
- **Explore means for removing material from annulus**
  - Initiated discussions with robotic crawler vendors

Conclusion

- Tank is stable with enhanced monitoring in place
- Investigation in progress to determine source of dried solids on floor of annulus and material condition of tank components
- Extent of Condition Evaluation initiated
- Actions underway to mitigate hazard should conditions within the annulus change
- Tank Waste mission essential to mitigate risk associated with aging waste tanks

Hildman, Cynthia M

From: Bohrmann, Dieter (ECY) <DBOH461@ecy.wa.gov>
Sent: Friday, August 31, 2012 11:08 AM
To: Gamache, Lori M
Subject: RE: Update of AY-102 Material Discovery

Thanks, Lori!

From: Gamache, Lori M [Lori_M_Gamache@rl.gov]
Sent: Friday, August 31, 2012 11:05 AM
To: Bohrmann, Dieter (ECY)
Subject: FW: Update of AY-102 Material Discovery

Hi Dieter,

Per my voicemail, below is an employee message we sent out today, updating them on AY-102. I will be contacting some media today who have been following this issue.

Thanks,
Lori

From: ^ORP Office of Communications
Sent: Friday, August 31, 2012 10:31 AM
Subject: Update of AY-102 Material Discovery

ANNOUNCEMENT

Department of Energy	ORP No. 12-084
Office of River Protection	
P.O. Box 450	
Richland, Washington 99352	Issued: 8-31-2012

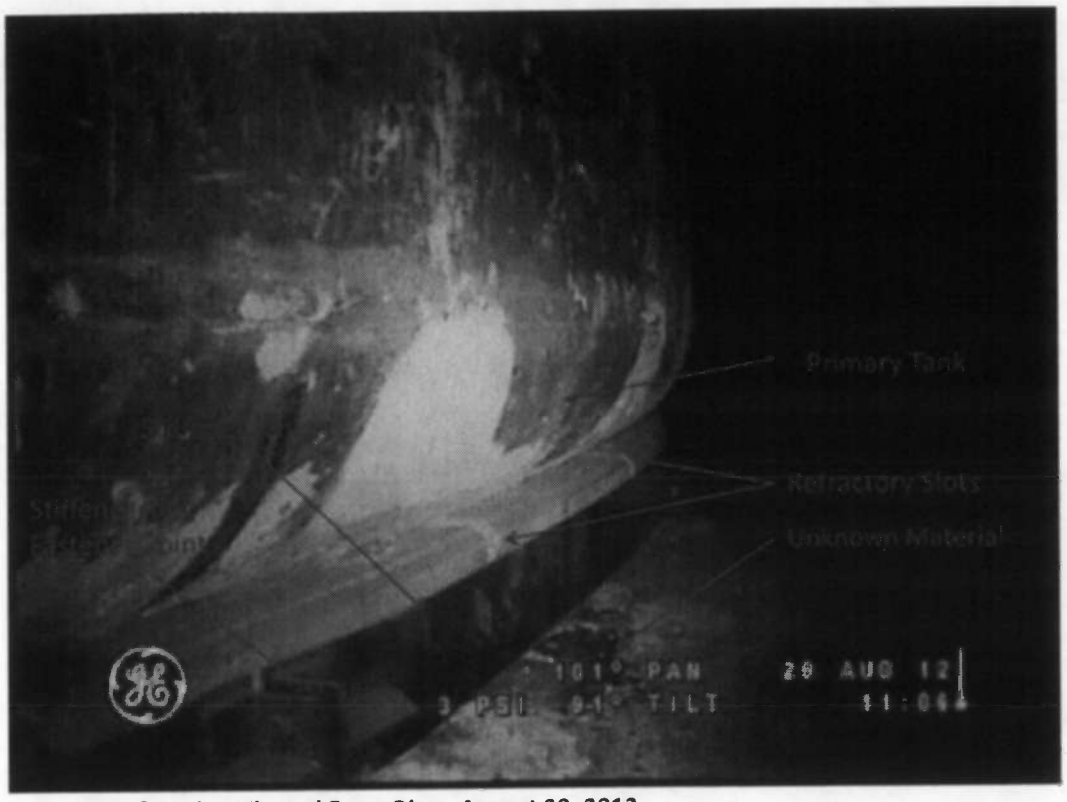
To: All ORP Employees
Subject: Update of AY-102 Material Discovery

Earlier this month we notified regulators, employees and the public of material found within the annulus of double-shell tank AY-102. We committed to keeping you informed as we proceed with our investigation of this tank. That investigation includes visual inspections through other risers in the tank annulus.

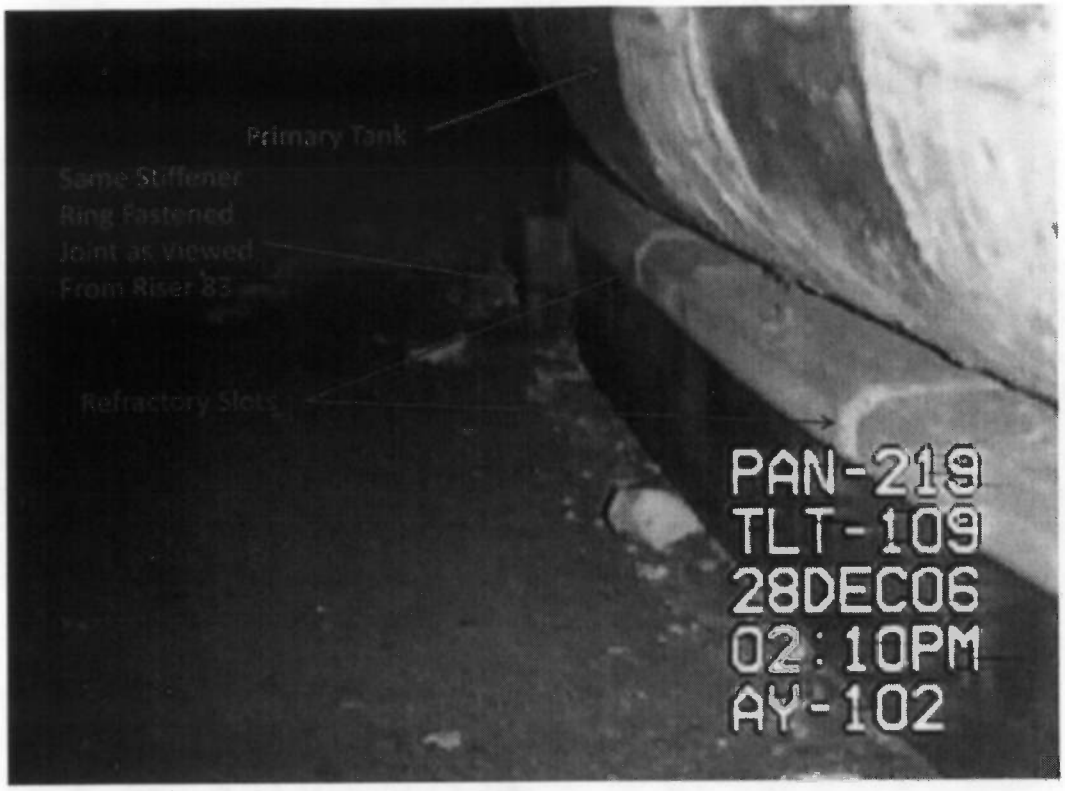
A second riser was visually inspected this week and additional material was identified in the annulus near this second riser. At this time, it is unknown if the material is radioactive. This area of the tank annulus was previously viewed in 2006, providing historical benchmarking data. The 2006 visual inspection did not show

any unknown material in this area of the tank annulus. We are continuing our investigation, including gathering additional information from other tank risers. As we learn more, we will keep you informed.

Tom Fletcher



Overview of Region Viewed From Riser, August 29, 2012



Overview of Region Viewed From Riser in 2006

Hildman, Cynthia M

From: Niles, Ken <ken.niles@state.or.us>
Sent: Wednesday, August 22, 2012 9:59 AM
To: Gamache, Lori M
Subject: RE: Occurrence Report for Discovery of Material in AY-102 Annulus

Thanks – I was thinking one of these should have been filed on August 10.

From: Gamache, Lori M [mailto:Lori_M_Gamache@rl.gov]
Sent: Tuesday, August 21, 2012 6:27 PM
To: 'Ken Niles'
Subject: FW: Occurrence Report for Discovery of Material in AY-102 Annulus

Hi Ken,

I spoke with Tom about the Occurrence report on AY-102. Please see below.

Thanks,
Lori

From: Fletcher, Thomas W
Sent: Tuesday, August 21, 2012 12:47 PM
To: Gamache, Lori M
Subject: FW: Occurrence Report for Discovery of Material in AY-102 Annulus

Lori,

Here is the occurrence report for AY-102.

Thanks,
Tom Fletcher, PE, PMP
Assistant Manager of Tank Farms
Tank Farm Project – Office of River Protection
Phone: 509.376.3434 || **Fax:** 509.372.1350 || **Cell:** 509.539.2828

From: Little, David B
Sent: Tuesday, August 21, 2012 12:43 PM
To: Fletcher, Thomas W
Subject: FW: Occurrence Report for Discovery of Material in AY-102 Annulus

Tom – here is the content of the reportable.

David

From: Wilkinson, Robert E
Sent: Monday, August 20, 2012 2:30 PM
To: Sams, Terry L; Little, David B
Subject: FW: Occurrence Report for Discovery of Material in AY-102 Annulus

From: Malhan, Rakesh
Sent: Monday, August 20, 2012 2:29 PM
To: Frink, Ronald L; ^Occurrence Notify Center
Cc: Waters, Shaun F; ^Tank Farms Shift Operations; Patten, Elester; Wilkinson, Robert E; Moser, David R; Strasser, David W
Subject: Occurrence Report for Discovery of Material in AY-102 Annulus

OCCURRENCE REPORT NUMBER:	Pending (TANKFARM)	
REPORTING CONTRACTOR:	WRPS	
REPORTING FACILITY/AREA:	241-AY / 200-E	
REPORT ORIGINATOR/PHONE #:	Rakesh Malhan / 509-373-2689	
DATE/TIME OF DISCOVERY:	08/20/12	1351
DATE/TIME CATEGORIZATION:	08/20/12	1415
DATE/TIME ONC NOTIFIED:	08/20/12	1429
OCCURRENCE REPORT STATUS:	Notification Report Pending	
SIGNIFICANCE CATEGORY:	3	
HQ-OC PROMPT NOTIFICATION:	N/A	

OCCURRENCE REPORT CRITERIA: Group 10 (2) SC-3, "An event, condition, or series of events that does not meet any of the other reporting criteria, but is determined by the Facility Manager or line management to be of safety significance or of concern for that facility to other facilities or activities in the DOE complex."

OCCURRENCE REPORT DESCRIPTION: Periodic visual monitoring (via camera) of the DST AY-102 annulus, part of the tank integrity program, identified dry material on the annulus floor. Survey results near the material identified contamination levels higher than expected. From the inspections the condition is stable and the identified material is contained in the secondary tank structure.

AY-102 was built in 1970 and placed into service during 1971. The primary waste in the tank comprises of B-Plant Low Level Waste and Sludge from C-106 Sluicing operations. The tank has a volume of 784,000 gallons of sludge and supernate and there has been no unexplained primary tank level change. The primary and annulus ventilation is fully operational and is used to remove residual heat from the primary tank.

Due to the ongoing investigation of the material and potential impacts to ongoing operations, management is declaring an occurrence to communicate information associated with the anomaly.

IMMEDIATE ACTIONS TAKEN:

- Increased monitoring frequency of liquid level in primary tank and liquid detection in the annulus space
- Initiated Tank Assessment Process following company and regulator approved process
- Initiated activities to obtain samples of the identified material
- Initiated camera installation in Riser for twice a week visual monitoring
- Initiated planning to inspect all accessible areas of tank annulus
- Initiated extent of condition evaluations.

NOTIFICATIONS:

On-Call Sr. Mgmt Rep:	Lester Patten on 08/20/12 @ 1428
On-Call FR:	Ron Frink on 08/20/12 @ 1426
ONC:	Terry Woodford on 08/20/12 @ 1429

Rakesh Malhan
Washington River Protection Solutions,
contractor to the United States Department of Energy
509-373-2689

Hildman, Cynthia M

From: Murphy, Kim <kamurphy@tribune.com>
Sent: Tuesday, August 21, 2012 3:17 PM
To: Gamache, Lori M
Subject: RE: Discovery of Material in Double Shell Tank AY-102

Unfortunately, this photo isn't viewable embedded in the email. do you have it as an attachment?

thanks,

Kim

Kim Murphy
Los Angeles Times
latimes.com
Northwest Correspondent
Seattle
206-201-3549
kim.murphy@latimes.com
Twitter: @kimmurphy

From: Gamache, Lori M [Lori_M_Gamache@rl.gov]
Sent: Tuesday, August 21, 2012 2:14 PM
To: Murphy, Kim
Subject: Discovery of Material in Double Shell Tank AY-102

Hi Kim,

Per our conversation, below is a picture of a typical double-shell tank. In addition, below is some information related to AY-102 which you may find useful.

Thanks,
Lori

During a routine inspection of double-shell tank (DST) AY-102, a small amount of dried material was discovered inside the tank annulus. This observation was made by inserting a video camera through a tank riser which had not previously been used for visual examinations. The annulus is the area between the inner and the outer wall of the DST, which serves as an overflow area if the inner steel liner were to leak. There is no evidence of liquid in the annulus from inspections conducted thus far. This material is contained within the outer wall of the tank and poses no current threat to workers, the public or environment.

This is the first time material has been discovered outside the primary wall of a DST. WRPS maintains a rigorous tank-integrity program to evaluate the conditions of the tanks through regular inspections. No other findings have been identified in any of the other DSTs.

Tank AY 102 was built in 1970 and put into service in 1971. AY Farm was the first DST farm built at Hanford from 1968-1970. The farm contains two DSTs, each capable of holding more than 1 million gallons of waste. This DST currently stores approximately 857,000 gallons of waste. There is approximately 706,000 gallons of liquid waste and 151,000 gallons of waste sludge, the bulk of which came from tank C-106, a single-shell tank in which retrieval activities were declared complete in 2003.

Analysis of samples taken near the material show higher-than-expected contamination levels. Until we learn more about this material and begin to understand the source, we are increasing the monitoring frequency of AY-102. In addition, we are actively working to characterize the material to determine the appropriate next steps, and visually inspecting all accessible areas within the tank to ensure no other material is present.

We have been in ongoing discussions with the Washington State Department of Ecology regarding the inspection of this tank.

Department of Energy	ORP No. 12-107
Office of River Protection	
P.O. Box 450	
Richland, Washington 99352	Issued: 10/22/12

To: All ORP Employees
Subject: Updated Release on AY-102

To continue my commitment to share real time information, below is a press release on double-shell tank (DST) AY- 102. This will be issued today.

Please contact me if you have any questions.

Thanks,
Tom Fletcher

HANFORD DETERMINES DOUBLE-SHELL TANK LEAKED WASTE FROM INNER TANK

Testing found no indication of leaks outside the outer tank

RICHLAND -- The Department of Energy's Office of River Protection (ORP), working with its Hanford tank operations contractor Washington River Protection Solutions, has determined that there is a slow leak of chemical and radioactive waste into the annulus space in Tank AY-102, the approximately 30-inch area between the inner primary tank and the outer tank that serves as the secondary containment for these types of tanks. This is the first time a double-shell tank leak from the primary tank into the annulus has been identified. There is no indication of waste in the leak detection pit outside the DST, which means that no waste has leaked out of the annulus and into the environment.

Since the material in the annulus was discovered in August, ORP has conducted a video surveillance of more than 95% of the walls and floor of the annulus through 10 risers, or pipes, that extend from within the interior of the tank annulus up through the tank dome to ground level. The surveillance video revealed material in two locations near Riser 90 and one location near Riser 83. In addition to the video surveillance, DOE has taken samples from all locations and performed sample analysis.

Through the sample analysis, DOE has confirmed that one of the areas of material located near Riser 90 is a 2 foot by 2 foot by 8 inch mound of soil, and is not waste. The Department suspects the soil fell into the annulus during construction repairs to the ventilation system. The additional analyses have also allowed DOE to confirm that the material in the remaining two locations in the tank's annulus is waste. The waste is primarily crystalline in form and does not include any pumpable liquid.

ORP is continuing to conduct regular visual inspections of the tank. Based on the most recent inspections located near Riser 83, there is indication that the inner tank is slowly leaking.

"We will continue to perform visual inspections twice a week of the material inside the annulus, using cameras. In addition, liquid levels inside the primary tank and annulus will continue to be monitored. Liquid level monitors, although they cannot detect small changes like those that have occurred in Tank AY-102, would record any significant changes in the liquid levels of the tank," said Tom Fletcher, Assistant Manager for the Tank Farms Project. "We are working collaboratively with Washington State Department of Ecology to

determine the most effective path forward for AY-102 and ensure that we are effectively protecting the public and the environment."

The material was discovered in the tank annulus space during a regularly scheduled DST Integrity Inspection. The area of the annulus floor is approximately 600 square feet. DOE estimates that the waste near Riser 83 covers an area of about three square feet that is less than ½ inch thick. The waste located near Riser 90 covers an estimated 40 square feet and is less than ¼ inch thick.

The underground DSTs include built-in secondary containment, with the outer shell surrounded by steel-reinforced concrete. There is no indication of waste in the leak detection pit outside the DST, which means that no waste has leaked out of the annulus and into the environment.

Since the discovery of material, ORP has kept the Washington State Department of Ecology and other Hanford stakeholders updated on the status of tank AY-102.

Remote-controlled sampling devices were modified and deployed into the annulus to take several samples of the material. ORP completed analysis of the samples and the results were reviewed by a panel of experts and senior managers who made the determination that the inner shell of tank AY-102 had leaked.

There have been no indications of abnormal events or leaks detected in any of the other double-shell tanks through routine monitoring. ORP monitors liquid level indicators within the primary tank and the annulus of the DSTs and continuously monitors for airborne contamination within the annulus. In addition, DST Integrity Program inspections that already occur will be accelerated and expanded to perform visual inspections on six other tanks that have similar construction as well as operating and process histories. These tanks are located in the AY, AZ, and SY tank farms.

Tank AY-102 was the first double-shell tank constructed at Hanford and has been in operation for more than 40 years. It contains about 850,000 gallons of sludge and liquid waste from the past production of plutonium for the nation's nuclear arsenal.

###

Hildman, Cynthia M

From: Gamache, Lori M
Sent: Monday, August 20, 2012 2:14 PM
To: 'Bohrmann, Dieter (ECY)'
Cc: Olds, Theodore E (Erik); Meyer, Carrie C
Subject: RE: Media on DST issue

Hi Dieter,

Thanks for the information. We are also receiving a lot of calls. Something posted on Environment News Service at http://ens-newswire.com/2012/08/20/hanford-double-shell-tank-leaks-nuclear-waste/. It looks like the picked up inform from HC release and TCH article.

Attached is the background/Q&A we prepared in advance of communicating this information. Our roll-out and key messages are:

Discovery of material in AY-102 annulus

Objective:

1) Inform key stakeholders of:
    a. discovery of material in AY-102 annulus, first such event in a double-shell tank (DST)
    b. apparent stability of tank material posing no current threat to workers, public, or environment
    c. DOE-ORP/WRPS path forward in dealing with the discovery

Messages:

1) Material remains inside the DST and poses no threat to workers, the public or environment
2) We are actively working to characterize the material to determine the appropriate next steps
3) We have increased the frequency of monitoring in this Hanford's DST while working with the Department of Energy (DOE) and Ecology to identify future actions
4) Events such as this reinforce the importance of emptying all the Hanford waste storage tanks as quickly as possible

Actions:

1) Develop RTQ for use in notifying external stakeholders
2) Develop message for DOE and WRPS employees
3) Coordinate stakeholder notifications among GMOS/URS, WRPS and DOE-ORP
4) Implement notifications

In addition, we just briefed HQ and I've attached the presentation for your information.

Thanks,
Lori

DST intrusion 081712.docx

EM-1_AY-102_Status briefing to...

From: Bohrmann, Dieter (ECY) [mailto:DBOH461@ecy.wa.gov]
Sent: Monday, August 20, 2012 1:24 PM
To: Gamache, Lori M
Cc: Olds, Theodore E (Erik); Meyer, Carrie C
Subject: Media on DST issue

Hi Lori,

In addition to Annette Cary last week, we've been contacted by a few other reporters who are following up on Tom Carpenter's news release re: AY-102.

We had email inquiries from Mike Nartker at WCM and Derek Sands at Platts. We also spoke to John Stang, who is reporting for Crosscut. Cheryl Whalen is handling most of the interviews. Our talking points include general concern about possible leak; DSTs critical to retrieval mission; no evidence that there's any threat to environment at this time; working to collect more information and continuing discussions w/DOE, etc.

I'm sure this is keeping you all busy. Just wanted to let you know who we have heard from.

Thanks.

Dieter

Dieter Bohrmann
Communications manager
Washington Department of Ecology
Nuclear Waste Program
509.372.7954
509.420.3874 (c)

DRAFT RTQ: Discovery of material in AY-102 annulus

General statement:

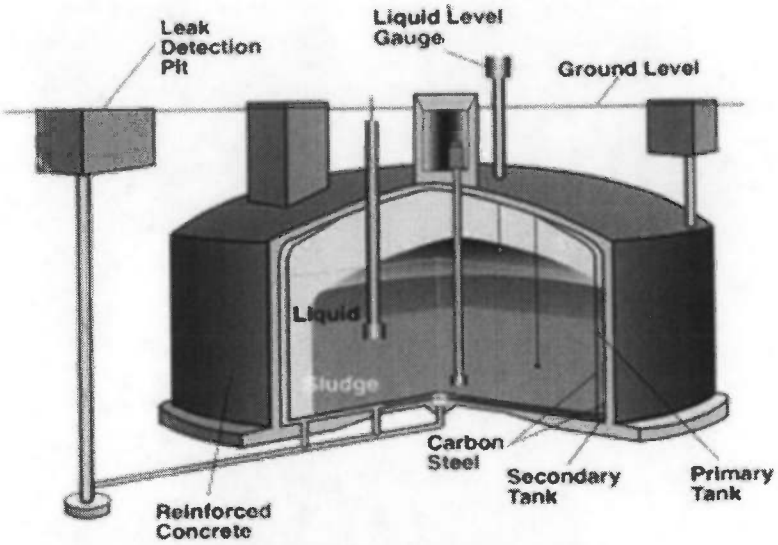
As part of an ongoing monitoring process, WRPS engineers have discovered a small amount of dried material outside the inner wall of one of Hanford's double-shell tanks (DSTs). The material is still contained within the outer wall of the tank and poses no current threat to workers, the public or environment.

The discovery was made during a routine inspection of DST AY-102, which stores approximately 857,000 gallons of radioactive and hazardous waste from Hanford's past plutonium production mission. Hanford has 28 DSTs, where waste from 149 aging, leak-prone single-shell tanks (SSTs) is being sent for safe storage until it can be processed at the Waste Treatment Plant (WTP). AY-102 is slated to be one of the first to deliver waste to the WTP once operations begin.

It is still unknown at this point how the material collected outside the inner wall of AY-102. WRPS has increased the frequency of monitoring in this DST while working with the Department of Energy (DOE) and Ecology to identify future actions.

About the tanks:

DSTs are essentially a tank within a tank. The primary "inner" tank consists of a carbon steel liner and dome top resting on a platform of insulating concrete. This tank is encapsulated by a secondary "outer" carbon steel liner along the walls and floor. Between the inner and outer walls exists a gap—or annulus—which would serve as an overflow area if the inner steel liner were to leak. Both liners are encapsulated by an outer shell of reinforced concrete, capped with a concrete dome and buried under seven to 10 feet of soil.



DOUBLE-SHELL TANK

Q&A:

Q. What is the material? Is there the possibility it could be waste?

A. Further sampling and analyses is needed to determine the composition of the material. Analyses of samples taken near the material show higher-than-expected contamination levels and we are actively working to characterize the material to determine the appropriate next steps.

Q. How much material was discovered in the annulus? Is there increased risk?

A. A dried mound of material, approximately 2 feet x 3 feet x 8 inches, was discovered in the space between the first and second walls of DST AY-102. This discovery poses no increased threat to workers, the public or the environment.

Q. How did the material get there?

A. It is unknown at this time how the material got into the annulus of the tank. We are actively working to sample and inspect to determine how the material got there. All accessible areas within the tank will be visually inspected to ensure no other material is present.

Q. When was AY-102 built? How much waste does it hold?

A. Tank AY-102 was built in 1970 and put into service in 1971. AY Farm was the first DST farm built at Hanford from 1968-1970. The farm contains two DSTs, each capable of holding more than 1 million gallons of waste.

AY-102 contains approximately 706,000 gallons of liquid waste and 151,000 gallons of waste sludge, the bulk of which came from tank C-106, an SST in which retrieval activities were declared complete in 2003.

Q. How long is life expectancy of a DST?

A. The DSTs built at Hanford have a design life of between 25 and 50 years. Currently, none of the DSTs are known to have leaked waste to the environment, and this is the first discovery of material outside of the inner liner of a DST. This discovery reinforces the importance of our mission to safely retrieve and treat the waste in Hanford's underground tanks.

Q. When did the last waste-disturbing activity take place in AY-102?

A. In 2007, the Tank Operations Contractor transferred liquid waste from AP-101 to AY-102 in order to combine all waste approved for WTP hot commissioning feed into a single tank.

Q. Are there any other DSTs affected?

A. This is the first time material has been discovered outside the inner wall of a DST. WRPS maintains a rigorous tank-integrity program to evaluate the conditions of the tanks via regular inspection. No other findings have been identified in any of the other DSTs.

Q. Are the tanks monitored now? What's going to be done moving forward?

A. Yes, WRPS uses a measuring instrument inside the primary tank to continuously monitor tank-waste levels. In addition, three instruments are placed inside the annulus space just above the tank floor in order to detect potential leaks. These also provide continuous monitoring capabilities and a daily reading is recorded to track status. A continuous air monitoring system is also in place to measure any potential waste particulates that might enter the annulus. In this instance, the dried material was identified using video cameras during a periodic visual inspection of the annulus space.

WRPS will increase monitoring of the annulus space of AY-102 by inserting cameras into the annulus space twice a week to conduct visual inspections. Leak detection pits located underneath the bottom of the tank are in the process of being sampled to confirm the integrity of the tank.

Q. Do you plan on pumping the liquid out of the DSTs if cracks are discovered in the inner tanks? What if these tanks are, in fact, leaking?

A. If it is proven that the primary liner of the tank has leaked waste into the annulus of the DST, DOE and WRPS will work with Ecology to determine the appropriate path forward. The DSTs are doing what they were designed to do by keeping the waste from leaking into the environment. While these tanks seem to be showing the first signs of their age, the discovery of material in the annulus does not pose a threat to the public, our workers or the environment.

Q. What kind of impact does this have on WTP? Does it affect your ability to send waste to the vit plant?

A. AY-102 is slated to be one of the first DSTs to send waste to the WTP once it begins operations. The discovery of material in the annulus space does not change those plans. If the material is identified as waste, DOE and WRPS will work together with Ecology to determine future actions.

Tank AY-102 Status

Tom Fletcher

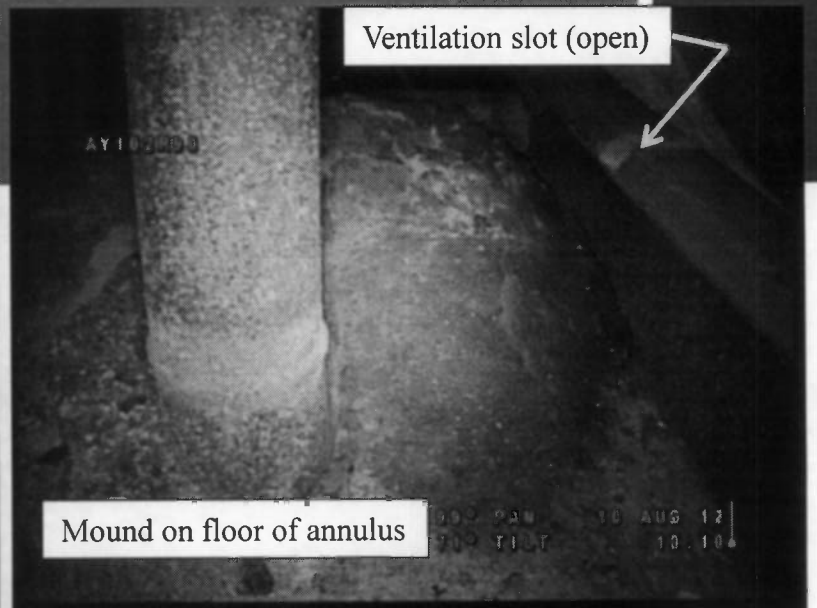
August 20, 2012

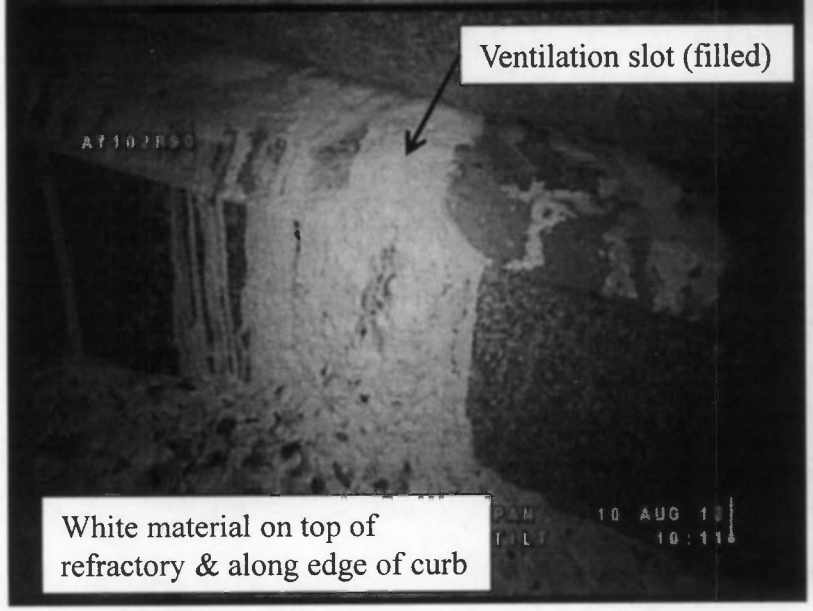
Summary

Routine periodic visual monitoring (via camera) of the AY-102 annulus found material that was never before seen. Inspection of the annulus noted the following;

- Material found in two locations near Riser 90 – source unknown
  - mound approximately (2 ft. x 3 ft. x 8 inches)
  - white material on both the refractory (tank sits on refractory) and annulus floor
- Material is dry (i.e., no standing water or indications of moisture)
- Leak Detection and Constant Air Monitor (CAM) Operable in Annulus (real time monitoring)
- Camera equipment removed from annulus without incident (i.e., no contamination on equipment)
- Contamination present when annulus floor sample was taken

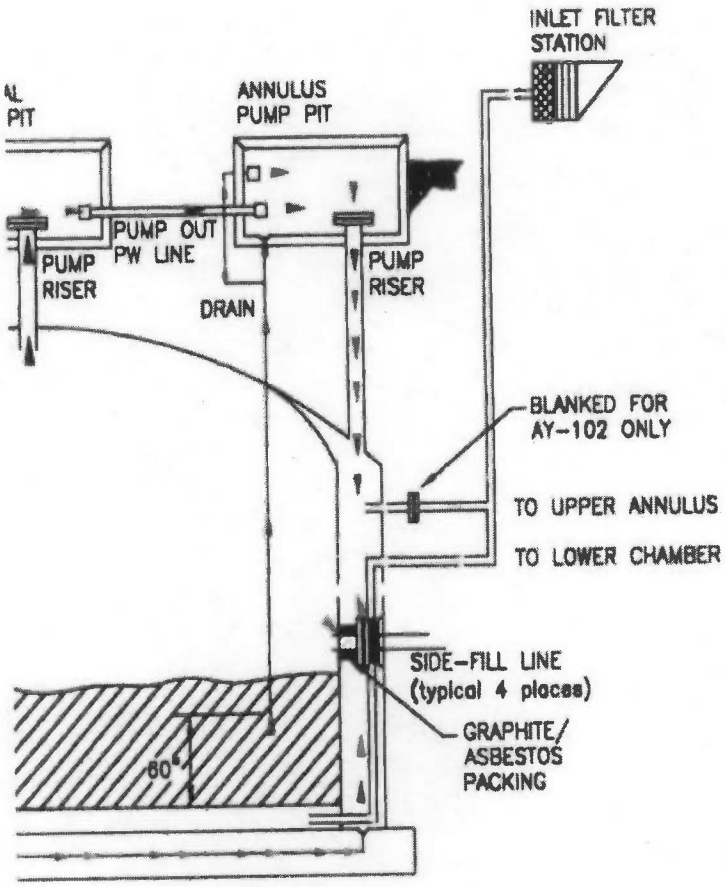
Riser 90 Inspection Photographs





Background

- AY-102 built in 1970 and placed into service in 1971 as aging waste spare and received waste in 1977
- Annulus ventilation used to remove tank residual heat
- Liner provides secondary containment of waste
- Primary waste types are B Plant evaporated waste and Sludge from C-106 Sluicing
- No other Hanford Waste Tank closely approximates this composition of <u>sludge</u>
  - High H_2 Generation
  - Sludge contains solution low in Nitrate, Nitrite, and pH < 12
  - High Heat Generation
- Current volume 784,000 gallons of sludge and supernatant
- No unexplained primary tank level changes



DST Integrity Monitoring

Two elements make-up the Double Shell Tank (DST) Integrity Monitoring Program – Inspections and Tank Waste Chemistry Control

Inspections

- Annulus videos are performed on a nominal 5 year cycle, not to exceed 7 years.
  - AY-102 last perform in 2006
- Ultrasonic wall thickness testing is performed on the primary tank wall from the annulus on an 8 to 10 year cycle.
  - WRPS averages completing 3 to 4 tank UT scans each year
  - AY-102 UT last performed in 2007 (no abnormalities noted)

Tank Waste Chemistry Control

- Corrosion monitoring probes are installed in many DST with removal and analysis of the probe every 3 years
  - AY-102's corrosion probe was installed in 2009
- Tank waste samples are taken on a nominal 5 year cycle for chemistry control, or more frequently when transfers are being made into or out of a tank (e.g., SST retrievals)

Ongoing Investigatory Actions

Action	Status
• Initiate camera installation in Riser 90	COMPLETE
• Monitoring twice per week per monitoring plan	
• Increased level monitoring of Annulus	COMPLETE
• Monitor each Shift	
• Perform bi-weekly monitoring of CAM	COMPLETE
• Develop tank specific history timeline	COMPLETE
• Tank contents, Operational Events & Radiological Events	
• Initiate activities to obtain samples of materials	IN PROGRESS
• Data Quality Objective (DQO) and Sample Plan under development	
• Obtain annulus samples mid to late September	
• Initiate Tank Assessment Process	IN PROGRESS
• Use TFC-ENG-CHEM-D-42, *Tank Leak Assessment Process*	
• Complete assessment about 1 week after sample results are reported	
• Document near term and long term actions in Engineering Path Forward	IN PROGRESS

Near Term Actions

- **Initiate tank annulus inspection (accessible areas)**
  - Developed List of Accessible Risers – Complete
  - Developing Work Package and Inspection Criteria – In Progress
  - Annulus inspection planned for week of August 27, 2012
- **Develop Contingency Plan to Transfer AY-102 Contents**
  - Developing transfer procedure – In Progress
  - Developing Work packages to verify transfer system components are operational (motors, valves, piping) – In Progress
  - Task Ready to Transfer – in 6 to 8 weeks (as non-emergency)
- **Sample & pump tertiary leak detection pit (Confirms secondary liner integrity)**
  - Review procedure and issue sample request – In Progress
  - Ready to sample and pump contents – by August 30

Long Term Actions

- **Determine Extent of Condition (i.e., applicability to other tanks)**
  - Developing list of tanks for accelerated inspection (up to 7 tanks)
    - Similar Tank Construction and Operating History
    - Similar Process History
- **Initiate planning to inspect Ventilation piping and adjacent ventilation slots to assess cause**
  - Determining feasibility to perform inspection of ventilation piping
  - Developing work package to inspect ventilation slots
    - Evaluating ability to perform concurrent with annulus inspection
- **Explore means for removing material from annulus**
  - Initiated discussions with robotic crawler vendors

Conclusion

- Tank is stable with enhanced monitoring in place
- Investigation in progress to determine source of dried solids on floor of annulus and material condition of tank components
- Extent of Condition Evaluation initiated
- Actions underway to mitigate hazard should conditions within the annulus change
- Tank Waste Mission essential to mitigate risk associated with aging waste tanks

Johnson, Jeremy M

From: Lyon, Jeffery (ECY) <JLYO461@ecy.wa.gov>
Sent: Wednesday, March 06, 2013 10:21 AM
To: Johnson, Jeremy M
Subject: Re: AY-102 IPT

I understand your responsibilities. I regretfully need to seek additional help from our internal decision-makers. As of right now I do not know what DOE is doing with regard to pumping this tank, and I am concerned there may be some doubt about what your responsibilities are.

Hopefully I will be able to clarify that.

Thanks

Sent from my iPhone

On Mar 6, 2013, at 9:40 AM, "Johnson, Jeremy M" <Jeremy_M_Johnson@orp.doe.gov> wrote:

> IPT,
>
> At our February 7th meeting we had discussed focusing our attention during the March 7th meeting on options for tank space. There is a briefing scheduled on DST space with the Secretary of Energy on March 15th and a meeting of deep sludge experts on March 26-28th. In light of these recently scheduled meetings I will be cancelling our March 7th meeting. I will send out an updated extent of condition schedule and the most recent pictures from AY-102. I apologize for the late change.
>
> Thanks,
>
> Jeremy Johnson
> DOE-ORP
> Programs Division
> 509-376-1866

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> Jeremy Johnson
> DOE-ORP
> Programs Division
> 509-376-1866

Huffman, Lori A

From: ^Environmental Portal
Sent: Wednesday, December 19, 2012 2:04 PM
To: Adams, M R (Margie); Allen, Ruth M; Atwood, Julie M; Bang, Reese; Beam, Thomas G; blcurn@bechtel.com; Borneman, Lucinda E; Bowers, Holly M; Breshears, Jerralee A; Brunke, Ronald C; Cammann, Jerry W; Cawrse, Allan E; Cherry, Stephen B; Colby, Julie M; Davis, Greta P; Dixon, Brian J; Donnelly, Jack W; Engelmann, Richard H; Erlandson, Brad; Faust, Toni L; Fox, Randal E; Fritz, Lori L; Greene, Michael R; Grohs, Eugene L; Hadley, Karl A; Hagel, Darlene L; Hoglen, Susan T; Hopkins, Andrea M; Horton, Lori J; Huffman, Lori A; Hummer, Amy L; Jaraysi, Moses; Johansen, Stephanie K; Joyner, Jessica A; Kaldor, Reed A; Kemp, Christopher J; Killoy, Steven E; Landon, Roger J; Luke, Jeffrey J; Mattlin, Ellen M; McKarns, Anthony C (Tony); McPherson, Robert B; Miera, Felix R Jr; Miskho, Anthony G; Mulkey, Charles H; Neath, Gae M; Noland, Terry W; Ollero, Jennifer F; Parker, Dan L (Danny); Peck, Bret D; Peistrup, Philip E; Peloquin, Michael G; Perry, Jon K; Petersen, Linda C; Peterson, Kirk A; Pezzetti, Angela R; Proctor, Megan L; Pysto, Thomas H; Ranade, Digambar G (Raja); Ruck, Fred A III; Rumburg, Brian P; Russell, Woody; Seaver, Jennie R; Simmons, Fen M; Slack, Carol L; Smith, Stephen T; Strickland, Michael S; Stubblebine, Scott D; Thompson, Wendy S; Tilden, Harold T II; Toebe, Wayne E; Tuott, Lee C; Vedder, Barry L; Voogd, Jeffry A; Warriner, Richard D; Watson, David J (Dave); Weil, Stephen R; Wiegman, Rebecca S; Williams, Joel F Jr; Williamson, Barbara D; Woolard, Joan G; Wooley, Theodore A; Yasek, Donna M; Zelen, Benjamin J
Subject: 12-NWP-188 - [1212190454] --- REGULATORY INFO --WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITIES CONDUCTED NOVEMBER 12, 2012 OF THE WASTE MATERIAL FOUND NEAR RISER 83 OF THE 241-AY-102 DOUBLE SHELL TANK (D

"12-NWP-188 - [1212190454]" can be accessed via the following link:
http://idmsweb.rl.gov/idms/livelink.exe/open/174202138

WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITIES CONDUCTED NOVEMBER 12, 2012 OF THE WASTE MATERIAL FOUND NEAR RISER 83 OF THE 241-AY-102 DOUBLE SHELL TANK (DST)

Huffman, Lori A

From: ^DOE-ORP Correspondence Control
Sent: Monday, December 17, 2012 12:11 PM
To: Samuelson, Scott L (ORP)
Cc: Stubblebine, Scott D; Harrington, Paul G; Huffman, Lori A; Russell, Woody; Hu, Tachung A (Albert); Lew, Barclay S; Harkins, Brian A; Mauss, Billie M; Wrzesinski, Wendell R; Diediker, Janet A; Johnson, Jeremy M; Fletcher, Thomas W; Ciola, Ronald J; Kemp, Christopher J; Knight, Daniel P; Koll, Ronald J; Mattlin, Ellen M; Trenchard, Glyn D; Wright, Teresa A; Wheeler, Isabelle; Fletcher, Thomas W; Peterson, Becky; Tobias, Shannon L; Steiling, Jeri L; Noyes, Delmar L; Harp, Benton J (Ben); Young, Jason D; Renevitz, Joseph A; Swarens, Cecil L; Abdul, Wahed; Harrington, Christopher C; Vogel, Hans R
Subject: INFO CORR / 12-NWP-188 - [1212170595] / WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITIES CONDUCTED NOVEMBER 12, 2012 OF THE WASTE MATERIAL NEAR RISER 83 OF THE 241-AY-102 DOUBLE SHELL TANK (DST)

"12-NWP-188 - [1212170595]" can be accessed via the following link:
http://idmsweb.rl.gov/idms/livelink.exe/open/174168235

Document: 12-NWP-188
Document Date: 12/12/2012
Author: Hendrickson M.L.
Addressee: Samuelson S.L.

Title: **WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY)ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITIES CONDUCTED NOVEMBER 12, 2012 OF THE WASTE MATERIAL NEAR RISER 83 OF THE 241-AY-102 DOUBLE SHELL TANK (DST)**

MGR	Mendoza, Estella		
	Samuelson, Scott MGR		
	Stubblebine, Scott		
TRS	Harrington, Paul (Actionee)		
AMTT	Diediker, Janet		
	Johnson, Jeremy		
	Steiling, Jeri		
	Tobias, Shannon		
	Wheeler, Isabelle		
	Fletcher, Tom		
	Ciola, Ron	WTP	Noyes, Delmar
	Kemp, Chris		Young, Jason
	Knight, Daniel		Harp, Ben
	Koll, Ronald		Renevitz, Joseph A
	Mattlin, Ellen M.		Swarens, Cecil
	Trenchard, Glyn		Abdul, Wahed
	Wright, Teresa		Harrington, Chris
TRS	Harrington, Paul		Vogel, Hans R
	Huffman, Lori		
	Russell, Woody		
	Flett, Sarah		
	Peterson, Becky		
	Hu, Albert		
	Lew, Barclay		
	Harkins, Brian		
	Mauss, Billie		
WSC	Wrzesinski, Wendell		

Comments:

Records Schedule Information:
ENV-1.d13

Scan?: Yes Sensitive?: No Sensitive Attachments?: No IDMS Folder: ORP General Only

Date ORP CC Rec'd: 12/17/2012

If No Action has been assigned to this document and one is needed, please advise ORP Correspondence Control.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
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711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

December 12, 2012 12-NWP-188

Mr. Scott L. Samuelson, Manager
Office of River Protection
United States Department of Energy
P.O. Box 450, MSIN: H6-60
Richland, Washington 99352

Re: Washington State Department of Ecology (Ecology) Assessment Report for Field Monitoring Activities conducted November 12, 2012 of the waste material near Riser 83 of the 241-AY-102 Double Shell Tank (DST)

Dear Mr. Samuelson:

On November 12, 2012, Ecology staff visited the 241-AY Farm. The purpose of this visit was to witness the weekly visual inspection of the waste material found near Riser 83 of the 241-AY-102 DST. Ecology staff noted the following:

- The extent of the area of the waste material with respect to the annulus "landmarks" (orange foam pieces, black pebble, the ventilation slot, etc.) appeared to slightly grow as compared to the amount of material viewed during the visual inspection conducted 10/18/12 and 10/25/12.
- The moisture streaks on either side of the waste within the ventilation slot near Riser 83 once again appeared to be wet, indicating that the slow leak is still present and has not "self-healed".
- An increased amount of white mineralization on the outside perimeter of the waste material within the annulus space.
- The waste material near the 6-inch refractory/connector ring had turned color from yellow to white. The size or height of the white waste material appeared to "grow" or crystalize. This increase in waste height, in turn created the appearance of "deeper" waste pools and finger channeling of the green and darker yellow colored waste.
- The waste is in direct contact with tank components. During this inspection Ecology staff could not determine if the 6-inch wide carbon steel refractory ring, annulus floor, primary tank liner, or the refractory/concrete material showed staining, cracking, pitting, etc., at those specific locations, as a result of the direct contact. The lack of visual assessment is due to the increased crystal growth, especially in the lower two-thirds of the leak area within the annulus space near Riser 83.

RECEIVED
DEC 17 2012
DOE-ORP/ORPCC

The United States Department of Energy-Office of River Protection, Washington River Protection Solutions LLC, and Ecology Integrated Project Team (IPT) continue to meet on a weekly basis and use this data to develop and evaluate options for the interim and longer term management of this tank and its contents. Ecology staff also participated in a DST Expert Panel on Corrosion (EPOC) conference call. At this time, the EPOC and IPT are unsure of the impacts this waste will have on the tank components that it is in contact with. Analytical results are pending, but preliminary results indicate that the waste is high in nitrite and hydroxide compounds. This would indicate that additional environmental stress cracking due to the waste should be at a slower rate. The EPOC has proposed to initiate additional corrosion tests using simulant that closely matches interstitial liquid and supernatant in the AY-102 DST based on the preliminary analytical results of the waste material.

Attached are Ecology's assessment report and photographs from the November 12, 2012, field visit. If you have any questions, please contact me at 509-372-7970 or Michelle.Hendrickson@ecy.wa.gov.

Sincerely,

Michelle L. Hendrickson, CHMM, PE
Tank System Operations and Closure Engineer
Nuclear Waste Program

dbm
enclosures (2)

cc electronic w/enc:

Tom Fletcher, USDOE-ORP
Lisa Domnoske-Rauch, USDOE-ORP
Jeremy Johnson, USDOE-ORP
Jeff Voogd, WRPS
Steve Killoy, WRPS
Jason Engeman, WRPS
Dennis Washenfelder, WRPS
David Bernhard, NPT
Dirk Dunning, ODOE
Ken Niles, ODOE
Randall Robinson, DNFSB

cc w/enc:

Stuart Harris, CTUIR
Gabriel Bohnee, NPT
Steve Hudson, HAB
Russell Jim, YN
Administrative Record: DST/Tank Waste Storage/214-AY-102/S-2-3
Environmental Portal, LMSI
USDOE-ORP Correspondence Control
WRPS Correspondence Control

ASSESSMENT REPORT

Field Monitoring Activities

A. GENERAL INFORMATION

Project:	241-AY-102 Field Monitoring, Riser 83 Video
Project Contact:	Jeremy Johnson (ORP) Phone: (509) 376-1866
Review Date:	11/12/2012
Reviewer:	Michelle Hendrickson, CHMM, PE
USDOE Project:	US Department of Energy-Office of River Protection (USDOE-ORP)
USDOE Contact::	Tom Fletcher/Jeremy Johnson
Prime Contractor:	Washington River Protection Solutions (WRPS)
Project Manager:	Michael Hardesty Phone: (509) 373-4573
Location:	241-AY-102, 200 East Area, Hanford
Scheduled Start Date:	11/12/2012 Actual Start Date: 11/12/2012 Completion Date: 11/12/2012
Contract Amount:	Approximately $75,000 for 4 Riser Visual Inspections
Sub-Contractor:	N/A
Location:	200 East Area, Hanford Nuclear Reservation, Richland, WA

PROJECT DESCRIPTION:

- On an 8/8/12 visual inspection, material was found in the Annulus Space at AY-102. On 10/23/2012, USDOE-ORP reported that the DST was leaking and more material was accumulating in the Annulus Space.
- To monitor the slow leak, WRPS is conducting weekly and often twice weekly video inspections of the material through the AY-102 Tank's Riser #83.

The Pre-job meeting was conducted at 8:00 AM, including the conditions of RWP WTO04399, Rev. 2. The job in the field consisted of:

1. We entered the farm at approximately 9:45 AM. The ventilation exhauster was throttled down in the annulus from -14 inch to a -1 inch vacuum. The ventilation vacuum was lessened as the air currents generated by the vacuum create air currents which cool the sludge. However, these currents also impede the collection of a flammable gas sample and cause the camera to swing and makes its manipulation within the annular space very difficult..

2. A flammable gas sampled was collected and indicated that the annulus space was less than 25% lower flammability limit.

3. The camera was in a plastic bag and wire attached in a sleeve. The sleeve was carefully inspected and then the camera was removed from the bag and lowered into the annulus space. The camera was lowered to the 55-foot mark for the video/photographs. The camera completed a 360-degree scan and was raised and tilted. Also, a zoom of 10-times was used for close-up observation of the waste. Close-ups of the material along the entire area of waste deposition were viewed. The "landmarks" within the tank (black dot or rock, two white pebbles, and ventilation slots) were specifically viewed.

4. Once all of the views were captured, the camera was raised and re-bagged.

5. We surveyed out of the 241-AY Farm.

B. RECORDS AND PROCEDURES

1. Personnel Contacted During Assessment

	Name	Title or Duties/Organization	Phone
a.	Steve Stamper	Camera Operator - WRPS	509-392-3977
b.	Michael Hardesty	Field Work Supervisor	509-373-4573
c.	Roger Hammer	Camera Operator - WRPS	509-373-3355
d.			

2. Progress
   a. Scheduled Percentage 100 %

	Yes	No	NA	See Remarks
3. Stockpiled equipment or materials				
a. Records adequate?	X	☐	☐	☐
b. Protected?	X	☐	☐	☐
4. Monitoring Procedures up to date?	X	☐	☐	☐
5. Work Packages up to date?	X	☐	☐	☐
6. Adequate involvement in changes?	X	☐	☐	☐
7. Change of monitoring procedures appropriate and submitted to Ecology?	☐	☐	X	☐
8. Instrument(s) Calibrated adequately?	X	☐	☐	☐
9. Permit No/TPA Requirement.: DST System Unit RCRA Permit				

C. FIELD MONITORING

- The weather was reported at the Plan of the Day meeting was rain and low winds.
- The video taken of the waste material was near Riser 83 of the 241-AY-102 Annulus Space.
- The video was viewed and camera manipulated in the AY-801 Building.
- As the camera descended to the bottom of the annular space, a thermocouple became visible. The camera zoomed in and the off-riser sampler/crawler's tracks were no longer visible.
- All witnessing the inspection noted that the color of the waste appeared to be changing. The dark green was changing to a lighter green in some locations. The lighter green was becoming a dark yellow. The darker yellow was changing to a lighter yellow. The lighter yellow was turning to a white color along the waste perimeter. This indicates that the waste material may be drying, most likely due to the ventilation.
- The camera viewed the waste in respect to the different in-annular space "landmarks" including the black dot or rock, two white pebbles and ventilation slots. It was noted by all witnessing the video that the size of the area of the waste material did appear to have slightly increased in size, especially in the ventilation slot landmark, as compared to the amount of waste material viewed during the visual inspection conducted on 10/25/12.
- All witnessing the video also noted that there appeared to be moisture streaks indicating that the concrete near the ventilation slot was wet on either side of the waste. This had been viewed during previous visual inspections.
- Ecology noted that there appeared to be an increased amount of white mineralization on the outside perimeter of the waste material in the annulus space.
- Ecology also noted some rust and pitting on the primary tank. It is unclear if this was previously identified or if it is a newer development.
- Ecology also noted that the waste material near the 6-inch refractory/connector ring

had turned from yellow to white and appeared to "grow" in height or crystalize. And as this white waste material appears to increase in height, the finger channels of waste or pools of waste (that are dark green, light green, and yellow) appear to look deeper and slightly extend in length.

- Ecology could not visually distinguish if any visual damage indicators such as staining, cracking, pitting, etc. of the 6 inch wide carbon steel refractory ring, annulus floor, primary tank liner, or the refractory/concrete material where the waste was in direct contact with the tank structures. This lack of visual assessment is due to the increased growth of crystals, especially in the lower 2/3rds of the leak area and increased amount of deposition of mineralization around the perimeter of the leak area within the annulus. It is unknown at this time what influence the waste will have that is contacting the annulus floor and refractory/concrete pedestal.

	Yes	No	NA	See Remarks
1. Comply with Procedures and QA/QC Specifications?	X	☐	☐	☐
2. Field Test Being Accomplished?	X	☐	☐	☐
3. Satisfactory Contractor Quality Control?	X	☐	☐	☐
4. Inspection Documentation Satisfactory?	X	☐	☐	☐
5. Site Condition				
a. Orderly?	X	☐	☐	☐
b. Control room interface adequate?	X	☐	☐	☐
c. Equipment set-up adequate?	X	☐	☐	☐
6. Monitoring bypassing satisfactory?	☐	☐	X	☐
7. Unsafe Conditions/Health Hazards Observed?	☐	X	☐	☐
8. Is Project on Schedule?	X	☐	☐	☐
9. Is the Operations and Maintenance Documentation on Schedule?	☐	☐	X	☐
10. Is the Maintenance Management System on Schedule?	☐	☐	X	☐
11. Traffic control and traffic safety?	☐	☐	X	☐

REMARKS:

Photographs from this field monitoring event are attached.

Assessment Completed:

Michelle D. Hendrickson

Project Engineer's Signature

12/12/12

Date

11/1/2012

11/5/2012

11/8/2012

11/12/2012

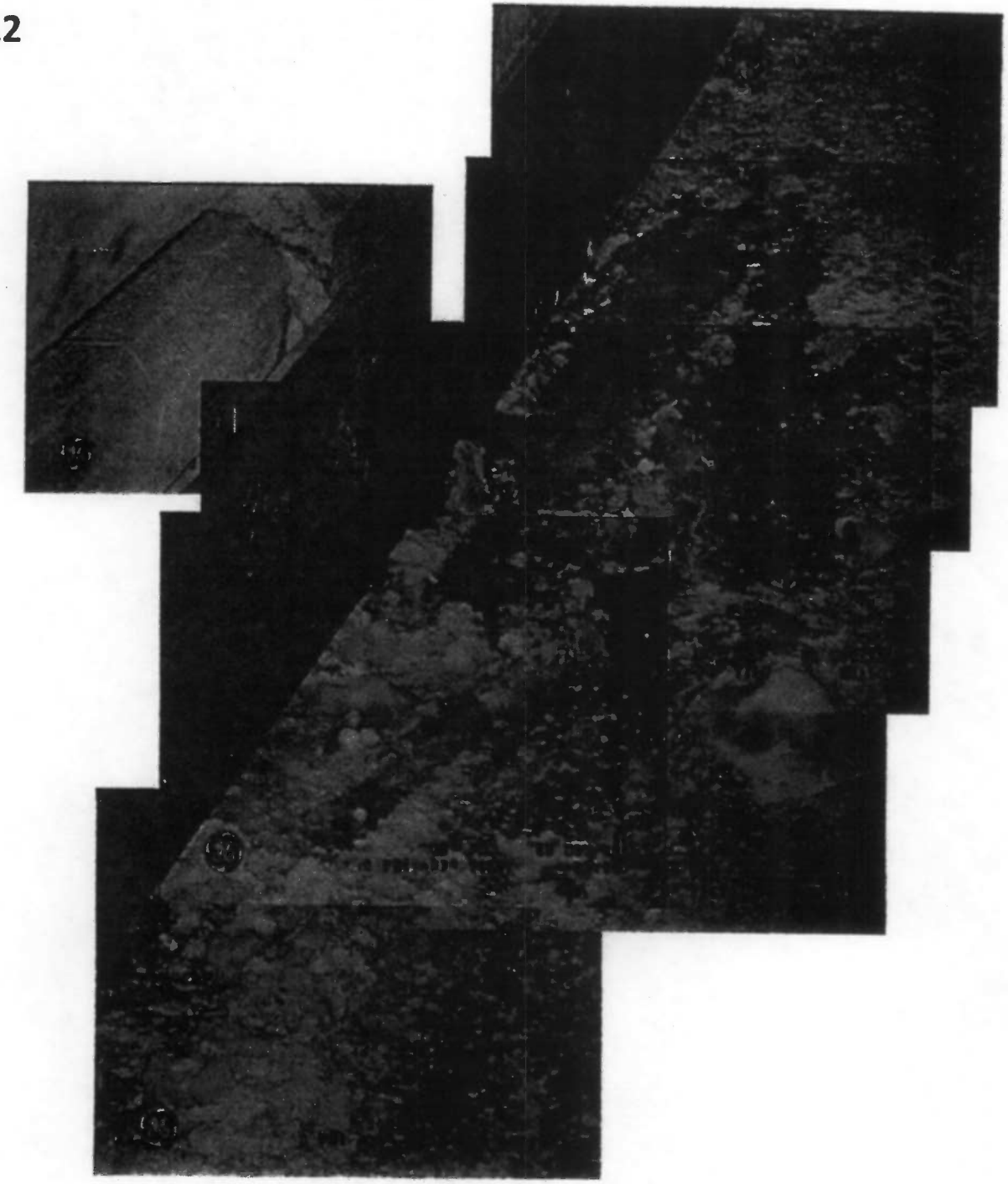
10/25/2012

11/1/2012

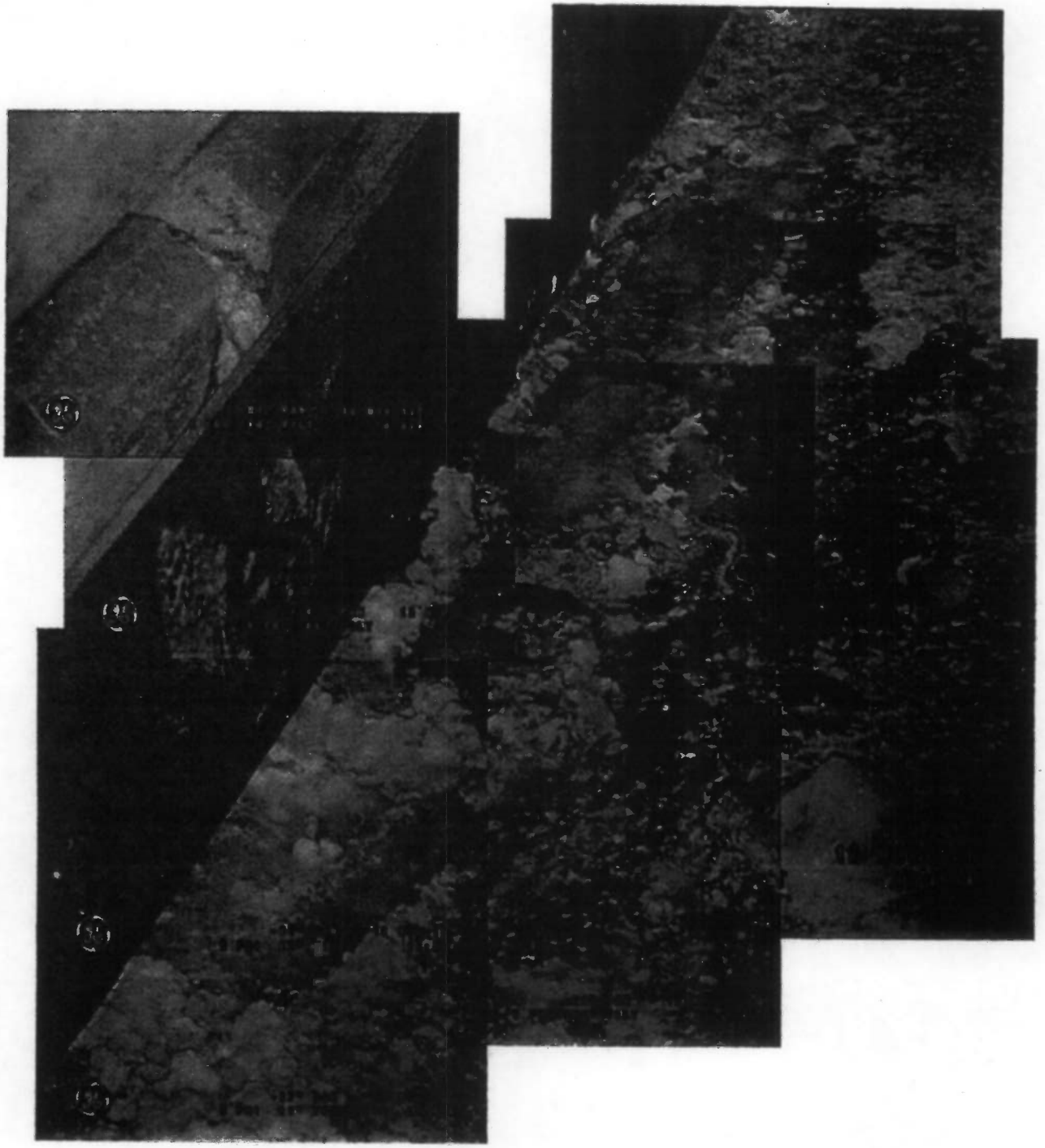
11/8/2012

11/12/2012

11/8/2012



11/12/2012



Huffman, Lori A

From: ^Environmental Portal
Sent: Monday, December 10, 2012 3:44 PM
To: Adams, M R (Margie); Allen, Ruth M; Atwood, Julie M; Bang, Reese; Beam, Thomas G; blcurn@bechtel.com; Borneman, Lucinda E; Bowers, Holly M; Breshears, Jerralee A; Brunke, Ronald C; Cammann, Jerry W; Cawrse, Allan E; Cherry, Stephen B; Colby, Julie M; Davis, Greta P; Dixon, Brian J; Donnelly, Jack W; Engelmann, Richard H; Erlandson, Brad; Faust, Toni L; Fox, Randal E; Fritz, Lori L; Greene, Michael R; Grohs, Eugene L; Hadley, Karl A; Hagel, Darlene L; Hoglen, Susan T; Hopkins, Andrea M; Horton, Lori J; Huffman, Lori A; Hummer, Amy L; Jaraysi, Moses; Johansen, Stephanie K; Joyner, Jessica A; Kaldor, Reed A; Kemp, Christopher J; Killoy, Steven E; Landon, Roger J; Luke, Jeffrey J; Mattlin, Ellen M; McKarns, Anthony C (Tony); McPherson, Robert B; Miera, Felix R Jr; Miskho, Anthony G; Mulkey, Charles H; Neath, Gae M; Noland, Terry W; Ollero, Jennifer F; Parker, Dan L (Danny); Peck, Bret D; Peistrup, Philip E; Peloquin, Michael G; Perry, Jon K; Petersen, Linda C; Peterson, Kirk A; Pezzetti, Angela R; Proctor, Megan L; Pysto, Thomas H; Ranade, Digambar G (Raja); Ruck, Fred A III; Rumburg, Brian P; Russell, Woody; Seaver, Jennie R; Simmons, Fen M; Slack, Carol L; Smith, Stephen T; Strickland, Michael S; Stubblebine, Scott D; Thompson, Wendy S; Tilden, Harold T II; Toebe, Wayne E; Tuott, Lee C; Vedder, Barry L; Voogd, Jeffry A; Warriner, Richard D; Watson, David J (Dave); Weil, Stephen R; Wiegman, Rebecca S; Williams, Joel F Jr; Williamson, Barbara D; Woolard, Joan G; Wooley, Theodore A; Yasek, Donna M; Zelen, Benjamin J
Subject: 12-NWP-186 - [1212101154]--- REGULATORY INFO---ECOLOGY ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITES OF THE WASTE MATERIAL NEAR RISER 83 OF THE 241-AY-102 DOUBLE SHELL TANK (DST)

"12-NWP-186 - [1212101154]" can be accessed via the following link:
http://idmsweb.rl.gov/idms/livelink.exe/open/174081419

ECOLOGY ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITES OF THE WASTE MATERIAL NEAR RISER 83 OF THE 241-AY-102 DOUBLE SHELL TANK (DST)

Huffman, Lori A

From: Havens, Jill K
Sent: Monday, December 10, 2012 11:05 AM
To: Samuelson, Scott L (ORP); Harrington, Paul G; Fletcher, Thomas W
Cc: Mendoza, Estella (Stella); Stubblebine, Scott D; Pfaff, Stephen H; Diediker, Janet A; Johnson, Jeremy M; Steiling, Jeri L; Tobias, Shannon L; Wheeler, Isabelle; Ciola, Ronald J; Domnoske-Rauch, Lisa A; Higgins, Kathleen L; Kemp, Christopher J; Knight, Daniel P; Koll, Ronald J; Mattlin, Ellen M; Stickney, Brian J; Trenchard, Glyn D; Wright, Teresa A; Bowser, Dennis W; Huffman, Lori A; Russell, Woody; Flett, Sarah D; Peterson, Becky; Hu, Tachung A (Albert); Lew, Barclay S; Mauss, Billie M; Wrzesinski, Wendell R; Noyes, Delmar L; Bruggeman, Jeffrey M; Young, Jason D; Harp, Benton J (Ben); Renevitz, Joseph A; Swarens, Cecil L; Abdul, Wahed; Harrington, Christopher C; Vogel, Hans R; Woody, Kate; ^ORP APM
Subject: INFO CORR/12-NWP-186 - [1212100362]/Ecology Assessment Report for Field Monitoring Activities of the Waste Material Near Riser 83 of the 241-AY-102 Double Shell Tank (DST)

"12-NWP-186 - [1212100362]" can be accessed via the following link:
http://idmsweb.rl.gov/idms/livelink.exe/open/174077163

Document: 12-NWP-186
Document Date: 12/05/2012
Author: HENDRICKSON ML
Addressee: SAMUELSON SL

Title: Ecology Assessment Report for Field Monitoring Activities of the Waste Material Near Riser 83 of the 241-AY-102 Double Shell Tank (DST)

MGR	Mendoza, Estella MGR		
	Stubblebine, Scott MGR		
TRS	Harrington, Paul (Actionee)		
AMTF	Pfaff, Steve		
	Diediker, Janet		
	Johnson, Jeremy		
	Steiling, Jeri		
	Tobias, Shannon		
	Wheeler, Isabelle		
	Fletcher, Tom		
	Ciola, Ron	WTP	Noyes, Delmar
	Domnoske-Rauch, Lisa		Bruggeman, Jeff
	Higgins, Kathy		Young, Jason
	Kemp, Chris		Harp, Ben
	Knight, Daniel		Renevitz, Joseph A
	Koll, Ronald		Swarens, Cecil
	Mattlin, Ellen M.		Abdul, Wahed
	Stickney, Brian		Harrington, Chris
	Trenchard, Glyn		Vogel, Hans R
	Wright, Teresa		Woody, Wendy (Kate)
TRS	Bowser, Dennis		
	Harrington, Paul		
	Huffman, Lori		
	Russell, Woody		
	Flett, Sarah		
	Peterson, Becky		
	Hu, Albert		
	Lew, Barclay		
	Mauss, Billie		
WSC	Wrzesinski, Wendell		

Comments:

Records Schedule Information:
ENV-1.a

Scan?: Yes Sensitive?: No Sensitive Attachments?: No IDMS Folder: ORP General Only

Date ORP CC Rec'd: 12/10/2012

If No Action has been assigned to this document and one is needed, please advise ORP Correspondence Control.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
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711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

December 5, 2012 12-NWP-186

Mr. Scott L. Samuelson, Manager
Office of River Protection
United States Department of Energy
P.O. Box 450, MSIN: H6-60
Richland, Washington 99352

Re: Ecology Assessment Report for Field Monitoring Activities of the waste material near Riser 83 of the 241-AY-102 Double Shell Tank (DST)

Dear Mr. Samuelson:

On August 8, 2012, the Department of Ecology (Ecology) was notified that material was found in the Annulus Space of the 241- AY-102 DST. On October 23, 2012, the United States Department of Energy – Office of River Protection (USDOE-ORP) reported that the DST was leaking and more material was accumulating in the Annulus Space. To monitor the leak, the Tank Farm Contractor, Washington River Protection Solutions (WRPS), conducted weekly video inspections of the material through the 241-AY-102 Tank's Riser #83.

Ecology staff visited the 241-AY Farm on October 25, 2012 to witness the weekly visual inspection of the waste material found near Riser 83 of the 241-AY-102 DST. Ecology staff noted the following:

- The extent of the area of the waste material did not appear to grow compared to the amount viewed during the visual inspection conducted 10/18/12.
- The quantity and potential cascade of waste through a ventilation slot had shrunk in size as compared to the amount present the prior week.
- The color of the waste appeared to be changing from a dark green to a lighter green in some locations, from a lighter green to lighter yellow, and a lighter yellow to a white color along the waste perimeter. This indicates that the waste material may be "drying".
- The waste is in direct contact with tank components. Neither the 6-inch wide carbon steel refractory ring, annulus floor, primary tank liner, nor the refractory/concrete material showed staining, cracking, pitting, etc., at those specific locations, as a result of the direct contact.

RECEIVED
DEC 10 2012
DOE-ORP/ORPCC

The USDOE-ORP/WRPS/Ecology Integrated Project Team will use this data to develop and evaluate options for the interim and longer term management of this tank and its contents.

Attached are Ecology's assessment report and photographs from the field visit. If you have any questions, please contact me at 509-372-7970 or Michelle.Hendrickson@ecy.wa.gov.

Sincerely,

Michelle L. Hendrickson

Michelle L. Hendrickson, CHMM, PE
Tank System Operations and Closure Engineer
Nuclear Waste Program

dbm
Enclosures (2)

cc electronic:

Tom Fletcher, USDOE-ORP
Lisa Domnoske-Rauch, USDOE-ORP
Jeremy Johnson, USDOE-ORP
Jeff Voogd, WRPS
Steve Killoy, WRPS
Jason Engeman, WRPS
Dennis Washenfelder, WRPS
David Bernhard, NPT
Dirk Dunning, ODOE
Ken Niles, ODOE
Randall Robinson, DNFSB

cc:

Stuart Harris, CTUIR

Gabriel Bohnee, NPT
Steve Hudson, HAB
Russell Jim, YN

Administrative Record: DST/Tank Waste Storage/214-AY-102/S-2-3
Environmental Portal, LMSI
USDOE-ORP Correspondence Control
WRPS Correspondence Control

ASSESSMENT REPORT

Field Monitoring Activities

A. GENERAL INFORMATION

Project:	241-AY-102 Field Monitoring, Riser 83 Video		
Project Contact:	Tom Fletcher (ORP)	Phone:	(509) 376-3434
Review Date:	10/25/2012		
Reviewer:	Michelle Hendrickson, CHMM, PE		
USDOE Project:	US Department of Energy-Office of River Protection (USDOE-ORP)		
USDOE Contact::	Tom Fletcher		
Prime Contractor:	Washington River Protection Solutions (WRPS)		
Project Manager:	Michael Hardesty	Phone:	(509) 373-4573
Location:	241-AY-102, 200 East Area, Hanford		
Scheduled Start Date:	10/25/2012	Actual Start Date: 10/25/2012	Completion Date: 10/25/2012
Contract Amount:	Currently estimated at $75,000 for 4 Risers by WRPS.		
Sub-Contractor:	N/A		
Location:	200 East Area, Hanford Nuclear Reservation, Richland, WA		

PROJECT DESCRIPTION:

- On an 8/8/12 visual inspection, material was found in the Annulus Space at AY-102. On 10/23/2012, USDOE-ORP reported that the DST was leaking and more material was accumulating in the Annulus Space.
- To monitor the slow leak, WRPS is conducting weekly video inspections of the material through the AY-102 Tank's Riser #83.

The Pre-job meeting was conducted at 8:00 AM. Prior to the meeting, RCTs reviewed RWP TF-101 for oversight with an escort.

The job in the field consisted of:

1. We entered the farm at approximately 9:45 AM. A Flammable Gas sample was being collected because the annulus exhauster had not ran continuously in the past 24-hours and the camera is considered a potential spark source. The ventilation was down because a breaker on the chiller for the primary exhauster, 702-AZ, tripped. The annulus exhauster was then also shutdown. Upon investigation, a wire for one of the compressor heaters had grounded out and caused the trip. This compressor was disconnected and the 702-AZ primary ventilation was restarted. The annulus ventilation was also restarted at approximately 1:00 PM on 10/24/12.

2. When the flammable gas sample indicated that the annulus space was less than 25% lower flammability limit, the camera was cleared to be lowered into the annulus space.

3. The camera was in a plastic bag and wire attached in a sleeve. The sleeve was carefully inspected and then the camera was removed from the bag and lowered after the ventilation from the annulus was reduced from -14 inch to a -1 inch vacuum. The ventilation vacuum was lessened as the air currents generated by the vacuum create air currents which cause the camera to swing and makes its manipulation within the annular space very difficult.

4. A "top-hat" configuration had previously been installed at Riser 83 for visual inspection and sample collection through that riser. Also, vapor monitoring had previously been conducted.

5. The camera completed a 360-degree scan and was raised and tilted. Close-ups of the material along the entire area of waste deposition were viewed. The "landmarks" within the tank (black dot or rock, two white pebbles, and ventilation slots) were specifically viewed.

6. Once all of the views were captured, the camera was raised and re-bagged.

7. We surveyed out of the 241-AY Farm.

B. RECORDS AND PROCEDURES

1. Personnel Contacted During Assessment

	Name	Title or Duties/Organization	Phone
a.	Tom Fletcher	TF Assistant Manager - ORP	509-376-3434
b.	Michael Hardesty	Field Work Supervisor	509-373-4573
c.	Lisa Domnoske-Rauch	Facility Representative - ORP	509-376-9886
d.	Jason Engeman	DST Integrity Engineering - WRPS	509-376-2113
e.	Roger Hammer	Camera Operator - WRPS	509-373-3355

2. Progress
   a. Scheduled Percentage 100 %

	Yes	No	NA	See Remarks
3. Stockpiled equipment or materials				
a. Records adequate?	X	☐	☐	☐
b. Protected?	X	☐	☐	☐
4. Monitoring Procedures up to date?	X	☐	☐	☐
5. Work Packages up to date?	X	☐	☐	X
6. Adequate involvement in changes?	X	☐	☐	X
7. Change of monitoring procedures appropriate and submitted to Ecology?	☐	☐	X	☐
8. Instrument(s) Calibrated adequately?	X	☐	☐	☐
9. Permit No/TPA Requirement.: DST System Unit RCRA Permit				

C. FIELD MONITORING

- The weather was reported at the Plan of the Day meeting as low fog, chilly with a high reaching 50-degrees Fahrenheit and low winds.
- The video taken of the waste material was near Riser 83 of the 241-AY-102 Annulus Space.
- The video was viewed and camera manipulated in the AY-801 Building.
- As the camera descended to the bottom of the annular space, a thermocouple became visible. These are used to monitor concrete at the base of the primary tank. Some thermocouples are actually embedded inside of the concrete. Others are routed through the refractory material. Ecology asked if these thermocouples were operable and temperature readings were taken. (It may be good to know if these specific thermocouples are operable and note if any change in temperature since 2006 has occurred in this location.)
- The camera zoomed in and the off-riser sampler/crawler's tracks were visible. The crawler's tread size ranges from approximately 9/8-inch wide at center, tapering to 5/8- inch wide at the edge This indicates that less than a few inches of waste material is present in this specific location.

- All witnessing the inspection noted that the color of the waste appeared to be changing. The dark green was changing to a lighter green in some locations. The lighter green was becoming a dark yellow. The darker yellow was changing to a lighter yellow. The lighter yellow was turning to a white color along the waste perimeter. This indicates that the waste material may be drying, most likely due to the ventilation.
- The camera viewed the waste in respect to the different in-annular space "landmarks" including the black dot or rock, two white pebbles and ventilation slots. It was noted by all witnessing the video that the size of the area of the waste material did not appear to have grown as compared to the amount of waste material viewed during the visual inspection conducted on 10/18/12.
- It was estimated that the area extent of the waste material in this riser location was approximately 6 inches by 22 inches when first discovered. It is approximated that the area extent of the waste material in this riser location is now approximately 8 inches by 36 inches in the rounded portion and approximately 48 inches in total length.
- All witnessing the video noted that the quantity and potential cascade of waste through a ventilation slot had either shrunk in size or receded. It looked more like the photos from visual inspections taken on 10/1/12 than those collected during the 10/18/12 effort.
- Ecology noted that there did not appear to be any visual damage indicators such as staining, cracking, pitting, etc. of the 6 inch wide carbon steel refractory ring, annulus floor, primary tank liner, or the refractory/concrete material where the waste was in direct contact with the tank structures. ORP noted that preliminary analytical results of the waste material indicated the presence of corrosion prohibiting constituents such as nitrite and hydroxides. ORP is actively seeking chemistry control/stabilization of the waste material present within the annulus.

	Yes	No	NA	See Remarks
1. Comply with Procedures and QA/QC Specifications?	X	☐	☐	☐
2. Field Test Being Accomplished?	X	☐	☐	☐
3. Satisfactory Contractor Quality Control?	X	☐	☐	☐
4. Inspection Documentation Satisfactory?	X	☐	☐	☐
5. Site Condition				
a. Orderly?	X	☐	☐	☐
b. Control room interface adequate?	X	☐	☐	☐
c. Equipment set-up adequate?	X	☐	☐	☐
6. Monitoring bypassing satisfactory?	☐	☐	X	☐
7. Unsafe Conditions/Health Hazards Observed?	☐	X	☐	☐
8. Is Project on Schedule?	X	☐	☐	☐
9. Is the Operations and Maintenance Documentation on Schedule?	☐	☐	X	☐
10. Is the Maintenance Management System on Schedule?	☐	☐	X	☐
11. Traffic control and traffic safety?	☐	☐	X	☐

REMARKS:

B.5.) the work package was modified to collect a flam gas sample as the ventilation had not ran for the past 24-hrs continuously.

B.6.) USDOE-ORP Facility Representatives and TF AM were involved with the proposed and accepted modification.

Photographs from this field monitoring event are attached.

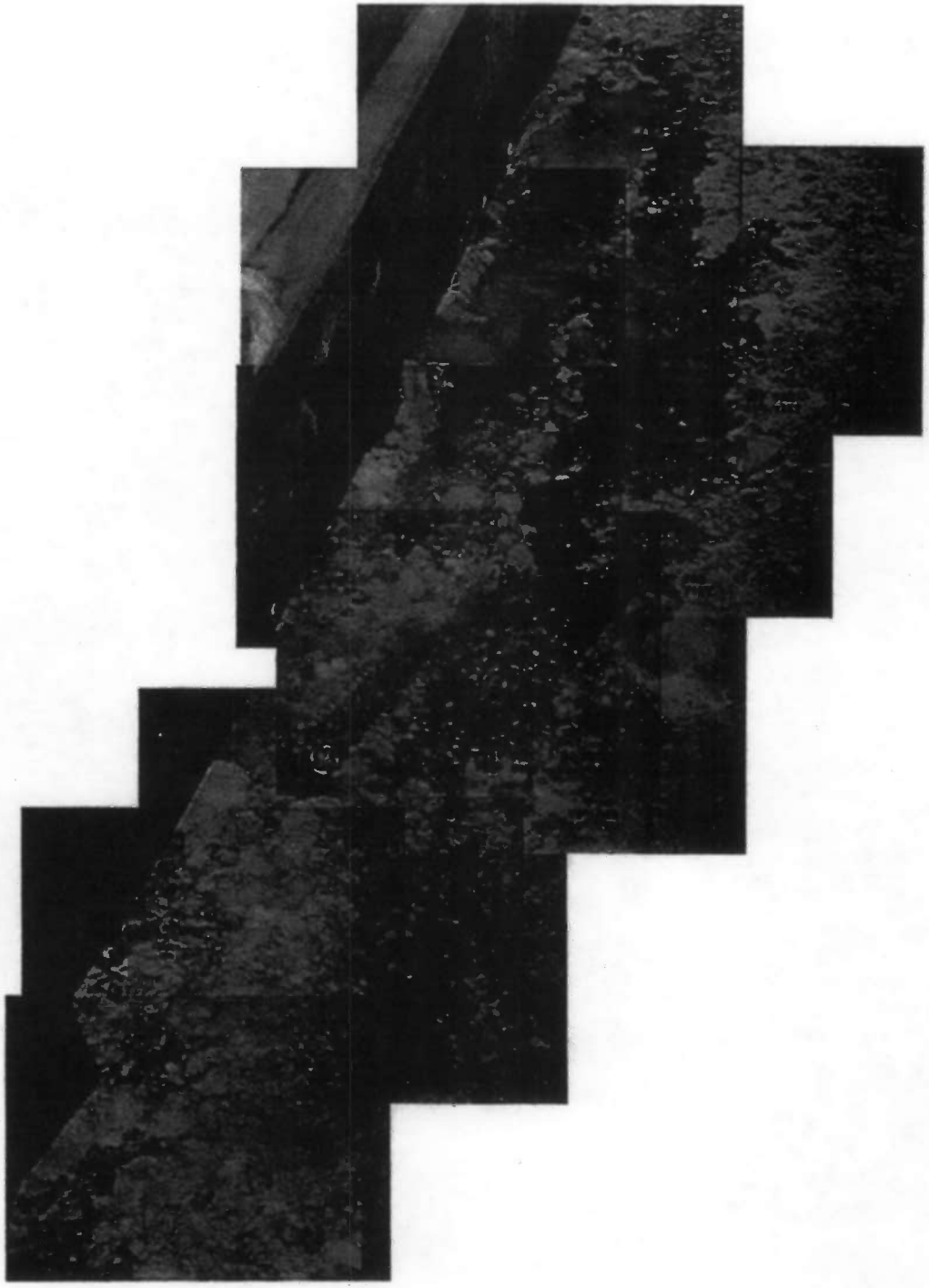
Assessment Completed:

Project Engineer's Signature

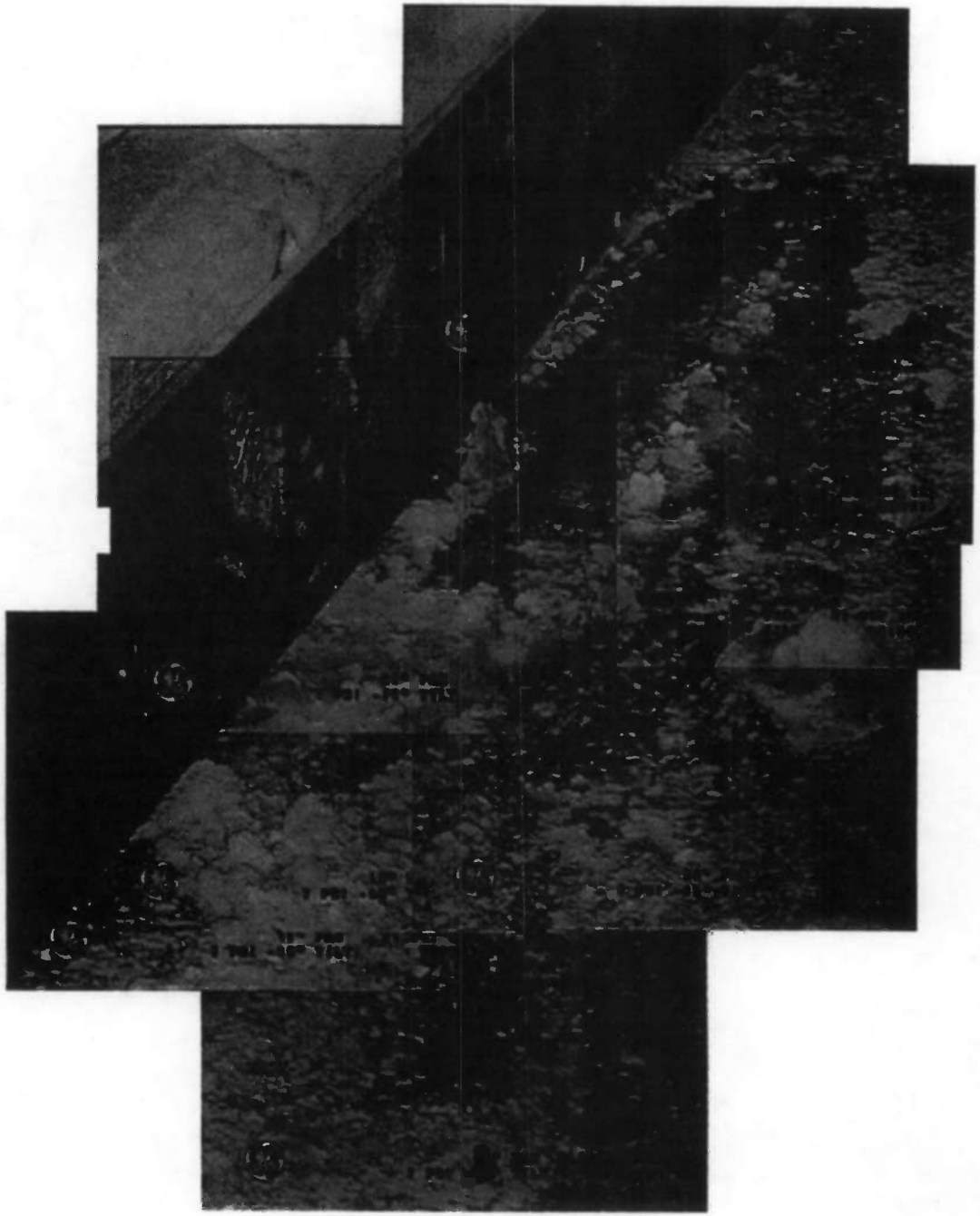
12/5/2012

Date

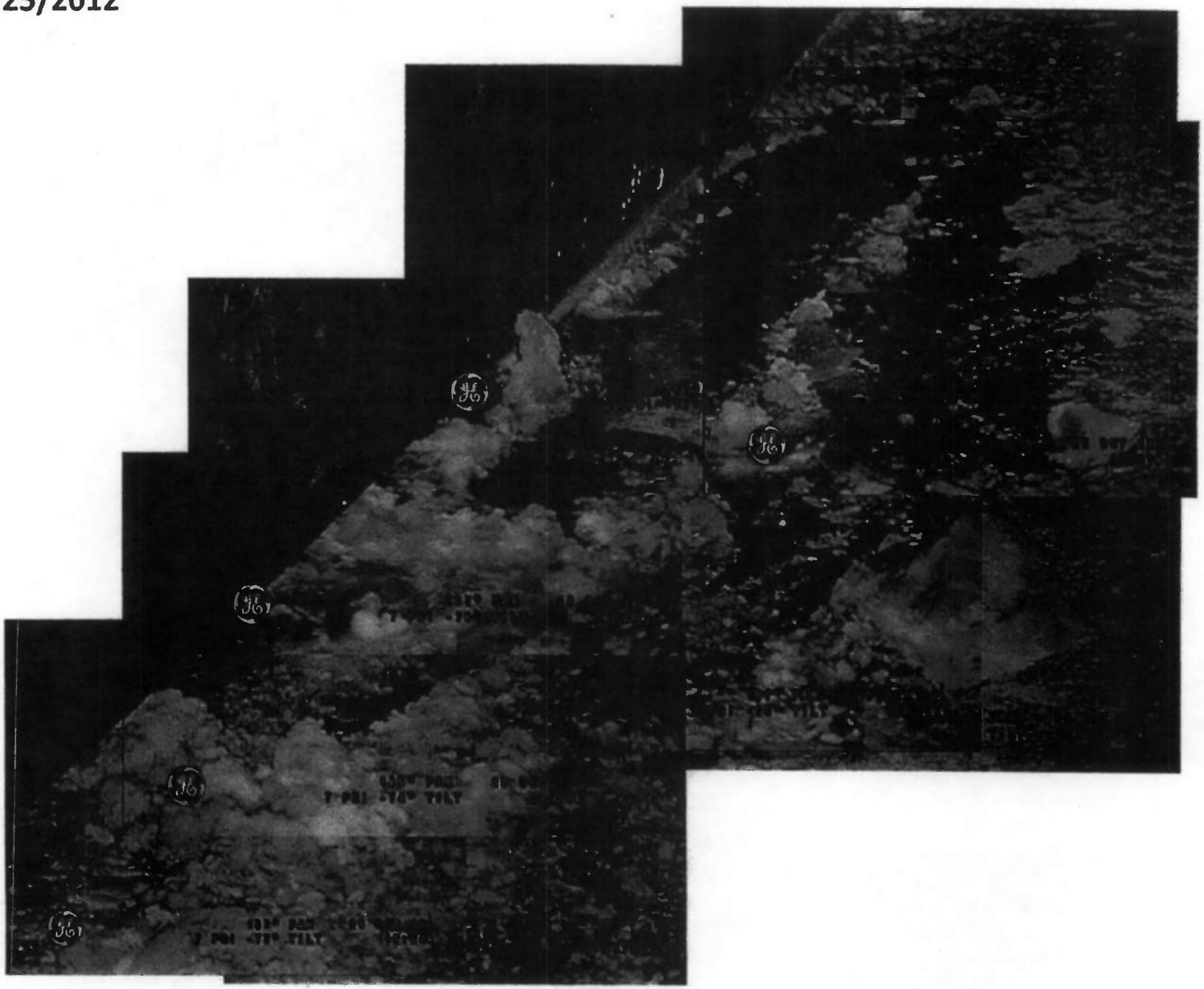
10/1/2012



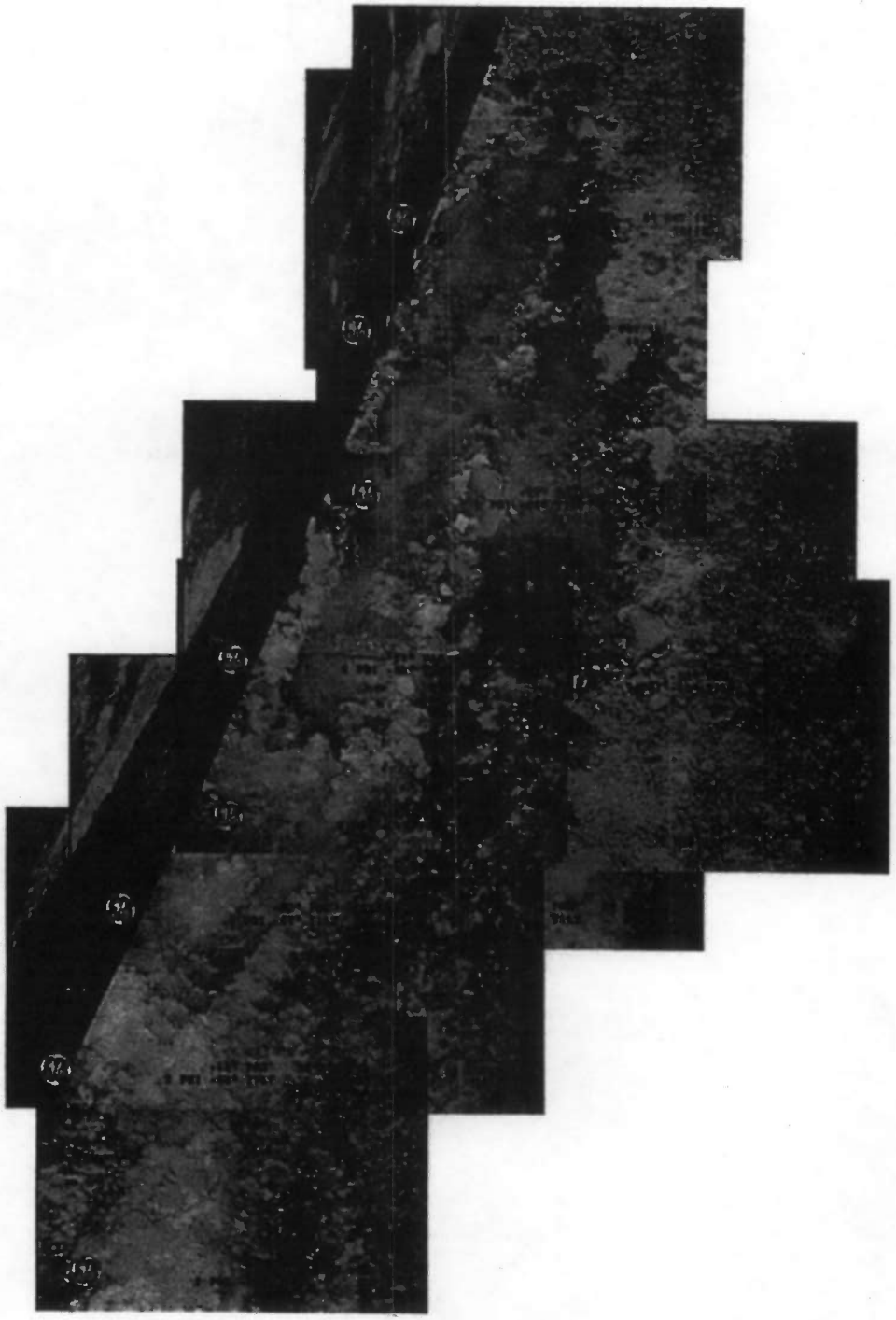
10/21/2012



10/25/2012



10/25/2012



10/8/2012

10/18/2012

10/21/2012

10/25/2012

Huffman, Lori A

From: ^Environmental Portal
Sent: Thursday, November 29, 2012 11:30 AM
To: Adams, M R (Margie); Allen, Ruth M; Atwood, Julie M; Bang, Reese; Beam, Thomas G; blcurn@bechtel.com; Borneman, Lucinda E; Bowers, Holly M; Breshears, Jerralee A; Brunke, Ronald C; Cammann, Jerry W; Cawrse, Allan E; Cherry, Stephen B; Colby, Julie M; Davis, Greta P; Dixon, Brian J; Donnelly, Jack W; Engelmann, Richard H; Erlandson, Brad; Faust, Toni L; Fox, Randal E; Fritz, Lori L; Greene, Michael R; Grohs, Eugene L; Hadley, Karl A; Hagel, Darlene L; Hoglen, Susan T; Hopkins, Andrea M; Horton, Lori J; Huffman, Lori A; Hummer, Amy L; Jaraysi, Moses; Johansen, Stephanie K; Joyner, Jessica A; Kaldor, Reed A; Kemp, Christopher J; Killoy, Steven E; Landon, Roger J; Luke, Jeffrey J; Mattlin, Ellen M; McKarns, Anthony C (Tony); McPherson, Robert B; Miera, Felix R Jr; Miskho, Anthony G; Mulkey, Charles H; Neath, Gae M; Noland, Terry W; Ollero, Jennifer F; Parker, Dan L (Danny); Peck, Bret D; Peistrup, Philip E; Peloquin, Michael G; Perry, Jon K; Petersen, Linda C; Peterson, Kirk A; Pezzetti, Angela R; Proctor, Megan L; Pysto, Thomas H; Ranade, Digambar G (Raja); Ruck, Fred A III; Rumburg, Brian P; Russell, Woody; Seaver, Jennie R; Simmons, Fen M; Slack, Carol L; Smith, Stephen T; Strickland, Michael S; Stubblebine, Scott D; Thompson, Wendy S; Tilden, Harold T II; Toebe, Wayne E; Tuott, Lee C; Vedder, Barry L; Voogd, Jeffry A; Warriner, Richard D; Watson, David J (Dave); Weil, Stephen R; Wiegman, Rebecca S; Williams, Joel F Jr; Williamson, Barbara D; Woolard, Joan G; Wooley, Theodore A; Yasek, Donna M; Zelen, Benjamin J
Subject: 12-TPD-0069 - Letter [1211290001] - 1 --- REGULATORY INFO. --- AY-102 INTEGRATED PROJECT TEAM PARTICIPATION

"12-TPD-0069 - Letter [1211290001] - 1" can be accessed via the following link:
http://idmsweb.rl.gov/idms/livelink.exe/open/173919500

AY-102 INTEGRATED PROJECT TEAM PARTICIPATION

Huffman, Lori A

From: ^DOE-ORP Correspondence Control
Sent: Thursday, November 29, 2012 6:40 AM
Cc: Huffman, Lori A; Lynch, James J; Stubblebine, Scott D; Fletcher, Thomas W; Trenchard, Glyn D; Johnson, Jeremy M; Steiling, Jeri L; Mendoza, Estella (Stella)
Subject: BCC CORR / 12-TPD-0069 / AY-102 INTEGRATED PROJECT TEAM PARTICIPATION

"12-TPD-0069" can be accessed via the following link:
http://idmsweb.rl.gov/idms/livelink.exe/open/173920834

U.S. Department of Energy
Office of River Protection
P.O. Box 450, MSIN H6-60
Richland, Washington 99352

12-TPD-0069

NOV 28 2012

Ms. Jane A. Hedges, Program Manager
Nuclear Waste Program
State of Washington
Department of Ecology
3100 Port of Benton Blvd
Richland, Washington 99352

Dear Ms. Hedges:

AY-102 INTEGRATED PROJECT TEAM PARTICIPATION

On behalf of the Department of Energy, Office of River Protection (ORP), please accept my sincere thanks for your ongoing participation in our collaborative efforts to determine the appropriate path forward for Double-Shell Tank (DST) AY-102. As you know, discovery of material in the annulus space between the primary tank liner and secondary tank liner, and the determination that the material is a result of a breach in the primary tank's integrity is a very serious issue.

Since the discovery of this anomaly several months ago, ORP and the Washington State Department of Ecology (Ecology) have met on several occasions to share the available information and discuss the next steps for data collection, analysis, monitoring, and potential responses. Based on my conversations with Mr. Thomas W. Fletcher, ORP's Assistant Manager for Tank Farms Project, it is my understanding that Ecology is not expecting us to begin pumping the primary tank of AY-102 at this time. It is also ORP's understanding that Ecology supports the ongoing evaluation of alternative responses through the AY-102 Integrated Project Team (IPT) to determine the most appropriate path forward based upon more complete information and analysis. Although we do not believe that there is an imminent threat to human health, worker safety, or the environment, ORP remains committed to pump this tank in a safe manner should this become necessary, and agrees with Ecology that a detailed evaluation by the IPT of timing and methods to transfer the waste from AY-102 will minimize these risks.

As you know, this jointly created IPT, whose membership includes Ecology, the Washington State Department of Health, ORP, and Washington River Protection Solutions LLC, initially met on November 8, 2012, and will be key to our continued efforts to ensure the best path forward for AY-102. The purpose of the AY-102 IPT is to provide a forum to identify, discuss, evaluate, and provide recommendations for actions to be taken pertaining to AY-102 to ensure that the tank waste will continue to be stored safely in a manner that is protective of human health, worker safety, and the environment.

Again I would like to thank you for your diligent response and participation in the department of a collaborative solution to such a complex issue. If you have any questions or concerns, please contact me, or your staff may contact Thomas W. Fletcher, Assistant Manager for Tank Farms Project, (509) 376-3434.

Sincerely,

Scott L. Samuelson, Manager
Office of River Protection

TPD: JMJ

cc:
S. Harris, CTUIR
M. L. Hendrickson, Ecology
J. J. Lyon, Ecology
J. B. Price, Ecology
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K. Niles, ODOE
J. Martell, WDOH
J. Schmidt, WDOH
R. Jim, YN
Administrative Record
Environmental Portal, LMSI
WRPS Correspondence

Huffman, Lori A

From: ^Environmental Portal
Sent: Tuesday, March 12, 2013 10:14 AM
To: Adams, M R (Margie); Allen, Ruth M; Anderson, Robert H; Atwood, Julie M; Bang, Reese; Barnett, Matthew; Bates, John A; Beam, Thomas G; Borneman, Lucinda E; Bowers, Holly M; Bowser, Dennis W; Breshears, Jerralee A; Brunke, Ronald C; Cammann, Jerry W; Cawrse, Allan E; Cherry, Stephen B; Clement, Curt J; Colby, Julie M; Crummel, Gary M; Davis, Greta P; Dixon, Brian J; Donnelly, Jack W; Engelmann, Richard H; Erlandson, Brad; Faust, Toni L; Fox, Randal E; Fritz, Lori L; Greene, Michael R; Hadley, Karl A; Hagel, Darlene L; Hoglen, Susan T; Homan, Nancy A; Hopkins, Andrea M; Horton, Lori J; Huffman, Lori A; Hummer, Amy L; Jackson, Dale E; Jaraysi, Moses; Johansen, Stephanie K; Johnson, Daniel L; Joyner, Jessica A; Kemp, Christopher J; Killoy, Steven E; Landon, Roger J; Luke, Jeffrey J; McPherson, Robert B; Miskho, Anthony G; Mulkey, Charles H; Ollero, Jennifer F; Parker, Dan L (Danny); Peistrup, Philip E; Peloquin, Michael G; Penn, Lucinda L; Perry, Jon K; Petersen, Linda C; Peterson, Kirk A; Proctor, Megan L; Pysto, Thomas H; Ramos, Mary C; Rohan, Leah C; Rokkan, Donald J; Rumburg, Brian P; Seaver, Jennie R; Simmons, Fen M; Smith, Stephen T; Strickland, Michael S; Stubblebine, Scott D; Toebe, Wayne E; Tuott, Lee C; Voogd, Jeffry A; Warriner, Richard D; Watson, David J (Dave); Wiegman, Rebecca S; Williams, Joel F Jr; Williamson, Barbara D; Woodruff, Rodger K; Woolard, Joan G
Subject: 13-ECD-0012 - [1303110172] -- U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF

"13-ECD-0012 - [1303110172]" can be accessed via the following link:
http://idmsweb.rl.gov/idms/livelink.exe/open/175372579

U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER

OFFICE OF RIVER PROTECTION
P.O. Box 450, MSIN H6-60
Richland, Washington 99352

MAR 0 7 2013

13-ECD-0012

Mr. John Martell, Manager
Radioactive Air Emissions Section
Washington State Department of Health
309 Bradley Blvd., Suite 201
Richland, Washington 99352
(Hanford Mailstop: B1-42)

Mr. Martell:

U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER

Reference: ORP letter from S. J. Olinger to J. Martell, WDOH, "Request for Approval of Modification to the Notice of Construction and Approval Order for the 296-A-42 Exhauster Operation and Amendment to Hanford Site Air Operating Permit (AOP) for Emission Unit 200E P-296A042," 08-ESQ-085, dated May 9, 2008.

Attached for Washington State Department of Health (WDOH) review and approval is a request for an off-permit change to license operation of the AY-102 tank annulus exhauster. The documents provided are: Notice of Construction Application/Permit Revision/AOP Off-Permit Change Notification (Attachment 1), and Radioactive Air Emissions Notice of Construction Application for Operation of the 296-A-42 Exhauster (Attachment 2). Electronic versions of the subject Notice of Construction Application were provided separately to your staff.

If you have any questions, please contact Dennis W. Bowser, Environmental Compliance Division, (509) 373-2566.

Kevin W. Smith
Manager

ECD:DWB

Attachments: (2)

cc: See page 2

cc w/attachs:
L. Bostic, BNI
B. G. Erlandson, BNI
J. A. Bates, CHPRC
J. Cox, CTUIR
S. Harris, CTUIR
K. A. Conaway, Ecology
P. M. Gent, Ecology
D. Bartus, EPA (Region 10, Seattle)
D. Zhen, EPA (Region 10, Seattle)
R. H. Anderson, MSA
T. G. Beam, MSA
G. Bohnee, NPT
K. Niles, Oregon Energy
D. E. Jackson, RL
J. W. Schmidt, WDOH
R. M. Allen, WRPS
L. L. Penn, WRPS
B. P. Rumburg, WRPS
R. Jim, YN
Administrative Record
BNI Correspondence
Environmental Portal, LMSI
WRPS Correspondence

Attachment 1
13-ECD-0012
(5 Pages)

NOC Application/Permit Revision/AOP Off-Permit Change Notification

NOC Application/Permit Revision/AOP Off-Permit Change Notification

NOTE: Any increase to abated or unabated PTE requires a full NOC modification

REASON FOR CHANGE

Submittal Date: _____

☒ **NOC Application Revision**
: _____

☐ **Condition Change/ Clarification**
WDOH Condition Number: 2 & 3
AOP Condition Number: 2 & 3

☐ **ALARACT Revision**
New ALARACT Rev Number: _____

PROJECT IDENTIFICATION

Project Title: License to Operate Ventilation of the 241 AY/AZ Tank Farm
NOC Application Number: 08-ESQ-085
AEI ID Number (AOP Emission Unit Number(s): 93 & 218
Current WDOH Approval Letter Number(s): AIR 12-319
WDOH NOC ID Number: 840

DESCRIPTION OF CHANGE

Number of Attachments 1

WDOH will provide a new approval letter containing any new or modified conditions that result from the following proposed change.

Proposed Change (provide original and proposed wording):

Please allow changes to the NOC application and revise the subject approval as indicated in this Off-Permit Change Notification. Attached is the NOC Application, originally submitted via letter 08-ESQ-085, from Shirley J. Olinger, Office of River Protection, to Mr, John Martell, Washington State Department of Health, subject "Request for Approval of Modification to the Notice of Construction and Approval Order for the 296-A-42 Exhauster Operation and Amendment to Hanford Site Air Operating Permit (AOP) for Emission Unit 200E-P-296A024," dated May 9, 2008. Requested changes appear in the attached application in the color **blue**. A summary of those changes are as follows:

The Executive Summary was updated.

Section 1.0, "Location" of the NOC Application was updated by adding the following:

> The exhauster that ventilates the 241-AY-102 tank annulus is assigned stack number 296-A-19 and is listed in 00-05-006, the *Hanford Site Air Operating Permit* under number 200E P-296A019-001, Emission Unit ID 218.

Section 2.0, "Responsible Manager" was changed from:

Shirley J. Olinger, Manager
U.S. Department of Energy, Office of River Protection
P.O. Box 550
Richland, Washington 99352
(509) 372-2315

Change to Section 2.0, "Responsible Manager" were:

Kevin W Smith, Manager
U.S. Department of Energy, Office of River Protection
P.O. Box 450, MSIN H6-60
Richland, Washington 99352
(509) 372-3062

Section 3.0, "Proposed Actions" of the NOC Application was updated to include the following:

Additional activities include those activities necessary to mitigate potential waste which has entered the annulus from the primary tank 241-AY-102. This annulus is ventilated by its own exhauster, stack number 296-A-19.

Section 5.0, "Process Description" was updated to include the following:

The tank annulus is located between the 75-ft diameter primary tank and the 80-ft diameter secondary liner, resulting in a nominal 2.5-ft wide annular space wrapping around the entire circumference of the primary tank. Several penetrations, or risers, of various sizes exist at the top of the secondary liner, which allows access into the annulus space. This access is used for a variety of activities, including but not limited to visual inspection cameras, sampling, ultrasonic testing crawlers, emergency pumps, and leak detection instruments. The annulus provides secondary containment when the primary tank fails and also provides the ability to cool the primary tank to reduce thermal stresses.

The annulus systems for the AY/AZ Tank Farms include three separate ventilation systems. The annuli of the two AY Tank Farm tanks are ventilated by separate ventilation systems, while the two AZ Tank Farm tanks share a common ventilation system. The annulus ventilation systems minimize potential corrosion due to condensation by removing moisture through evaporation. The ventilation air accelerates the evaporation rate by circulating outside air through the annulus. The ventilation air also dilutes and removes any flammable gas generated within the annulus if there is waste in the annulus.

Each AY Tank Farm annulus ventilation system's exhaust fan draws outside air into an intake consisting of a damper and two prefilters configured in series. For Tank 241-AY-102, all of the air is distributed to a central air-distribution chamber below the primary tank. The air flows from the distribution chamber through the air-distribution grid to the annulus. For Tank 241-AY-101, the air flows proportionally between the air-distribution

grid under the primary tank and directly into the annulus space using flow restricting orifices.

The title of Section 5.1.4 was changed from "Removal of In-Tank Equipment" to the following:

"Removal of In-Tank or In-Annulus Equipment"

The title of Section 5.1.5 was changed from "In-Tank Equipment Installation" to the following:

"In-Tank or In-Annulus Equipment Installation"

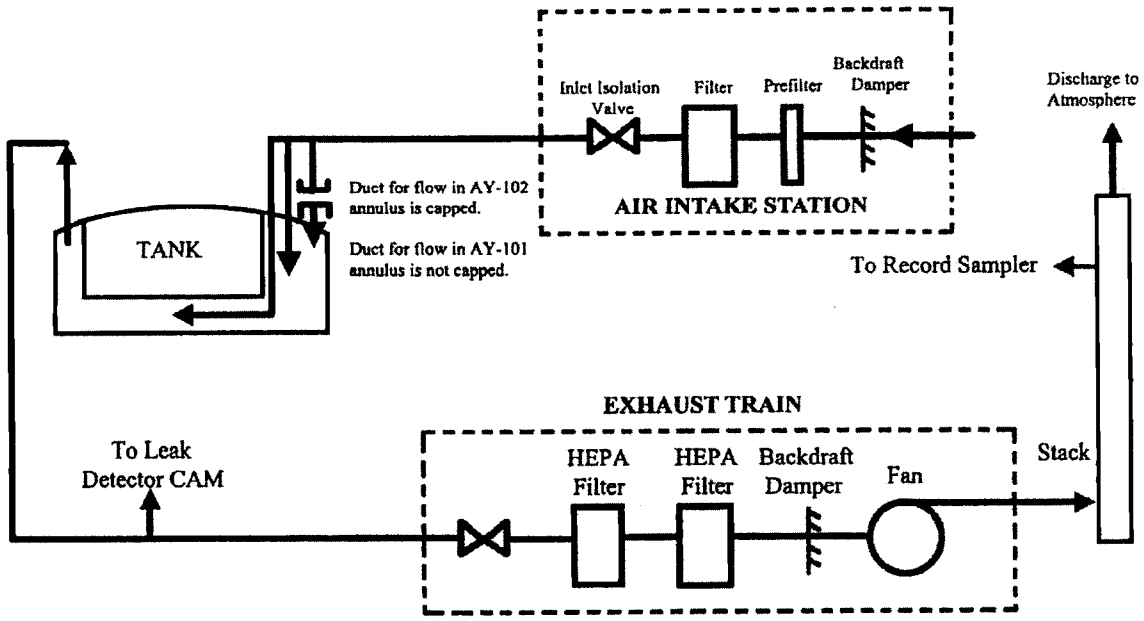
Section 6.2, "Tank Ventilation and Emissions Control System" was updated to include the following:

The annulus of tank 241-AY-102 is ventilated via exhauster stack numbered 296-A-19. This stack has an internal diameter of 15 inches (1.25 feet, 0.38 meters). It is approximately 12.9 feet (3.9 meters) in height. The exhaust fan is capable of providing a maximum capacity of 3,850 cubic feet per minute (cfm) (52.3 feet per second or 15.9 meters per second) at 12 inches (w.g.). Recent measured flow rates through this system have ranged from 787 dry standard cubic feet per minute (dscfm) to 1,173 dscfm, the average of which is 992 dscfm (13.5 feet/second or 4.1 meters/second). The average temperature of these measured flow rates was 83 degrees F (28.3 degrees C).

The Tank 241-AY-102 annulus ventilation system's exhaust fan draws outside air into an intake consisting of a damper and two pre-filters configured in series. Currently, the air is routed to the air distribution ring centered under the primary tank floor. The air flows from the air distribution ring through the air distribution slots in the refractory to the annulus. Exhaust air from the tank annulus is drawn out through underground ducts. The ducts merge aboveground to form a common vent header. For leak-detection purposes, a vacuum pump extracts an air sample from the header located upstream of the exhauster HEPA filters and feeds this air sample to a CAM. The header connects to the exhaust train where tank annulus exhaust air continues through a two banks of HEPA filters configured in series. Filtered air exits the annulus ventilation system through an exhaust fan and stack and is released to the environment. The stack is fitted with a record sampler system that samples the air stream for radioactive particulates.

Add to Section 7.0, "Drawings of Controls" the following figure:

AY Tank Farm Ventilation Tank Annulus System Flow Diagram.



NOTE: Tanks 241-AY-101 and 241-AY-102 have seperate annulus ventilation systems. The configuration of both systems is identical except as shown.

Section 8.4, "Potential to Emit for Mixer Pump Emissions" was updated to include the following:

> The overall PTE from this facility will not be increased due to the migration of tank waste into the annular space. However, a small portion of the total emissions will travel through the annular stack; i.e. the 296-A-19 stack.

A new section was added under Section 9.2, "Monitoring" titled 9.3, titled "241-AY-102 Annulus Ventilation System Monitoring." The following words were included in that new section:

> Record sampling for the 241-AY-102 annulus will be obtained through use of the existing 296-A-19 stack sampling system. The samples will be analyzed, at a minimum, for ^{90}Sr, ^{137}Cs, and ^{241}Am. While in operation, the 296-A-19 record sampler instrumentation will be calibrated annually in accordance with approved procedures, and system inspections will be performed daily to ensure instrumentation is operating within specified parameters.

Section 10.0, "Annual Possession Quantity" was updated to include the following:

> The maximum APQ source for tank 241-AY-102 annulus is contained in the Appendix B table under the column header titled "AY-102 Inventory 12/2007."

Attachment 2
13-ECD-0012
(58 Pages)

Radioactive Air Emissions Notice of Construction Application for Operation of the 296-A-42 Exhauster

RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION APPLICATION FOR OPERATION OF THE 296-A-42 EXHAUSTER

Prepared by
L. L. Penn

Date Published
January 2013

washington river protection solutions

P.O. Box 850, H6-04
Richland, Washington

Contractor for the U. S. Department of Energy
Office of River Protection under Contract DE-AC27-99RL14047

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EXECUTIVE SUMMARY

This document serves as a Notice of Construction (NOC) pursuant to the requirements of *Washington Administrative Code* (WAC) 246-247-060, "Applications, registration and licensing," and as a request for approval to modify pursuant to Title 40, *Code of Federal Regulations* (CFR) Section 61.07, "Application for approval of construction or modification" (10 CFR 61.07), for the operation of the 296-A-42 exhauster in support of each of the following tanks: 241-AZ-101, 241-AZ-102, 241-AY-101, and 241-AY-102. It revises and supersedes an existing NOC, *Radioactive Air Emissions Notice of Construction Application for Operation of the 296-A-42 Exhauster.* It includes description and management of the AY-102 Tank Annulus. Generally, it includes removal of existing equipment, installation of new equipment, and construction of new ancillary equipment and buildings.

An NOC for the upgrade of this ventilation system was submitted and approved in 1998. The installation and operation of mixer pumps in the 241-AZ-101 tank were permitted previously and approved by the Washington State Department of Health (WDOH) on July 1, 1998, through the issuance of letter AIR-98-708, "Approval of Radioactive Air Emissions NOC for Ventilation Upgrades for 241-AY and 241-AZ Tank Farms." This was later revised and a second NOC was submitted to include the installation and operation of waste retrieval equipment in tanks 241-AZ-101, 241-AZ-102, 241-AY-101, and 241-AY-102. At that time the estimates were based on the latest CAP-88 values published in DOE/RL-2006-29, "*Calculating Potential-to-Emit Releases and Doses.*" Approval for installation and operation of the waste retrieval systems in these tanks was granted by WDOH on May 9, 2002, through issuance of letter AIR-02-503 and again in August 2005 through issuance of letter AIR-05-708. In 2007 it was once again revised to allow for the removal and/or discontinuation of the use of the high efficiency gas adsorber filter on the ventilation system.

The total unabated dose estimate is 5.75E+03 mrem/yr and the abated dose estimate is 3.28E+00 mrem/yr. The potential to emit (PTE) will not be increased due to the inclusion of the AY-102 Annulus.

The total effective dose equivalent from all calendar year 2011 Hanford Site air emissions (point sources and diffuse and fugitive sources) was-0.042 mrem (DOE/RL-2012-19). The emissions resulting from the activities covered by this NOC, in conjunction with other operations on the Hanford Site, will not exceed the National Emission Standard of 10 mrem per year (40 CFR 61, Subpart H, "National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities").

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LIST OF TERMS

Abbreviations and Acronyms

ABCASH	automated bar coding of air samples at Hanford
ALARA	as low as reasonably achievable
ALARACT	as low as reasonably achievable control technology
ANSI	American National Standards Institute
APQ	annual possession quantity
ASME	American Society of Mechanical Engineers
BARCT	best available radionuclide control technology
CAM	continuous air monitor
CFR	*Code of Federal Regulations*
EDE	estimated dose equivalent
EDP	electronic data processing
EPA	U.S. Environmental Protection Agency
HEGA	high-efficiency gas adsorber
HEPA	high-efficiency particulate air
ICRP	International Commission on Radiological Protection
MEI	maximally exposed individual
MPR	maximum public receptor
NOC	Notice of Construction
PCM	periodic confirmatory monitoring
PTE	potential-to-emit
QA	quality assurance
RPP	River Protection Project
RWP	Radiological Work Permit
TEDE	total effective dose equivalent
TWINS	Tank Waste Inventory Network System
WAC	*Washington Administrative Code*
WDOH	Washington State Department of Health

Units

Ci	curie
cm^2	square centimeter
cpm	counts per minute
dpm	disintegrations per minute
ft	feet
ft^3	cubic feet
gal	gallon
hr	hour
in.	inch
lb	pounds
m	meter
µCi	microcurie
mrem	millirem

mrem/Ci	millirem per curie
m^3	cubic meters
m^3/sec	cubic meters per second
m^2	square meter
sec	second
yd^3	square yards

METRIC CONVERSION CHART

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
Inches	25.40	Millimeters	Millimeters	0.0393	Inches
Inches	2.54	Centimeters	Centimeters	0.393	Inches
Feet	0.3048	Meters	Meters	3.2808	Feet
Yards	0.914	Meters	Meters	1.09	Yards
Miles	1.609	Kilometers	Kilometers	0.62	Miles
Area			**Area**		
Square inches	6.4516	Square centimeters	Square centimeters	0.155	Square inches
Square feet	0.092	Square meters	Square meters	10.7639	Square feet
Square yards	0.836	Square meters	Square meters	1.20	Square yards
Square miles	2.59	Square kilometers	Square kilometers	0.39	Square miles
Acres	0.404	Hectares	Hectares	2.471	Acres
Mass (weight)			**Mass (weight)**		
Ounces	28.35	Grams	Grams	0.0352	Ounces
Pounds	0.453	Kilograms	Kilograms	2.2046	Pounds
Short ton	0.907	Metric ton	Metric ton	1.10	Short ton
Volume			**Volume**		
Fluid ounces	29.57	Milliliters	Milliliters	0.03	Fluid ounces
Quarts	0.95	Liters	Liters	1.057	Quarts
Gallons	3.79	Liters	Liters	0.26	Gallons
Cubic feet	0.03	cubic meters	Cubic meters	35.3147	Cubic feet
Cubic yards	0.76456	Cubic meters	Cubic meters	1.308	Cubic yards
Temperature			**Temperature**		
Fahrenheit	Subtract 32 then multiply by 5/9ths	Celsius	Celsius	Multiply by 9/5ths, then add 32	Fahrenheit
Force/Pressure			**Force/Pressure**		
Pounds per square inch	6.895	Kilopascals	Kilopascals	1.4504×10^{-1}	Pounds per square inch

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE, Second Ed., 1990, Professional Publications, Inc., Belmont, California.

1.0 LOCATION

Regulatory Citation: "Name and address of the facility, location (latitude and longitude) of the emission unit(s)."

U.S. Department of Energy, Office of River Protection
Hanford Site,
200 East Area Tank Farms
Richland, Washington 99352

The 241-AY and 241-AZ Tank Farms are located south of AN Tank Farm in the 200 East Area, at the corner of Canton Avenue and Seventh Street. The geodetic coordinates for these tank farms are as follows:

Latitude: 46° 33' 18" N
Longitude: 119° 31' 01" W

The exhauster that ventilates these tanks is assigned stack number 296-A-42 and is listed in 00-05-006, the *Hanford Site Air Operating Permit* under number 200E P-296A042-001.

The exhauster that ventilates the 241-AY-102 tank annulus is assigned stack number 296-A-19 and is listed in 00-05-006, the *Hanford Site Air Operating Permit* under number 200E P-296A019-001, Emission Unit ID 218.

2.0 RESPONSIBLE MANAGER

Regulatory Citation: "Name, title, address, and phone number of responsible manager."

Kevin W Smith, Manager
U.S. Department of Energy, Office of River Protection
P.O. Box 450, MSIN H6-60
Richland, Washington 99352
(509) 372-3062

3.0 PROPOSED ACTIONS

Regulatory Citation: "Identify the type of proposed action for which this application is submitted:

a. *Construction of new emission unit(s)*
b. *Modification of existing emission unit(s); identify whether this is a significant modification – significant means the potential-to-emit airborne radioactivity at a rate that could increase the TEDE to the MEI by at least 1.0 mrem/yr as a result of the proposed modification*
c. *Modification of existing unit(s), unregistered."*

The activities proposed by this Notice of Construction (NOC) are to install, remove, and operate waste retrieval systems (mixer pumps, transfer pumps, and other required equipment) in tanks 241-AZ-101, 241-AZ-102, 241-AY-101, and 241-AY-102. The high-efficiency gas adsorber (HEGA) filters may be removed from the ventilation system. Emissions from these tanks are ventilated through exhauster 296-A-42. The mixer pumps will operate in a batch mode as needed. The waste capacity of the tanks will not be altered, but as retrieval progresses, the source term will increase until the tanks are filled, currently planned for 1,000,000 gallons per tank. The maximum tank capacity of 1,001,000 gal will be used to determine a bounding annual possession quantity (APQ) and total effective dose equivalent (TEDE) to the maximally exposed individual (MEI). Fugitive emissions will be created during excavation activities, pipe cutting, removing and installation of in-tank equipment, and while performing work in open pits.

Additional activities include those activities necessary to mitigate potential waste which has entered the annulus from the primary tank 241-AY-102. This annulus is ventilated by its own exhauster, stack number 296-A-19.

4.0 STATE ENVIRONMENTAL POLICY ACT

Regulatory Citation: "If the project is subject to the requirements of the State Environmental Policy Act (SEPA) contained in chapter 197-11 WAC, provide the name of the lead agency, lead agency contact person, and their phone number."

In accordance with WAC 197-11, the WDOH has identified and adopted the following *National Environmental Policy Act* documentation as being appropriate for this proposal after independent review. This document meets the agencies' review needs for the current proposal.

- DOE/EIS-0212, "Final Environmental Impact Statement, Safe Interim Storage; Hanford's Tank Waste."
- 60 FR 61687, "Record of Decision; Safe Interim Storage of Hanford Tank Wastes, Hanford Site, Richland, WA."
- DOE/EIS-0189, "Tank Waste Remediation System, Hanford Site, Richland, Washington, Final Environmental Impact Statement."
- 62 FR 8693, "Record of Decision for the Tank Waste Remediation System, Hanford Site, Richland, WA."

5.0 PROCESS DESCRIPTION

Regulatory Citation: "Describe the chemical and physical processes upstream of the emission unit(s)."

The 241-AY-101, 241-AY-102, 241-AZ-101, and 241-AZ-102 tanks are double-shell tanks. The inner shell is constructed from heat-treated, stress-relieved steel. The outer shell is constructed of non-stress-relieved steel. The two shells are separated by a 2.5-ft annulus and contained inside a concrete shell. The tanks have a usable waste volume of approximately 1,001,000 gal.

The tank annulus is located between the 75-ft diameter primary tank and the 80-ft diameter secondary liner, resulting in a nominal 2.5-ft wide annular space wrapping around the entire circumference of the primary tank. Several penetrations, or risers, of various sizes exist at the top of the secondary liner, which allows access into the annulus space. This access is used for a variety of activities, including but not limited to visual inspection cameras, sampling, ultrasonic testing crawlers, emergency pumps, and leak detection instruments. The annulus provides secondary containment when the primary tank fails and also provides the ability to cool the primary tank to reduce thermal stresses.

The 241 AY and 241 AZ tanks are part of a *Resource Conservation and Recovery Act* treatment, storage, and/or disposal unit. The tanks contain mixed waste in the form of liquids or contained solids (suspended or settled). The contents in each of the four tanks may be mixed periodically to control gas entrapment in the settled solids, to control temperature, for chemical treatment to control corrosion, or for waste retrieval. Contained solids will be mobilized, as required, as part of this process by hydraulic action of the mixer pumps or by use of air-lift circulators in each of the tanks. During such activities, as well as during storage, the ventilation system maintains the vapor space in each tank below atmospheric pressure.

Airflow (Section 7.0) is from the tank to a glycol-cooled recirculation system and to a common header. The common header is the point in the overall system at which ventilation flow is provided to the emissions control system. Also, a portion of each tank's exhaust can be recirculated to assist in maintaining temperature.

The recirculation system cools, condenses, removes vapor and some entrained particulates, further removes moisture via a separator, and returns a portion of the cooled vapor to the tank. This provides cooling for the tank while reducing air emissions. Nominal flow rates in the recirculation system vary from zero m^3/sec (bypassed) to 0.25 m^3/sec per tank, at standard temperature and pressure conditions. At the higher flow rate, approximately 0.05 m^3/sec is provided to the emission control system with the remainder to the tank. Similar airflow from the other three tanks is combined in the common ventilation header connecting the discharges of the other recirculation coolant systems. The combined flow is discharged to the emissions control system (see Section 7.0). The recirculation system is considered part of the process because the collected material is returned to the tank.

When mixer pumps are operating in a tank, the 0.25 m^3/sec drawn from this tank may not be recirculated but may be combined with the flow from the other tanks for a total discharge to the emissions control system flow range of 0.4 to 0.5 m^3/sec. Numerous other combinations of discharge flow rates are possible but the combined annual average discharge flow rate to the emissions control system will not be greater than 0.5 m^3/sec. During system upset conditions, such as an automatic shutdown of one exhaust train and start of the opposite train, discharge flow rates could reach 0.6 m^3/sec for several seconds.

The portion of the stream discharged to atmosphere will flow through a condenser, high-efficiency mist eliminator, heater, and two high-efficiency particulate air (HEPA) filters in series. For purposes of calculating abated emissions, only the HEPA filter control efficiencies are used.

The central pump pits on the 241-AY and 241-AZ Tank Farm tanks are approximately 14 ft long x 10 ft wide x 10 ft depth (outside dimensions). Sluice pits and annulus pump pits are somewhat smaller with outside dimensions of 7 ft x 7 ft x 10 ft deep and 5 ft x 5 ft x 10 ft deep.

The annulus systems for the AY/AZ Tank Farms include three separate ventilation systems. The annuli of the two AY Tank Farm tanks are ventilated by separate ventilation systems, while the two AZ Tank Farm tanks share a common ventilation system. The annulus ventilation systems minimize potential corrosion due to condensation by removing moisture through evaporation. The ventilation air accelerates the evaporation rate by circulating outside air through the annulus. The ventilation air also dilutes and removes any flammable gas generated within the annulus if there is waste in the annulus.

Each AY Tank Farm annulus ventilation system's exhaust fan draws outside air into an intake consisting of a damper and two prefilters configured in series. For Tank 241-AY-102, all of the air is distributed to a central air-distribution chamber below the primary tank. The air flows from the distribution chamber through the air-distribution grid to the annulus. For Tank 241-AY-101, the air flows proportionally between the air-distribution grid under the primary tank and directly into the annulus space using flow restricting orifices.

With the previous NOC revision, modifications to all four tanks and associated equipment were permitted to allow for installation of waste retrieval systems and equipment, through issuance of letter AIR-05-708, including the following major components:

New In-Tank Equipment

- Two mixer pumps each in tanks 241-AZ-102, 241-AY-101, and 241-AY-102 for mobilizing the settled solids. Two mixer pumps were installed in tank 241-AZ-101 and permitted previously by WDOH through issuance of AIR-98-708. All of the pumps will be capable of pumping waste through each of two horizontally opposed discharge nozzles.

- A riser extension/spray wash system on top of each of the risers used for mixer pumps. The spray wash system will be used for future decontamination of the mixer pumps if they are removed from the tank.

- One transfer pump in each tank for the transfer of waste.

- New temperature probes for each tank.

- New decant pumps in the AY tanks and associated transfer piping; to include a one-time use hose-in-hose transfer line approximately 40 ft in length.

Ancillary Equipment and Buildings

- Electrical power and instrument cables and other utility tie-ins and/or upgrades (e.g., sanitary and raw water, and telecommunications).
- Tie-in to the existing dilution and caustic supply system to bring waste properties into compliance with the feed specifications and to flush and preheat transfer lines. The dilution system will have the capacity of providing approximately 140 gal/minute of pH-adjusted water.
- Pit cover blocks.
- Water/diluent piping to and from the process pits.
- Process jumpers.
- Miscellaneous concrete pads for electrical and mechanical equipment.
- Chain-link fencing and gates.

Removal, Repair, Decontamination, and Demolition of Existing Equipment

- Removal/repair of transfer and/or mixer pumps, as necessary, during the life of the facility.
- Removal and disposal of several thermocouple probes/instrument trees.
- Removal and disposal of several existing pumps and other miscellaneous equipment (e.g., slurry distributers and process jumpers).
- Additionally, this revision includes removal of HEGA filters.

5.1 CONSTRUCTION ACTIVITIES

Construction activities with the PTE could include soil excavation, work in pump pits, pipe cutting, and removal and installation of in-tank equipment. Some of these activities are described in, and will be done in accordance with, an applicable tank farm as low as reasonably achievable control technology (ALARACT) demonstration (HNF-4327, *Control of Airborne Radioactive Emissions for Frequently Performed TWRS Work Activities (ALARACT Demonstrations)*. The specific activities and corresponding ALARACT demonstration are called out as applicable in Sections 5.1.1 through 5.1.5.

If needed or chosen for use during these activities, the regulated guzzler, a portable/temporary radioactive air emission unit, and a HEPA filtered vacuum radioactive air emission unit may be

used in accordance with the latest revisions of the NOC [EPA 1998 letter, "Approval of Short Form Radioactive Air Emissions Notice of Construction (NOC) for Guzzler Excavation and Backfilling Activities in Support of 200 East Area A Farm Complex"; DOE/RL-96-75, "Radioactive Air Emissions Notice of Construction Portable/Temporary Radioactive Air Emission Units"; and DOE/RL-97-50, "Radioactive Air Emissions Notice of Construction for HEPA Filtered Vacuum Radioactive Air Emission Units," respectively].

Because of the possibility of encountering previously undetected subsurface contamination, all work will be performed in accordance with appropriate radiological controls and the River Protection Project (RPP) as low as reasonably achievable (ALARA) program. These requirements are carried out through work packages and associated Radiological Work Permits (RWP).

5.1.1 Soil Excavation

Soil will be excavated inside and outside the 241-AZ and 241-AY Tank Farms for the dilution piping that will tie-in to the existing AN Tank Farm caustic supply system and to remove soil in preparation for mixer pump foundations and miscellaneous equipment support structures, to remove soil around pits in preparation of core drilling, and for placement of control building foundations (as required). A total of approximately 6000 yd^3 per farm could be excavated. Backfill will be made with the original removed soil or noncontaminated controlled density fill (sand, water, and a small amount of cement).

Soil excavation activities inside the tank farm fence will be performed in accordance with ALARACT Demonstration 5, *TWRS ALARACT Demonstration for Soil Excavation (Using Hand Tools)* (HNF-4327). If contamination is discovered outside the tank farm fence, ALARACT 5 will be followed. Clean soil piles could be moved from one place to another within the tank farm with heavy equipment (backhoe, front-end loader, etc.). Soil excavation outside the tank farm fence in noncontaminated soil also could be performed with heavy equipment. The regulated guzzler also could be used as described in the NOC for use in the 241-A Tank Farm Complex (EPA 1998 letter).

5.1.2 Pipe Cutting and Welding

Any required cuts of contaminated piping will be made inside a glove bag using appropriate equipment such as a sawzall or tri-tool. To perform a cut without a glove bag, the piping will be surveyed/smeared to verify removable contamination levels are equal to or less than 10,000 disintegrations per minute (dpm) per 100 cm^2 beta gamma and 200 dpm/100 cm^2 alpha.

Welding may be necessary to join various pieces of equipment. If this is necessary, welding will commence once removable contamination levels in the weld area are reduced to ALARA. The goal will be to achieve 1000 dpm/100 cm^2 beta gamma and 20 dpm/100 cm^2 alpha or less, but might not always be attainable.

If needed or chosen for use during these activities, a portable/temporary radioactive air emission unit and a HEPA filtered vacuum radioactive air emission unit could be used in accordance with the latest revisions of the NOCs (DOE/RL-96-75 and DOE/RL-97-50, respectively).

5.1.3 Pit Work

Work to be performed in pits may include replacing existing sets of cover blocks with newly designed cover blocks, core drilling (equivalent of one hundred 14-in. diameter holes for AZ Farm and ten 14-in. diameter holes for AY Farm), installing new nozzles, and removing existing jumpers.

Pit access and work will be performed in accordance with ALARACT Demonstrations 6 and 14, *TWRS ALARACT Demonstration for Pit Access,* and *TWRS ALARACT Demonstration for Pit Work* (HNF-4327). Activities not covered in these ALARACTs are described in the following.

If needed or chosen for use during these activities, a portable/temporary radioactive air emission unit and HEPA filtered vacuum radioactive air emission unit could be used in accordance with the latest revisions of their NOCs (DOE/RL-96-75 and DOE/RL-97-50, respectively).

At the start of the pit work, the cover blocks will be lifted off and radiologically surveyed to determine an appropriate disposal method. New cover blocks will be installed when all work in the pits is completed.

Core drilling may be performed and will occur below grade level on the outside of the pit. The hole will be drilled from the outside to the inside, with the temporary pit cover in place. Nozzle installation generally will proceed immediately after the hole is completed. If immediate nozzle installation is not possible, the hole will be temporarily sealed with a plug, tape, or equivalent device until the nozzle can be installed.

Installation of new nozzles in existing pits will take place in an open pit. All parts of the nozzle will be assembled ahead of time and will be lowered into position as a single unit. The piping in the back of the nozzle will be threaded through the hole (from the inside of the pit to the outside) and pulled tight into place from the outside of the pit. Grout will be used to secure and seal the nozzle into place. The front opening of the nozzle, inside the pit, will be fitted with a temporary cap/seal until a jumper is connected to the nozzle. Once the nozzle(s) is/are installed, the temporary pit cover will be replaced until other work inside the pit requires pit cover removal.

5.1.4 Removal of In-Tank or In-Annulus Equipment

Various in-tank equipment will be removed from the tanks to make room for the waste retrieval equipment, or to be replaced with equivalent equipment built to withstand the mixer pump jet forces. Removed long-length equipment will either be packaged in long-length contaminated equipment disposal containers or size reduced for disposal in accordance with ALARACT Demonstration 15, T*ank Farm ALARACT Demonstration for Size Reduction of Waste Equipment for Disposal.* Equipment removal will be performed in accordance with ALARACT Demonstration 13, *TWRS ALARACT Demonstration for Installation, Operation, and Removal of Tank Equipment.* Activities not covered in this ALARACT are described in the following.

If needed or chosen for use during these activities, a portable/temporary radioactive air emission unit, and a HEPA filtered vacuum radioactive air emission unit may be used in accordance with the latest revisions of their NOCs (DOE/RL-96-75 and DOE/RL-97-50, respectively).

Decontamination of removed equipment is not anticipated. The fewer decontamination activities undertaken, the less exposure possibilities there are to the worker and the environment. Contingency decontamination plans, however, are in place if needed. The most likely equipment to be decontaminated would be sections of the flexible receiver. Equipment removal will be performed in accordance with TWRS ALARACT Demonstration 13, *Installation, Operation, and Removal of Tank Equipment.*

5.1.5 In-Tank or In-Annulus Equipment Installation

Equipment installation will be performed in accordance with TWRS ALARACT Demonstration 13, *Installation, Operation, and Removal of Tank Equipment.*

5.2 WASTE STAGING AND RETRIEVAL PROCESS OVERVIEW

Mixer pumps will be operated to maintain waste uniformity during staging and to mix the waste for a period before and during transfer. As required by operational directives, mixer pumps will be operated until waste samples verify that adequate mixing has been achieved. Waste samples will be collected in accordance with TWRS ALARACT Demonstration 7, *Tank Waste Grab Sampling*. If dilution/conditioning is needed, the pH and temperature of the diluents will be adjusted by means of a caustic supply system. Once the waste is verified acceptable, the transfer lines will be preheated/flushed with water, and the waste transfer to the treatment facility will follow. After the transfer, the lines will be flushed again with water.

6.0 PROPOSED CONTROLS

Regulatory Citation: "Describe the existing and proposed (as applicable) abatement technology. Describe the basis for the use of the proposed system. Include expected efficiency of each control device, and the annual average volumetric flow rate(s) in meters^3/sec for the emission unit(s)."

Controls, proposed for the various emission sources, are addressed in Sections 6.1 and 6.2.

6.1 CONTROLS UTILIZED DURING CONSTRUCTION ACTIVITIES

Emission controls used during the construction activities are administrative, based on ALARA principles, and consist of ALARA techniques. They are discussed in Sections 6.1.1 through 6.1.4 with respect to their associated activities, as described in Section 5.0.

6.1.1 Soil Excavation

Soil excavation activities will be performed in accordance with ALARACT Demonstration 5, *TWRS ALARACT Demonstration for Soil Excavation (Using Hand Tools)*, and will follow the radiological controls specified in that ALARACT.

If the regulated guzzler is used to excavate soil, radiological and administrative controls as described in the NOC for use in the A Tank Farm Complex (EPA 1998 letter) will be followed. Description of the emissions control technology for the regulated guzzler is provided in that NOC.

6.1.2 Pipe Cutting and Welding

Pipe cutting will be performed in a glove bag if the levels of removable contamination in the cut and weld area are greater than 10,000 dpm/100 cm^2 beta gamma and 200 dpm/100 cm^2 alpha. Health physics technician coverage will be provided. Although the key measure relied on to control air emissions during cutting will be the glove bag, measures such as expandable foam or fixatives might be applied on or around a pipe cut as an additional measure to help fix contamination. The decision to use expandable foam or fixatives will be made on a case-by-case basis after excavation exposes the pipe to be cut. When used, the expandable foam will help fix any contamination to the pipe wall in the area of the cut and will help prevent migration of contamination present in the pipe upstream or downstream of the cut.

If any welding is necessary to join pieces of equipment, welding will commence once removable contamination levels in the cut and weld area are reduced to ALARA. The goal will be to achieve 1000 dpm/100 cm^2 beta gamma and 20 dpm/100 cm^2 alpha or less, but may not always be attainable.

Work in glove bags will not be performed if sustained wind speeds are greater than 30 miles per hour.

If a portable/temporary radioactive air emission unit or a HEPA filtered vacuum radioactive air emission unit is used during the pipe cutting activities, controls as described in the NOCs (DOE/RL-96-75 and DOE/RL-97-50) will be followed.

6.1.3 Pit Work

Pit access and work will be performed in accordance with ALARACT Demonstrations 6 and 14, *TWRS ALARACT Demonstration for Pit Access* and *TWRS ALARACT Demonstration for Pit Work*, and will follow the radiological controls specified in those ALARACTs. Controls not covered in these ALARACTs are described in the following.

- All pit work will be performed in an appropriately configured confinement structure, as required by the applicable work package and its associated RWP, to maximize ALARA for contamination migration while allowing entry to perform the work. Health physics technician coverage will be provided during all pit work.

- If a portable/temporary radioactive air emission unit or a HEPA filtered vacuum radioactive air emission unit is used during the pit work activities, controls as described in the NOCs (DOE/RL-96-75 and DOE/RL-97-50) will be followed. Descriptions of the emissions control technology for these units are provided in the NOCs.

6.1.4 Removal and Installation of In-Tank Equipment

Equipment removal and installation activities will be performed in accordance with ALARACT Demonstration 13, *TWRS ALARACT Demonstration for Installation, Operation, and Removal of Tank Equipment*, and will follow the radiological controls specified in that ALARACT.

Removed long-length equipment will either be packaged in long-length contaminated equipment disposal containers or size reduced for disposal in accordance with ALARACT Demonstration 15, T*ank Farm ALARACT Demonstration for Size Reduction of Waste Equipment for Disposal.*

If a portable/temporary radioactive air emission unit or a HEPA filtered vacuum radioactive air emission unit is used during the removal or installation of in-tank equipment activities, controls as described in the NOCs (DOE/RL-96-75 and DOE/RL-97-50) will be followed. Descriptions of the emissions control technology for those units are provided in the NOCs.

6.2 TANK VENTILATION AND EMISSIONS CONTROL SYSTEM

The existing ventilation and emissions control systems for the 241-AY/AZ Tank Farm will be used during the mixing and transferring of waste in the AY and AZ tanks. The tank farm exhaust system provides ventilation for all AZ and AY tank primary vapor spaces. The system removes heat, water vapor, and particulates, and maintains a negative pressure on the tanks. The emission point is the 296-A-42 Stack.

Inlet air for the AZ and AY tanks is provided through the inlet air filters. Air is exhausted from each tank independently through 10.5-in.-diameter exhaust ducts. The ducts connect to a 55-ft-high stack (16.76 m). The exhaust station consists of two filtration subsystems and the stack. Either subsystem can collectively ventilate all the tanks together at a maximum flow rate of approximately 1000 ft^3/minute (approximately 0.42 m^3/sec). Only one system operates at a time, while the other remains in standby as a backup. A schematic of the 241-AZ/AY Tank Farm exhaust system is shown in Section 7.0.

Each filtration subsystem consists of a condenser, high-efficiency mist eliminator, heater, and two HEPA filters in series. Each HEPA filter is rated for 1000 ft^3/minute and is equipped with fluid seals. The HEPAs are individually tested annually (in accordance with ASME N510, *Testing of Nuclear Air Treatment System*) to a minimum efficiency of 99.95% for the removal of particulates with a median diameter of 0.3 microns.

The annulus of tank 241-AY-102 is ventilated via exhauster stack numbered 296-A-19. This stack has an internal diameter of 15 inches (1.25 feet, 0.38 meters). It is approximately 12.9 feet (3.9 meters) in height. The exhaust fan is capable of providing a maximum capacity of 3,850 cubic feet per minute (cfm) (52.3 feet per second or 15.9 meters

per second) at 12 inches (w.g.). Recent measured flow rates through this system have ranged from 787 dry standard cubic feet per minute (dscfm) to 1,173 dscfm, the average of which is 992 dscfm (13.5 feet/second or 4.1 meters/second). The average temperature of these measured flow rates was 83 degrees F (28.3 degrees C).

The Tank 241-AY-102 annulus ventilation system's exhaust fan draws outside air into an intake consisting of a damper and two pre-filters configured in series. Currently, the air is routed to the air distribution ring centered under the primary tank floor. The air flows from the air distribution ring through the air distribution slots in the refractory to the annulus. Exhaust air from the tank annulus is drawn out through underground ducts. The ducts merge aboveground to form a common vent header. For leak-detection purposes, a vacuum pump extracts an air sample from the header located upstream of the exhauster HEPA filters and feeds this air sample to a CAM. The header connects to the exhaust train where tank annulus exhaust air continues through two banks of HEPA filters configured in series. Filtered air exits the annulus ventilation system through an exhaust fan and stack and is released to the environment. The stack is fitted with a record sampler system that samples the air stream for radioactive particulates.

7.0 DRAWINGS OF CONTROLS

Regulatory Citation: "Provide conceptual drawings showing all applicable control technology components from the point of entry of radionuclides into the vapor space to release to the environment."

Figure 1 is a schematic of the 296-A-42 tank ventilation system.

Figure 1. 296-A-42 Ventilation System.

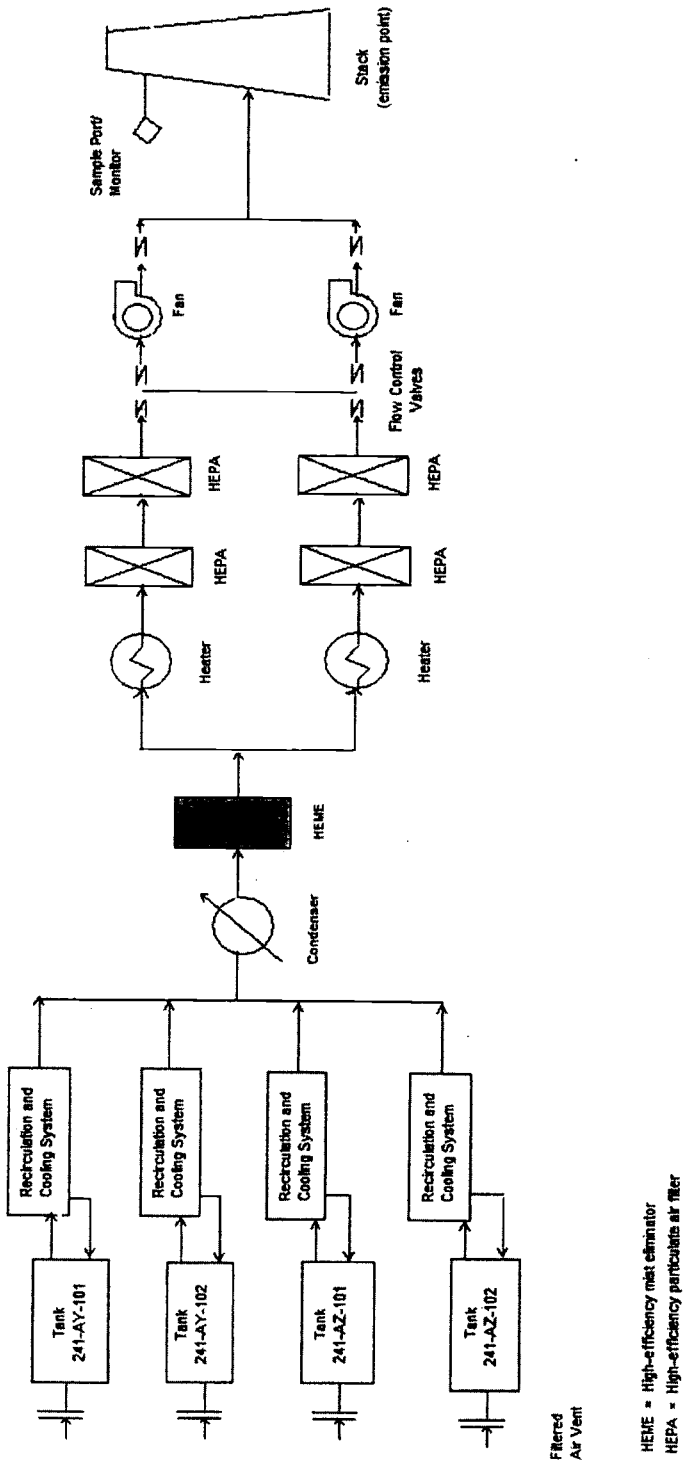
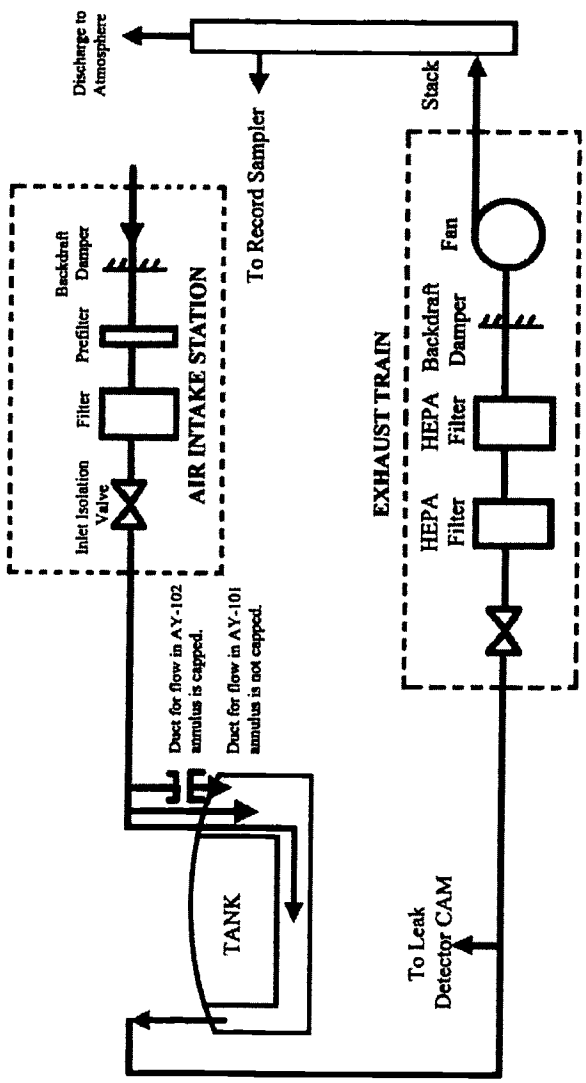


Figure 2. AY Farm Tank Annulus Ventilation System

AY Tank Farm Ventilation Tank Annulus System Flow Diagram.



NOTE: Tanks 241-AY-101 and 241-AY-102 have seperate annulus ventilation systems. The configuration of both systems is identical except as shown.

8.0 RADIONUCLIDES OF CONCERN

Regulatory Citation: "Identify each radionuclide that could contribute greater than ten percent of the potential–to-emit TEDE to the MEI, or greater than 0.1 mrem/yr potential–to-emit TEDE to the MEI."

Radionuclides of concern are listed in Appendixes B, C, D, E, F, and G. For each activity where individual radionuclides could be identified and with the potential to emit discussed in Sections 8.2 through 8.4, the estimated percentage dose contribution of the TEDE to the MEI was calculated for each isotope. The radionuclides of concern are ^{90}Sr, ^{243}Am, and ^{137}Cs.

8.1 POTENTIAL TO EMIT FOR SOIL EXCAVATION ACTIVITIES

The PTE derivations for manual soil excavation and the use of the guzzler are contained in Appendix C.

8.2 POTENTIAL TO EMIT FOR PIPE CUTTING ACTIVITIES

The PTE derivations for pipe cutting activities are contained in Appendix D.

8.3 POTENTIAL TO EMIT FOR PIT WORK AND IN-TANK EQUIPMENT INSTALLATION AND REMOVAL ACTIVITIES

Appendix E contains tables identifying in-tank equipment removal activities for each tank and a combined PTE for the areas covered by this NOC.

Appendix F contains the tables that derive the PTE for pit work.

8.4 POTENTIAL TO EMIT FOR MIXER PUMP EMISSIONS

Appendix G contains a table that derives the PTE for all tanks exhausting through the 296-A-42 emission unit, inclusive of the mixer pump operations.

The overall PTE from this facility will not be increased due to the migration of tank waste into the annular space. However, a small portion of the total emissions will travel through the annular stack; i.e. the 296-A-19 stack.

9.0 MONITORING

Regulatory Citation: "Describe the effluent monitoring system for the proposed control system. Describe each piece of monitoring equipment and its monitoring capability, including detection limits, for each radionuclide that could contribute greater than ten percent of the potential-to-emit TEDE to the MEI, or greater than 0.1 mrem/yr potential-to-emit TEDE to the MEI, or greater than twenty-five percent of the TEDE to the MEI, after controls. Describe the method with detail sufficient to demonstrate compliance with the applicable requirements."

Monitoring for each of the proposed activities is discussed in the Sections 9.1 and 9.2.

9.1 MONITORING DURING CONSTRUCTION ACTIVITIES

During soil excavation activities, periodic confirmatory monitoring (PCM) as described in ALARACT 5, will verify low emissions. If the regulated guzzler is used, PCM will be performed as required by the guzzler NOC.

During pipe cutting activities surface contamination surveys, as described in Section 6.1.2, will constitute the PCM to verify low emissions. If a portable/temporary radioactive air emission unit or a HEPA filtered vacuum radioactive air emission unit is used, PCM will be performed as required by these NOCs.

During pit work activities, PCM as described in ALARACT 14 will verify low emissions. If a portable/temporary radioactive air emission unit or a HEPA filtered vacuum radioactive air emission unit is used, PCM will be performed as required by these NOCs.

During in-tank equipment removal and installation activities surface contamination surveys, as described in ALARACT Demonstration 13, *TWRS ALARACT Demonstration for Installation, Operation and Removal of Tank Equipment* (HNF-4327) will constitute the PCM to verify low emissions. If a portable/temporary radioactive air emission unit or a HEPA filtered vacuum radioactive air emission unit is used, PCM will be performed as required by these NOCs.

9.2 MONITORING DURING OPERATIONS

Continuous monitoring will be obtained through use of the 241-AZ/AY Tank Farms existing sampling and monitoring system (296-A-42 stack). Samples will be collected approximately every 2 weeks and will include representative operation of the waste retrieval systems. The samples will be analyzed, at a minimum, for ^{90}Sr, ^{137}Cs, and ^{241}Am, each of which constitutes 10%, or more, of the EDE. While in operation, the 296-A-42 record sampler instrumentation will be calibrated annually in accordance with approved procedures, and system inspections will be performed daily to ensure instrumentation is operating within specified parameters.

The sampling and monitoring system consists of a continuous sampling record sampler and a continuous air monitor (CAM). The system collects samples at a variable flow rate, depending upon the stack effluent velocity. The system has been designed to match air velocities entering the sample probe with that of the duct in which it is installed. For example for stack flow rates of 400 and 1000 ft^3/minute, the sampling system will collect samples at 0.7 and 1.7 ft^3/minute, respectively. In this way, the design complies with those requirements specified in ANSI N13.1-1969, *Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities*. There are two sample probes (one for the CAM, one for the sampler) located in the exhaust duct in compliance with the 40 CFR 60 Appendix A, *Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities*, Method 1A requirement. The probe nozzles are configured in accordance with ANSI N13.1-1969. The sample flow totaling instruments are well within the ±2.0% accuracy described by Method 2A. The record sampler's collection efficiency during normal operations ranges between 55% (for stack flows of 1000 ft^3/minute) and 63% (for stack flows of 400 ft^3/minute) for penetration of 10-micron particles (from *Deposition 4.0* calculations). In addition, stack flow totalizers are installed that have been certified accurate to the requirements of 40 CFR 52,

Appendix E.

9.3 241-AY-102 ANNULUS VENTILATION SYSTEM MONITORING

Record sampling for the 241-AY-102 annulus will be obtained through use of the existing 296-A-19 stack sampling system. The samples will be analyzed, at a minimum, for ^{90}Sr, ^{137}Cs, and ^{241}Am. While in operation, the 296-A-19 record sampler instrumentation will be calibrated annually in accordance with approved procedures, and system inspections will be performed daily to ensure instrumentation is operating within specified parameters.

10.0 ANNUAL POSSESSION QUANTITY

Regulatory Citation: "Indicate the annual possession quantity for each radionuclide."

The maximum annual possession quantity (APQ) associated with this NOC is listed in Table 1. A bounding APQ was determined by considering the source term as recorded in Tank Waste Information Network System (TWINS) as of December 2007 and extrapolated to a full-tank condition (1,001,000 gal). Appendix B contains details of the derivation showing current source terms of individual tanks and projected full tank source terms.

The maximum APQ source for tank 241-AY-102 annulus is contained in the Appendix B table under the column header titled "AY-102 Inventory 12/2007."

11.0 PHYSICAL FORM

Regulatory Citation: "Indicate the physical form of each radionuclide in inventory: Solid, particulate solids, liquid, or gas."

The physical form of each radionuclide of concern in the inventory is either liquid or particulate.

12.0 RELEASE FORM

Regulatory Citation: "Indicate the release form of each radionuclide in inventory: Particulate solids, vapor, or gas. Give the chemical form and ICRP 30 solubility class, if known."

The release form of each radionuclide of concern in the inventory is listed in Table 1.

13.0 RELEASE RATES

Regulatory Citation: "a. New emission unit(s): Give predicted release rates without any emission control equipment (the potential-to-emit) and with the proposed control equipment using the efficiencies described in subsection 6 of this section.

b. Modified emission unit(s): Give predicted release rates without any emissions control equipment (the potential-to-emit) and with the existing and proposed control equipment using the efficiencies described in subsection 6 of this section. Provide the latest year's emission data or emissions estimates.
In all cases, indicate whether the emission unit is operating in a batch or continuous mode."

Construction activities will continue for several years; however, for conservatism in the emissions estimate and flexibility to adapt to schedule changes, the unabated emissions are assumed to be released over a 1-year period. Potential unabated emissions from the following general categories of construction activities are discussed in Sections 13.1 through 13.5 and calculated in Appendixes C, D, E, F, and G.

13.1 SOIL EXCAVATION

Manual excavation and regulated guzzler excavation emissions are discussed in Sections 13.1.1 and 13.1.2.

13.1.1 Manual Excavation

Unabated emissions for manual soil excavation activities were determined by assuming the entire volume of soil excavated (6000 yd^3) was at the same contamination concentration, and the 40 CFR 61 Appendix D, "Required Emission Inventory Information," release factor for particulates was applied to the total volume.

Table 1. Full Tank Annual Possession Quantity.

241-AY/AZ Tank Farm Radionuclide Annual Possession Quantity Data taken from TWINS Database during December 2007					
Radionuclide	Radionuclide Symbol	Physical State	Total APQ in AY Tanks (Ci)	Total APQ in AZ Tanks (Ci)	Total AY/AZ APQ (Ci)
Tritium	^{3}H	Gaseous	3.2E+01	1.9E+02	2.2E+02
Carbon-14	^{14}C	Gaseous	1.1E+01	1.2E+01	2.2E+01
Nickel-59	^{59}Ni	Particulate	6.6E+01	3.8E+01	1.0E+02
Cobalt-60	^{60}Co	Particulate	6.5E+02	1.8E+03	2.4E+03
Nickel-63	^{63}Ni	Particulate	6.1E+03	3.6E+03	9.8E+03
Selenium-79	^{79}Se	Particulate	1.9E+00	6.2E+00	8.1E+00
Strontium-90	^{90}Sr	Particulate	7.2E+06	1.1E+07	1.8E+07
Yttrium-90	^{90}Y	Particulate	7.2E+06	1.1E+07	1.8E+07
Niobium-93 metastable	^{93m}Nb	Particulate	2.0E+02	2.2E+02	4.2E+02
Zirconium-93	^{93}Zr	Particulate	3.4E+02	3.6E+02	7.0E+02
Technetium-99	^{99}Tc	Particulate	2.4E+02	2.2E+03	2.4E+03
Ruthenium-106	^{106}Ru	Particulate	3.8E-02	1.9E+02	1.9E+02
Cadmium-113 metastable	^{113m}Cd	Particulate	1.1E+02	9.4E+02	1.0E+03
Antimony-125	^{125}Sb	Particulate	3.6E+02	1.0E+04	1.1E+04
Tin-126	^{126}Sn	Particulate	2.0E+01	1.4E+01	3.4E+01
Iodine-129	^{129}I	Particulate	7.5E-01	5.2E-01	1.3E+00
Cesium-134	^{134}Cs	Particulate	4.4E+01	2.8E+03	2.9E+03
Cesium-137	^{137}Cs	Particulate	8.4E+05	1.0E+07	1.1E+07
Barium-137 metastable	^{137m}Ba	Particulate	7.9E+05	9.5E+06	1.0E+07
Samarium-151	^{151}Sm	Particulate	4.0E+05	3.9E+05	7.9E+05
Europium-152	^{152}Eu	Particulate	5.2E+02	3.1E+02	8.3E+02
Europium-154	^{154}Eu	Particulate	1.4E+04	2.2E+04	3.6E+04
Europium-155	^{155}Eu	Particulate	5.6E+03	2.8E+04	3.4E+04
Radium-226	^{226}Ra	Particulate	2.0E-04	5.2E-04	7.2E-04
Actinium-227	^{227}Ac	Particulate	1.3E-02	3.1E-03	1.6E-02
Radium-228	^{228}Ra	Particulate	1.5E-01	1.0E-02	1.6E-01
Thorium-229	^{229}Th	Particulate	6.6E-04	4.2E-06	6.7E-04
Protactinium-231	^{231}Pa	Particulate	1.3E-01	8.0E-03	1.4E-01
Thorium-232	^{232}Th	Particulate	1.3E-01	3.2E-02	1.6E-01
Uranium-232	^{232}U	Particulate	8.2E-03	9.3E-03	1.7E-02
Uranium-233	^{233}U	Particulate	3.9E-01	5.0E-01	8.9E-01
Uranium-234	^{234}U	Particulate	1.1E+00	4.3E+00	5.4E+00
Uranium-235	^{235}U	Particulate	4.5E-02	1.7E-01	2.2E-01
Uranium-236	^{236}U	Particulate	3.5E-02	3.7E-01	4.0E-01
Neptunium-237	^{237}Np	Particulate	7.9E+00	3.7E+01	4.5E+01
Plutonium-238	^{238}Pu	Particulate	1.4E+02	3.5E+02	4.8E+02
Uranium-238	^{238}U	Particulate	9.9E-01	3.2E+00	4.2E+00
Plutonium-239	^{239}Pu	Particulate	2.5E+03	2.8E+03	5.3E+03
Plutonium-240	^{240}Pu	Particulate	6.5E+02	7.7E+02	1.4E+03
Americium-241	^{241}Am	Particulate	2.2E+04	6.1E+04	8.2E+04
Plutonium-241	^{241}Pu	Particulate	6.4E+03	1.8E+04	2.4E+04
Curium-242	^{242}Cm	Particulate	3.0E+01	4.0E+01	7.0E+01
Plutonium-242	^{242}Pu	Particulate	6.4E-02	9.0E-02	1.5E-01
Americium-243	^{243}Am	Particulate	1.8E+01	2.1E+01	3.9E+01
Curium-243	^{243}Cm	Particulate	4.6E+00	4.3E+00	8.9E+00
Curium-244	^{244}Cm	Particulate	1.1E+02	9.8E+01	2.1E+02

To determine a PTE if contamination is encountered as monitored by standard radiological field instrumentation, the administrative limit of 100,000 dpm/100 cm^2 beta/gamma correlates to 10,000 cpm per probe area was used in the calculations. For alpha, the administrative limit of 35 dpm/100 cm^2 above background correlates to 5 cpm; however, 10 cpm was used in the calculations to account for variations in obtaining background readings. To determine the total possession quantity, the conversion factor (refer to second column in Appendix C) was multiplied by the total mass of soil to be excavated, by the maximum survey reading for alpha emitters, and the maximum survey reading for beta/gamma emitters. The average soil density was assumed to be 2640 lb/yd^3. The beta-gamma contributing radionuclide was assumed to be ^{90}Sr and the alpha contributing radionuclide was assumed to be ^{241}Am. The potential unabated emissions from manual soil excavation activities are shown in Appendix C.

13.1.2 Regulated Guzzler Excavation

Unabated emissions for soil excavation with the regulated guzzler are included by reference from EPA. It is not known at this time if, or how much, soil will be excavated by the regulated guzzler. Therefore, the entire soil volume (700 ft^3) that could be used without exceeding permitted limits for the guzzler was used to determine the potential emissions per farm.

The potential annual abated emissions during guzzler operation is 6.96E-05 mrem/yr (unabated dose, 1.39E-01 mrem/yr divided by 2000). The abated emissions were calculated from the unabated guzzler emissions and the decontamination factor for a single HEPA filter with a minimum efficiency of 99.95% for alpha/beta particles with a median diameter of 0.3 microns.

The potential unabated and abated emissions from regulated guzzler excavation activities are also shown in Appendix C.

13.2 PIPE CUTTING AND WELDING

To determine the unabated emissions from pipe cutting activities, it was assumed that a section of the pipe to be cut was full of the average farm waste (AZ Farm waste for the pipes used in AZ Farm and AY Farm waste for the pipes used in AY Farm), and the 40 CFR 61 Appendix D release factor of 1.0E-03 for particulates was applied to that volume of pipe (using the pipe volume is conservative with respect to the volume of the cut). For AZ Farm, the pipe volume was derived from a 2-ft section of a 2-in. Schedule 40 pipe (representing any needed cuts on a 2-in. pipe) and a 2-ft section of an 8-in. Schedule 40 pipe (representing any needed cuts on an 8-in. pipe). For AY Farm, the pipe volume was derived from a 2-ft section of a 3-in. pipe and a 2-ft section of a 6-in. pipe. A total of four pipe cuts for each size pipe was figured sufficient in AY Farm.

The pipe volume was multiplied by the average tank inventory (AZ tank inventory for the pipes used in AZ Farm and AY tank inventory for the pipes used in AY Farm) and then multiplied by the 1.0 E-03 release factor for particulates. The potential unabated emissions from pipe cutting activities are shown in Appendix D.

The potential unabated emissions associated with welding activities were considered and are shown in the following calculation. For calculation purposes, it was assumed that contamination levels of 10,000 dpm/100 cm^2 beta/gamma and 200 dpm/100 cm^2 alpha were used to calculate

potential emissions. It was also conservatively assumed that an entire 1 m^2 area of contamination was released. The calculation assumes a release fraction of 1. The potential emissions assume beta contamination is from ^{90}Sr, alpha contamination is from ^{241}Am, and gamma contamination is from ^{137}Cs. As shown by the calculation, the potential emissions associated with welding (2.75E-07 mrem/year for offsite) are insignificant when compared to the potential emissions associated with pipe cutting (3.42E-02 for AZ Farm and AY Farm).

Offsite

Beta = (10,000 dpm/100 cm^2)(1Ci/2.22E+12 dpm)(10,000 cm^2)(release fraction of 1/yr)(1.1E-01 mrem/Ci) = 4.95E-08

Alpha = (200 dpm/100 cm^2)(1Ci/2.22E+12 dpm)(10,000 cm^2)(release fraction of 1/yr)(1.3E+01 mrem/Ci) = 1.17E-07

Gamma = (10,000 dpm/100 cm^2)(1Ci/2.22E+12 dpm)(10,000 cm^2)(release fraction of 1/yr)(2.4E-01 mrem/Ci) = 1.08E-07

Total = 2.75E-07

Onsite

Beta = (10,000 dpm/100 cm^2)(1Ci/2.22E+12 dpm)(10,000 cm^2)(release fraction of 1/yr)(9.5E-03 mrem/Ci) = 4.28E-09

Alpha = (200 dpm/100 cm^2)(1Ci/2.22E+12 dpm)(10,000cm^2)(release fraction of 1/yr)(1.5E+01 mrem/Ci) = 1.35E-07

Gamma = (10,000 dpm/100 cm^2)(1Ci/2.22E+12dpm)(10,000 cm^2)(release fraction of 1/yr)(2.7E-01 mrem/Ci) = 1.22E-07

Total = 2.61E-07

13.3 PIT WORK AND REMOVAL OF IN-TANK EQUIPMENT

The unabated emission estimates for pit work are based on smearable contamination data from the pits and the 40 CFR 61 Appendix D release factor for particulates. The entire surface area from the walls and floors of the pit, and the enclosed equipment, was assumed to be uniformly contaminated at the highest smearable readings for beta/gamma (1,000,000 dpm/100 cm^2) and alpha (700,000 dpm/100 cm^2) that could be read on portable instruments. The beta-gamma contributing radionuclide was assumed to be ^{90}Sr and the alpha contributing radionuclide was assumed to be ^{241}Am. The potential unabated emissions from pit work activities are shown in Appendix F.

The unabated emissions estimate for the removal of in-tank equipment was determined by assuming a 0.16-cm layer of the applicable tank inventory being uniformly distributed across the surface area of the equipment and applying the 40 CFR 61 Appendix D release factor for particulates to the total volume contained over that surface area. That equipment includes

removal of existing mixer pumps, transfer pumps, thermocouple probes, and multi-function instrument trees. For AZ Farm, the biggest equipment from each tank (one mixer pump and one transfer pump for each tank) was chosen to represent the total unabated emissions for all removals and relocations in any given year. For AY Farm, emissions were estimated for removal of eight instrument probes and three pumps per tank per year. Free liquids are not expected to be held up in this equipment because the equipment is designed as self-draining. The small amount of liquid (less than one liter) that may be trapped behind a transfer pump impeller will be immobilized in the absorbent mat secured inside the flex receiver bag and will not be released by the grouting process. The potential unabated emissions from in-tank equipment removals are shown in Appendix E.

13.4 POTENTIAL UNABATED EMISSIONS DURING MIXER PUMP OPERATIONS

Original emissions from mixer pump operations were estimated based on the maximum envelope tank inventory presented in Section 7.0 and a measured partition fraction (1.02 E-09) representative of particulates generated in a double-shell tank during the operation of two airlift circulators for 1 hr (RHO-RE-SA-216P, *Characterization of Airborne Radionuclide Particulates in Ventilated Liquid Waste Tanks*).

Emissions are estimated in this revision using a release fraction of 1 for gases and 1E-03 for particulates. The potential annual unabated emissions during mixer pump operations in the 241-AZ-102, 241-AY-101, and 241-AY-102 tanks are shown in Appendix F.

13.5 POTENTIAL ABATED EMISSIONS DURING MIXER PUMP OPERATIONS

The potential annual abated emissions during mixer pump operations also are shown in Appendix F. The abated emissions were calculated from the unabated emissions using a decontamination factor for a single HEPA filter with a minimum efficiency of 99.95%. For constituents released in a vapor phase (H-3 and C-14) no credit was taken for decontamination.

14.0 LOCATION OF MAXIMALLY EXPOSED INDIVIDUAL

Regulatory Citation: "Identify the MEI by distances and direction from the emission unit(s). The MEI is determined by considering distance, windrose data, presence of vegetable gardens, and meat or milk producing animals at unrestricted areas surrounding the emission unit."

For emission estimates associated with AZ and AY Farm, the MEI is determined using CAP-88 dispersion factors which were derived for use on the Hanford Site and published in DOE/RL-2006-29, *Calculating Potential-to-Emit Radiological Releases and Doses*. Values used are shown in Table 4-9 of DOE/RL-2006-29 for 200 East Area with effective release height <40 m. Table 4-9 gives values in two separate columns for an offsite maximum public receptor (MPR) and an onsite MPR. Values from both columns were compared to determine the maximum dose. The results showed that the maximum dose occurred to the offsite MPR. Table 4-2 of DOE/RL-2006-29 states that the offsite MPR for the 200 East Area is 20,200 m in the east-southeast direction. This location is just east of the Columbia River at Ringold.

15.0 TOTAL EFFECTIVE DOSE EQUIVALENT TO THE MAXIMALLY EXPOSED INDIVIDUAL

Regulatory Citation: "Calculate the TEDE to the MEI using an approved procedure (see WAC 246-247-085). For each radionuclide identified in subsection 8 of this section, determine the TEDE to the MEI for existing and proposed emission controls, and without any emission controls (the potential-to-emit) using release rates from subsection 13 of this section. Provide all input data used in the calculations."

This section discusses the TEDE to the offsite MEI resulting from the unabated and abated emission estimates for operating mixer pumps in tanks 241-AZ-102, 241-AY-101, and 241-AY-102 and from unabated emissions from the construction activities. Results of the evaluation showed that the nearest public receptor was in Ringold.

The unabated offsite dose from the construction activities are contained within Appendixes C, D, E, and F. The potential unabated offsite dose from operation of the 296-A-42 emission unit, including the mixer pumps, is in Appendix G. Again, abated emissions for the mixer pump operation and guzzler activities were calculated from the unabated emissions and the decontamination factor for a single HEPA filter with a minimum efficiency of 99.95%.

A summary of the estimated AY/AZ Farm TEDE to the MEI is provided in Table 2.

Table 2. Summary of TEDE to the MEI.

	Unabated mrem/yr		Abated mrem/yr	
NOC summary	Offsite MEI	Onsite MEI	Offsite MEI	Onsite MEI
Mixer pump operation	5.75E+03	4.45E+03	2.92E+00	2.23E+00
Hand excavation	3.22E-02	8.29E-02	1.61E-02	1.56E-02
Guzzler excavation	1.39E-01	1.35E-01	6.96E-05	6.73E-05
Pipe cuts	3.42E-02	2.59E-02	3.36E-02	2.46E-02
Equipment Removal	3.18E-01	2.35E-01	3.11E-01	2.21E-01
Pit entries	8.28E-04	9.45E-04	8.28E-04	9.45E-04
Total	5.75E+03	4.45E+03	3.28E+00	2.49E+00

A comparison of the estimates previously permitted through, issuance of AIR-05-708, and current estimates, due to increasing APQ, is presented in Table 3.

Table 3. Comparison of Change in TEDE to the Offsite MEI.

	Unabated		Abated	
	Previous OffSite MEI	Current OffSite MEI	Previous OffSite MEI	Current OffSite MEI
Mixer Pump Emissions	3.57E+03	5.75E+03	1.80E+00	2.92E+00
Hand Excavation	3.22E-02	3.22E-02	3.22E-02	1.61E-02
Guzzler Excavation	6.96E-02	1.39E-01	3.48E-05	6.96E-05
Pipe Cuts	2.20E-02	3.42E-02	2.20E-02	3.36E-02
Equipment Removal	2.11E-01	3.18E-01	2.11E-01	3.11E-01
Pit Entries	8.28E-04	8.28E-04	8.28E-04	8.28E-04
Total	3.57E+03	5.75E+03	2.10E+00	3.28E+00

The TEDE for all 2006 Hanford Site air emissions (point sources, diffuse and fugitive sources, and radon and thoron) was 0.1 mrem (DOE/RL-2007-01, *Radionuclide Air Emissions Report for the Hanford Site, Calendar Year 2006*). The emissions resulting from the operation of 296-A-42 and construction activities in the AY and AZ farms, in conjunction with other operations at the Hanford Site, will not result in a violation of the National Emission Standard of 10 mrem/year.

16.0 COST FACTOR IF NO ANALYSIS

Regulatory Citation: "Provide cost factors for construction, operating, and maintenance of the proposed control technology components and system, if a BARCT or ALARACT demonstration is not submitted with the NOC."

It is proposed that the HEPA filtration system, as described in Section 8.0, be approved as BARCT for operation of mixer pumps in this application. The WDOH has provided guidance in the past that HEPA filtration be considered best available radionuclide control technology (BARCT) for particulate emissions. Particulate emissions comprise almost 100% of the TEDE from proposed activities. As such, cost factors for construction, operation, and maintenance of the control technology components and system have not been provided.

17.0 DURATION OR LIFETIME

Regulatory Citation: "Provide an estimate of the lifetime for the facility process with the emission rates provided in this application."

This system is expected to continue operating until the completion of waste retrieval and processing, which is currently scheduled for 2049.

18.0 STANDARDS

Regulatory Citation: "Indicate which of the following control technology standards have been considered and will be complied with in the design and operation of the emission unit(s) described in this application:....
ASME AG-1, ASME N509, ASME N510, ASME NQA-1, 40 CFR 60, Appendix A Methods 1, 1A, 2, 2A, 2C, 2D, 4, 5, and 17, and ANSI N13.1"

The standards discussion applies only to the emissions associated with operation of mixer pumps in the AZ and AY tanks, which ventilate through the 296-A-42 stack. Activities such as soil excavation, pipe cutting, pit work, and removal and installation of in-tank equipment do not require compliance with the standards discussed unless a portable/temporary radioactive air emission unit is used. If a portable/temporary radioactive air emission unit is used, use will comply with the standards as discussed in the most recently approved NOC (DOE/RL-96-75).

Operating the mixer pumps, in a batch mode, in the AZ and AY tanks has a PTE greater than 0.1 mrem/year TEDE to the MEI. Therefore, the design must meet, as applicable and to the

extent justified by a cost/benefit evaluation, the technology standards listed under *Washington Administrative Code* (WAC) 246-247-110(18), "Appendix A—Application information requirements." Sections 18.1 through 18.6 discuss compliance with major sections of these standards and provides justification to support adequacy of the design for sections of these standards that are not met.

The following control technologies standards were considered.

18.1 AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) AG-1

This ASME AG-1 equipment specific code consists of five primary sections, which are applicable to this unit. The applicable sections are fans (Section BA), ductwork (Section SA), HEPA filters (Section FC), dampers (Section DA) and Quality Assurance (QA) (Section AA).

The fan section of AG-1 (Section BA) covers the construction and testing requirements for fans. This fan meets the applicable criteria identified in AG-1

The next applicable requirement is the ductwork section of AG-1 (Section SA). As was the case for the fan, this section identifies several requirements for ductwork. This includes acceptable material, fabrication, and testing criteria. The ductwork used is metal and meets the applicable criteria identified in ASME AG-1.

The HEPA filter section of AG-1 (Section FC) is also applicable in this instance. The filters meet the applicable sections of AG-1.

The dampers installed on the exhauster do meet the applicable AG-1 criteria. This includes design, construction and testing. The manufacturer performs a generic leak test on the butterfly valves prior to shipping.

The quality assurance section of AG-1 relies on ASME NQA-1, *Quality Assurance Requirements for Nuclear Facility Applications*. The general QA criteria are located in Section AA. Specific component/system criteria are located in each section throughout AG-1. It can be shown the overall system meets the applicable quality assurance criteria.

AG-1 contains several other sections, however they do not apply to this system. The filter housing section is discussed below in the ASME N509 Section.

18.2 ASME N509

This standard deals with the individual components and how they relate to the overall system. The primary section of N509 that will be discussed is the filter housing section and heater section.

The filter housings for the exhauster are compliant with the applicable sections of the N509 criteria, with the exception of doors and windows. This includes design of housing, mounting frames, materials, and testing.

The heater used in this exhauster meets the N509 criteria. The reason for the heater is to assure

the relative humidity of the air stream is below 70%, reducing the opportunity for condensation in the filter housing.

18.3 ASME N510

This standard pertains to the testing of nuclear air cleaning systems. The first requirement identified in N510 is to perform a pressure decay test. This is to ensure there are no infiltration or outward leak paths from the system. This is a standard test for the filter housings at the housing manufacturer's facility.

This system meets the leak test criteria identified in N510. Test sections and manifolds are located in the exhaust train to allow for proper independent testing of both HEPA filters on both trains.

18.4 ANSI/ASME NQA-1

Quality assurance is addressed by HNF-MP-599, latest revision, "Quality Assurance Program Description" (Chapter 2.0, Section 3.3, and Chapter 7.0, Section 3.2), and by HNF-0528, "National Emission Standards for Hazardous Air Pollutants (NESHAP) Quality Assurance Project Plan for Radioactive Airborne Emissions" (Sections 2.0, 3.0, and 5.0), as a compatible alternative to NQA-1.

18.5 40 CFR 60, APPENDIX A

Method 2C (Determination of Stack Gas Velocity and Volumetric Flow Rate in Small Stacks or Ducts Standard Pitot Tube) as identified in Appendix A of 40 CFR 60 is used.

18.6 AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) N13.1

The sampling probe assembly is located in the horizontal ventilation ductwork just prior to entering the stack.

The 296-A-42 system has two individual withdrawal probes, each with two separate withdrawal points. The number of withdrawal points on each probe is two, as recommended by ANSI for a 10-in.-diameter duct. Two separate probes were used so that in addition to record sample collection, collection for a continuous air monitor could be accommodated as well.

Each probe's withdrawal points are spaced within the cross-sectional area of the duct on radii of 4.33 and 2.5 in. from the center of the duct. The radius of the first annular area is 3.68 in. from the center. This places the withdrawal points of each of the probes in the correct annular areas as specified in ANSI.

The following are at the 296-A-42 system probe location:

- Two particulate probes, each with two withdrawal nozzles. Each nozzle is sharpened to a knife edge. Minimal flow disturbances should result from these nozzle tips. The nozzle lengths are nearly an entire duct diameter (8.5 in. from the probe nozzle inlets to the centerline of the probe manifolds).

- Two air volume traverse probes, which are located just behind the plane of the sampler probe nozzle inlets. One traverse tube measures total pressure and the other measures static pressure. Each traverse probe contains four individual flow-sensing points (spaced in equal annular areas) which are designed to provide accurate measurements for multi-directional flows up to 30 degrees pitch and yaw from straight. Both traverse probes are used together to determine stack air velocities.

- A thermal probe is located 2.5 in. behind and between the traverse tubes. This thermal probe measures the stack air temperature. The signals from the thermal probe are used together with stack air velocity signals to determine mass flow. Mass flow is required to determine annual emissions.

This placement of the subject instrumentation at the location in question allows the air velocity to be determined in real time at the sampling probe withdrawal points so that the sample probe velocities can be maintained isokinetic in accordance with the ANSI standard requirements.

A 40 CFR 52, Appendix E, "Performance Specifications and Specifications of Test Procedures for Monitoring System for Effluent Stream Gas Volumetric Flow Rate," test was completed for the 296-A-42 system on April 7, 1997. This method was cited as a means to demonstrate compliance in an EPA 1993 letter, "Response for Clarification of Compliance Order and Information Request1092-01-23-113/114." This method is also cited for conformance "as applicable" in WAC 246-247-075(2), "Monitoring, testing, and quality assurance." This test resulted in a relative accuracy of 5.7%, which surpassed the Appendix E passing criteria of less than 10%.

The entire 296-A-42 stack sampling system was approved by WDOH on February 13, 1998, as an alternative sampling system. Collection efficiencies for 10-micron-sized particles are estimated to be between 55 to 63%. Compliance with ANSI N13.1-1999 standards was accomplished by meeting the requirements of Table 5, "Summary of maintenance, calibration, and field check requirements," identified in Section 7.0 *Quality assurance and quality control.*

19.0 REFERENCES

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40 CFR 61.07, "Application for approval of construction or modification," *Code of Federal Regulations*, as amended.

40 CFR 61, Appendix D, "Required Emission Inventory Information," *Code of Federal Regulations*, as amended.

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APPENDIX A. 241-AY TANK FARM IODINE EMISSIONS DATA

ABCASH Iodine Emissions - 1994-2007

Stack	EDP Code	Sample Number	Sample Collection Period (Date and Time)		Radionuclide, Calculated Concentration, and Analytical Uncertainty		
			On	Off	Volume ft³	^{129}I (µCi/ml)	% Uncert
296-A-17	E026	S173111	12/13/95 09:32	12/20/95 13:28	17690.3	3.2E-13	60.0
296-A-17	E026	S172018	12/21/95 17:26	12/28/95 09:13	17119.7	1.3E-13	320.0
296-A-17	E026	S143080	12/20/95 13:31	01/03/96 14:36	33514.6	3.4E-13	90.0
296-A-17	E026	S186835	05/01/96 09:38	05/07/96 14:52	14346.1	3.4E-12	25.0
296-A-17	E026	S194321	07/12/96 13:33	07/23/96 13:31	22669.7	9.3E-12	13.5
296-A-17	E026	S203640	10/25/96 14:09	11/01/96 08:36	6141.1	4.1E-12	32.4
296-A-17	E026	S213613	02/11/97 11:28	02/18/97 13:56	17316.9	7.7E-14	490.0
296-A-17	E026	S220099	05/06/97 13:53	05/13/97 10:24	10390.9	7.9E-12	20.0
296-A-17	E026	S232072	09/02/97 09:52	09/09/97 09:30	22750.0	3.4E-13	83.7
296-A-17	E026	S242116	12/02/97 11:06	12/09/97 11:04	12202.7	6.0E-12	21.4
296-A-17	E026	S248898	02/10/98 10:29	02/17/98 13:34	14418.6	2.5E-12	29.2
296-A-17	E027	S143081	12/28/95 09:18	01/03/96 14:39	15340.0	-2.5E-13	170.0
296-A-17	E027	S186836	05/01/96 09:39	05/07/96 14:53	14348.8	-2.2E-13	210.0
296-A-17	E027	S194322	07/12/96 13:34	07/23/96 13:32	22669.7	1.2E-12	39.0
296-A-17	E027	S203641	10/25/96 14:10	11/01/96 08:37	6141.1	4.4E-14	1000.0
296-A-17	E027	S213614	02/11/97 11:28	02/18/97 13:57	17319.7	2.0E-13	209.0
296-A-17	E027	S220100	05/06/97 13:54	05/13/97 10:25	10390.9	1.4E-12	81.3
296-A-17	E027	S232073	09/02/97 09:52	09/09/97 09:31	22753.2	1.1E-11	13.0
296-A-17	E027	S242117	12/02/97 11:06	12/09/97 11:05	12202.7	1.4E-12	26.1
296-A-17	E027	S248899	02/10/98 10:30	02/17/98 13:35	14418.6	-2.0E-13	212.0
296-A-42	E152	S258566	05/11/98 14:54	05/29/98 13:45	36295.0	9.3E-14	173.0
296-A-42	E152	S329790	01/26/00 11:07	02/16/00 09:09	53305.8	1.3E-12	20.3
296-A-42	E152	S339066	04/25/00 13:35	05/11/00 10:24	40112.0	4.0E-12	14.6
296-A-42	E152	S351644	08/13/00 09:05	08/30/00 10:36	41882.0	5.4E-12	12.9
296-A-42	E152	S357009	10/25/00 09:14	11/02/00 14:26	20938.7	5.3E-12	15.1
296-A-42	E152	S367778	01/25/01 08:31	02/14/01 13:36	48265.0	3.8E-13	54.9
296-A-42	E152	S379203	06/11/01 11:21	06/26/01 09:06	29734.0	2.9E-13	68.4
296-A-42	E152	S385142	09/12/01 09:53	09/27/01 09:10	29657.0	1.5E-12	27.8
296-A-42	E152	S397678	11/07/01 10:16	11/19/01 10:23	24570.0	9.5E-13	58.5
296-A-42	E152	S413538	02/12/02 13:43	02/26/02 21:27	29844.0	-2.8E-13	100.0
296-A-42	E152	S424958	05/08/02 10:03	05/21/02 13:01	26881.0	-3.0E-13	100.0
296-A-42	E152	S438173	08/12/02 10:31	09/11/02 13:27	56184.0	-2.1E-14	587.0
296-A-42	E152	S429364	10/24/02 12:53	11/11/02 10:47	37134.0	1.2E-13	172.0
296-A-42	E152	S460506	02/26/03 10:08	03/12/03 09:36	27359.8	-3.9E-14	630.0
296-A-42	E152	S569221	05/27/03 00:00	06/10/03 00:00	29150.0	3.0E-13	85.2
296-A-42	E152	S578970	08/13/03 12:37	08/25/03 10:23	25989.0	8.8E-14	305.0
296-A-42	E152	S594442	12/08/03 09:54	01/27/04 08:38	104113.0	8.4E-14	81.1
296-A-42	E152	s601753	03/03/04 18:41	03/17/04 12:44	9927.0	-5.5E-13	128.0
296-A-42	E152	S613711	08/21/04 15:05	09/03/04 00:35	26323.8	-1.8E-13	160.0
296-A-42	E152	S625348	09/17/04 01:34	10/12/04 01:14	58975.0	7.1E-13	26.6
296-A-42	E152	s631848	11/24/04 02:14	12/08/04 10:14	33263.0	1.4E-12	27.3
296-A-42	E152	s640203	02/03/05 09:49	03/09/05 12:36	77021.0	-3.6E-14	252.0
296-A-42	E152	S648616	03/30/05 09:42	06/09/05 11:10	149775.0	8.3E-15	559.0
296-A-42	E152	s660595	08/29/05 08:55	09/13/05 13:07	34780.0	-2.0E-13	100.0
296-A-42	E152	s662470	10/12/05 13:58	11/17/05 08:48	29922.0	-2.1E-13	117.0
296-A-42	E152	S679007	02/23/06 10:02	03/14/06 10:02	42464.0	-6.3E-14	260.0
296-A-42	E152	S682526	07/05/06 09:04	07/19/06 14:18	32300.0	-2.9E-13	100.0
296-A-42	E152	S695972	08/29/06 12:59	09/12/06 18:21	32335.0	-2.4E-13	100.0
296-A-42	E152	S701513	10/10/06 09:39	10/30/06 10:49	45847.0	4.6E-14	339.0
296-A-42	E152	S711837	01/17/07 08:45	02/02/07 14:38	36287.0	2.0E-15	1000.0
296-A-42	E152	S721382	04/11/07 13:04	04/26/07 11:06	33365.0	1.5E-13	147.0

100.0

APPENDIX B. 241-AY/AZ TANK FARM RADIONUCLIDE INVENTORY DATA

Radionuclide Symbol	AY-101 Inventory 12/2007 (Ci)	AY-102 Inventory 12/2007 (Ci)	AZ-101 Inventory 12/2007 (Ci)	AZ-102 Inventory 12/2007 (Ci)	Total 2007 Inventory (Ci)	AY-101 max Inventory (Ci)	AY-102 max Inventory (Ci)	AZ-101 max Inventory (Ci)	AZ-102 max Inventory (Ci)	Total Maximum APQ
Adjustment Factor (AJ) for Maximum Inventory						1,001,000 /871,750	1,001,000 /981,750	1,001,000 /836,000	1,001,000 /940,500	
Formulas	B	C	D	E	F=B+C+D+E	G=AJ*B	H=AJ*C	I=AJ*D	J=AJ*E	K=G+H+I+J
3H	1.41E+01	1.51E+01	5.39E+01	1.15E+02	1.98E+02	1.6E+01	1.5E+01	6.5E+01	1.2E+02	2.2E+02
14C	8.38E+00	9.18E-01	6.60E+00	3.57E+00	1.95E+01	9.6E+00	9.4E-01	7.9E+00	3.8E+00	2.2E+01
59Ni	3.58E+01	2.48E+01	2.13E+01	1.20E+01	9.39E+01	4.1E+01	2.5E+01	2.6E+01	1.3E+01	1.0E+02
60Co	4.98E+02	7.89E+01	7.79E+02	7.83E+02	2.14E+03	5.7E+02	8.0E+01	9.3E+02	8.3E+02	2.4E+03
63Ni	3.34E+03	2.25E+03	2.02E+03	1.14E+03	8.75E+03	3.8E+03	2.3E+03	2.4E+03	1.2E+03	9.8E+03
79Se	1.25E+00	4.30E-01	3.68E+00	1.73E+00	7.09E+00	1.4E+00	4.4E-01	4.4E+00	1.8E+00	8.1E+00
90Sr	2.13E+06	4.63E+06	5.52E+06	3.92E+06	1.62E+07	2.4E+06	4.7E+06	6.6E+06	4.2E+06	1.8E+07
90Y	2.13E+06	4.63E+06	5.52E+06	3.92E+06	1.62E+07	2.4E+06	4.7E+06	6.6E+06	4.2E+06	1.8E+07
93mNb	1.37E+02	4.59E+01	1.25E+02	6.63E+01	3.74E+02	1.6E+02	4.7E+01	1.5E+02	7.1E+01	4.2E+02
93Zr	2.46E+02	5.55E+01	2.02E+02	1.13E+02	6.17E+02	2.8E+02	5.7E+01	2.4E+02	1.2E+02	7.0E+02
99Tc	4.85E+01	1.82E+02	1.11E+03	7.85E+02	2.13E+03	5.6E+01	1.9E+02	1.3E+03	8.4E+02	2.4E+03
106Ru	3.27E-02	6.00E-04	7.99E+01	9.19E+01	1.72E+02	3.8E-02	6.1E-04	9.6E+01	9.8E+01	1.9E+02
113mCd	5.01E+01	4.92E+01	5.21E+02	2.99E+02	9.19E+02	5.8E+01	5.0E+01	6.2E+02	3.2E+02	1.0E+03
125Sb	2.84E+02	3.36E+01	4.82E+03	4.14E+03	9.28E+03	3.3E+02	3.4E+01	5.8E+03	4.4E+03	1.1E+04
126Sn	3.17E+00	1.62E+01	9.12E+00	2.92E+00	3.14E+01	3.6E+00	1.7E+01	1.1E+01	3.1E+00	3.4E+01
129I	2.23E-01	4.86E-01	3.93E-01	4.92E-02	1.15E+00	2.6E-01	5.0E-01	4.7E-01	5.2E-02	1.3E+00
134Cs	1.43E+00	4.12E+01	1.49E+03	9.94E+02	2.53E+03	1.6E+00	4.2E+01	1.8E+03	1.1E+03	2.9E+03
137Cs	1.36E+05	6.68E+05	5.31E+06	3.50E+06	9.61E+06	1.6E+05	6.8E+05	6.4E+06	3.7E+06	1.1E+07
137mBa	1.28E+05	6.31E+05	5.01E+06	3.30E+06	9.07E+06	1.5E+05	6.4E+05	6.0E+06	3.5E+06	1.0E+07
151Sm	2.77E+05	8.11E+04	1.31E+05	2.17E+05	7.06E+05	3.2E+05	8.3E+04	1.6E+05	2.3E+05	7.9E+05
152Eu	3.98E+02	6.43E+01	1.57E+02	1.11E+02	7.30E+02	4.6E+02	6.6E+01	1.9E+02	1.2E+02	8.3E+02
154Eu	6.17E+03	6.50E+03	1.08E+04	8.73E+03	3.22E+04	7.1E+03	6.6E+03	1.3E+04	9.3E+03	3.6E+04
155Eu	2.52E+03	2.62E+03	1.22E+04	1.27E+04	3.00E+04	2.9E+03	2.7E+03	1.5E+04	1.4E+04	3.4E+04
226Ra	9.77E-05	8.93E-05	3.00E-04	1.52E-04	6.39E-04	1.1E-04	9.1E-05	3.6E-04	1.6E-04	7.2E-04
227Ac	3.27E-03	9.16E-03	1.78E-03	9.16E-04	1.51E-02	3.8E-03	9.3E-03	2.1E-03	9.7E-04	1.6E-02

APPENDIX B. 241-AY/AZ TANK FARM RADIONUCLIDE INVENTORY DATA

Radionuclide Symbol	AY-101 Inventory 12/2007 (Ci)	AY-102 Inventory 12/2007 (Ci)	AZ-101 Inventory 12/2007 (Ci)	AZ-102 Inventory 12/2007 (Ci)	Total 2007 Inventory (Ci)	AY-101 max Inventory (Ci)	AY-102 max Inventory (Ci)	AZ-101 max Inventory (Ci)	AZ-102 max Inventory (Ci)	Total Maximum APQ
Adjustment Factor (AJ) for Maximum Inventory						1,001,000 /871,750	1,001,000 /981,750	1,001,000 /836,000	1,001,000 /940,500	
Formulas	B	C	D	E	F=B+C+D+E	G=AJ*B	H=AJ*C	I=AJ*D	J=AJ*E	K=G+H+I+J
228Ra	8.82E-02	4.31E-02	2.74E-03	6.62E-03	1.41E-01	1.0E-01	4.4E-02	3.3E-03	7.0E-03	1.6E-01
229Th	5.44E-04	3.72E-05	2.50E-06	1.13E-06	5.85E-04	6.2E-04	3.8E-05	3.0E-06	1.2E-06	6.7E-04
231Pa	2.80E-02	9.54E-02	4.68E-03	2.25E-03	1.30E-01	3.2E-02	9.7E-02	5.6E-03	2.4E-03	1.4E-01
232Th	6.45E-02	5.28E-02	8.17E-03	2.06E-02	1.46E-01	7.4E-02	5.4E-02	9.8E-03	2.2E-02	1.6E-01
232U	4.79E-03	2.68E-03	2.68E-03	5.68E-03	1.58E-02	5.5E-03	2.7E-03	3.2E-03	6.0E-03	1.7E-02
233U	1.66E-01	1.96E-01	1.50E-01	3.03E-01	8.15E-01	1.9E-01	2.0E-01	1.8E-01	3.2E-01	8.9E-01
234U	2.92E-01	7.22E-01	7.82E-01	3.18E+00	4.98E+00	3.4E-01	7.4E-01	9.4E-01	3.4E+00	5.4E+00
235U	1.24E-02	3.02E-02	2.96E-02	1.28E-01	2.00E-01	1.4E-02	3.1E-02	3.5E-02	1.4E-01	2.2E-01
236U	1.05E-02	2.27E-02	7.16E-02	2.66E-01	3.71E-01	1.2E-02	2.3E-02	8.6E-02	2.8E-01	4.0E-01
237Np	3.50E+00	3.83E+00	1.36E+01	1.93E+01	4.02E+01	4.0E+00	3.9E+00	1.6E+01	2.1E+01	4.5E+01
238Pu	6.53E+01	6.14E+01	1.15E+02	1.97E+02	4.39E+02	7.5E+01	6.3E+01	1.4E+02	2.1E+02	4.8E+02
238U	2.54E-01	6.81E-01	5.52E-01	2.37E+00	3.86E+00	2.9E-01	6.9E-01	6.6E-01	2.5E+00	4.2E+00
239Pu	7.70E+02	1.60E+03	1.18E+03	1.33E+03	4.88E+03	8.8E+02	1.6E+03	1.4E+03	1.4E+03	5.3E+03
240Pu	2.36E+02	3.69E+02	3.32E+02	3.51E+02	1.29E+03	2.7E+02	3.8E+02	4.0E+02	3.7E+02	1.4E+03
241Am	1.44E+04	4.97E+03	2.56E+04	2.84E+04	7.34E+04	1.7E+04	5.1E+03	3.1E+04	3.0E+04	8.2E+04
241Pu	3.27E+03	2.61E+03	8.19E+03	7.34E+03	2.14E+04	3.8E+03	2.7E+03	9.8E+03	7.8E+03	2.4E+04
242Cm	2.15E+01	5.61E+00	1.12E+01	2.48E+01	6.31E+01	2.5E+01	5.7E+00	1.3E+01	2.6E+01	7.0E+01
242Pu	3.36E-02	2.47E-02	4.18E-02	3.79E-02	1.38E-01	3.9E-02	2.5E-02	5.0E-02	4.0E-02	1.5E-01
243Am	1.30E+01	2.72E+00	9.41E+00	9.39E+00	3.45E+01	1.5E+01	2.8E+00	1.1E+01	1.0E+01	3.9E+01
243Cm	2.12E+00	2.12E+00	1.04E+00	2.86E+00	8.14E+00	2.4E+00	2.2E+00	1.2E+00	3.0E+00	8.9E+00
244Cm	4.96E+01	5.02E+01	2.42E+01	6.50E+01	1.89E+02	5.7E+01	5.1E+01	2.9E+01	6.9E+01	2.1E+02

APPENDIX C. POTENTIAL UNABATED EMISSIONS AND DOSE FOR SOIL EXCAVATION IN AY AND AZ FARMS

Potential Unabated Emissions and Dose from Soil Excavation Activities in AY Farm

Hand Digging Soil Excavation Activities

Maximum Soil Excavated (Y)	6,000	yd^3
Maximum Soil Excavated (F)	162,000	ft^3
Soil Density (SD)	98	lbs/ft^3
Total Soil Mass (SM = SD*F*453.59)	7.20E+09	grams
Maximum beta/gamma reading (MB)	10,000	cpm
Maximum alpha reading (MA)	10	cpm
Release Fraction (RF)	1.0E-03	

Assumed Isotope	Conversion Factor*	Total Possession Quantity	Unabated Release	CAP-88 East Area Offsite MPR	CAP-88 East Area Onsite MPR	Unabated Emissions Offsite MPR	Unabated Emissions Onsite MPR
	(pCi/gram)/cpm	Ci	Ci	mrem/Ci		mrem/yr	
	A	B=A*SM*MA(MB)/(1E+12)	C=B*RF	D	E	F=C*D	G=C*E
beta/gamma: Sr-90	0.35	2.55E+01	2.55E-02	1.10E-01	9.50E-03	2.81E-03	2.42E-04
alpha: Am-241	14.2	1.02E+00	1.02E-03	1.30E+01	1.50E+01	1.33E-02	1.53E-02
Total		2.65E+01	2.65E-02			1.61E-02	1.56E-02

Guzzler Soil Excavation Activities

Maximum Soil Excavated (F)	700	ft^3
Soil Density (SD)	98	lbs/ft^3
Total Soil Mass (SM = SD*F*453.59)	3.11E+07	grams
Maximum beta/gamma reading (MB)	10,000	cpm
Maximum alpha reading (MA)	10	cpm
Release Fraction (RF)	1.0E+00	

Assumed Isotope	Conversion Factor*	Total Possession Quantity	Unabated Release	CAP-88 East Area Offsite MPR	CAP-88 East Area Onsite MPR	Unabated Emissions Offsite MPR	Unabated Emissions Onsite MPR
	(pCi/gram)/cpm	Ci	Ci	mrem/Ci		mrem/yr	
	A	B=A*SM*MA(MB)/(1E+12)	C=B*RF	D	E	F=C*D	G=C*E
beta/gamma: Sr-90	0.35	1.10E-01	1.10E-01	1.10E-01	9.50E-03	1.21E-02	1.05E-03
alpha: Am-241	14.2	4.42E-03	4.42E-03	1.30E+01	1.50E+01	5.74E-02	6.63E-02
Total		1.15E-01	1.15E-01			6.96E-02	6.73E-02

** From Table 4 of HNF-2418*

APPENDIX C. POTENTIAL UNABATED EMISSIONS AND DOSE FOR SOIL EXCAVATION in AY AND AZ FARMS

Potential Unabated Emissions and Dose from Soil Excavation Activities in AZ Farm

Hand Digging Soil Excavation Activities

	yd^3	ft^3					
Maximum Soil Excavated (F)	6,000	162,000	Soil Density (SD)	98	lbs/ft^3		
Total Soil Mass (SM = SD*F*453.59)	7.20E+09	grams					
Maximum beta/gamma reading (MB)	10,000	cpm	Release Fraction (RF)		1.0E-03		
Maximum alpha reading (MA)	10	cpm		**CAP-88 East Area**		**Unabated Emissions**	
Assumed Isotope	**Conversion Factor***	**Total Possession Quantity**	**Unabated Release**	**Offsite MPR**	**Onsite MPR**	**Offsite MPR**	**Onsite MPR**
	(pCi/gram)/cpm	Ci	Ci	mrem/Ci		mrem/yr	
	A	B=A*SM*MA(MB)/(1E+12)	C=B*RF	D	E	F=C*D	G=C*E
beta/gamma: Sr-90	0.35	2.55E+01	2.55E-02	1.10E-01	9.50E-03	2.81E-03	2.42E-04
alpha: Am-241	14.2	1.02E+00	1.02E-03	1.30E+01	1.50E+01	1.33E-02	1.53E-02
Total		2.65E+01	2.65E-02			1.61E-02	1.56E-02

*Footnote *: from Table 4 of HNF-2418*

Guzzler Soil Excavation Activities

Maximum Soil Excavated (F)	700	ft^3	Soil Density (SD)	98	lbs/ft^3		
Total Soil Mass (SM = SD*F*453.59)	3.11E+07	grams					
Maximum beta/gamma reading (MB)	10,000	cpm	Release Fraction (RF)		1.0E+00		
Maximum alpha reading (MA)	10	cpm		**CAP-88 East Area**		**Unabated Emissions**	
Assumed Isotope	**Conversion Factor***	**Total Possession Quantity**	**Unabated Release**	**Offsite MPR**	**Onsite MPR**	**Offsite MPR**	**Onsite MPR**
	(pCi/gram)/cpm	Ci	Ci	mrem/Ci		mrem/yr	
	A	B=A*SM*MA(MB)/(1E+12)	C=B*RF	D	E	F=C*D	G=C*E
beta/gamma: Sr-90	0.35	1.10E-01	1.10E-01	1.10E-01	9.50E-03	1.21E-02	1.05E-03
alpha: Am-241	14.2	4.42E-03	4.42E-03	1.30E+01	1.50E+01	5.74E-02	6.63E-02
Total		1.15E-01	1.15E-01			6.96E-02	6.73E-02

** From Table 4 of HNF-2418*

APPENDIX D. POTENTIAL UNABATED EMISSIONS AND DOSE FOR PIPE CUTTING ACTIVITIES ASSOCIATED WITH AY AND AZ FARM

Potential Unabated Emissions and Dose for Pipe Cutting Activities in AY Farm				
Hanford Site Area	200-East			
3 inch pipe	3	inch		
6 inch pipe	6	inch		
3 inch pipe volume V3 = (3/2)^2*3.14159*24/231	0.73	gallons	(2 linear feet per pipe size)	
6 inch pipe volume V6 = (6/2)^2*3.14159*24/231	2.94	gallons	(2 linear feet per pipe size)	
Total Volume in Pipes VP = V3*4 +V6*4	**14.69**	gallons		
Total Tank Volume (TV)	2,000,000	gallons		
Release Fraction (RF)	1.0E-03			

Potential Unabated Emissions and Dose for Pipe Cutting Activities in AY Farm									
					CAP-88 East Area		Unabated Emissions		% Unabated Emissions
Analyte	Sum of AY101 and AY102 Inventory	Tank Concentration	Pipe Inventory	Released	Offsite MPR	Onsite MPR	Offsite MPR	Onsite MPR	Offsite MPR
	Ci	Ci/gal	Ci	Ci/yr	mrem/Ci		mrem/yr		
	A	B=A/TV	C=B*VP	D=C*RF	E	F	G=D*E	H=D*F	I=G/SumG
3H	3.2E+01	1.58E-05	2.32E-04	2.32E-07	2.50E-05	7.10E-06	5.80E-12	1.65E-12	0.00%
14C	1.1E+01	5.28E-06	7.75E-05	7.75E-08	1.90E-03	1.80E-04	1.47E-10	1.40E-11	0.00%
59Ni	6.6E+01	3.32E-05	4.88E-04	4.88E-07	3.10E-04	2.90E-04	1.51E-10	1.41E-10	0.00%
60Co	6.5E+02	3.26E-04	4.79E-03	4.79E-06	2.50E-01	3.00E-01	1.20E-06	1.44E-06	0.01%
63Ni	6.1E+03	3.06E-03	4.50E-02	4.50E-05	2.60E-04	6.90E-05	1.17E-08	3.11E-09	0.00%
79Se	1.9E+00	9.37E-07	1.38E-05	1.38E-08	1.30E-01	1.50E-01	1.79E-09	2.06E-09	0.00%
90Sr	7.2E+06	3.58E+00	5.26E+01	5.26E-02	1.10E-01	9.50E-03	5.79E-03	5.00E-04	60.41%
90Y	7.2E+06	3.58E+00	5.26E+01	5.26E-02	3.40E-04	2.60E-04	1.79E-05	1.37E-05	0.19%
93mNb	2.0E+02	1.02E-04	1.50E-03	1.50E-06	2.10E-03	1.20E-03	3.15E-09	1.80E-09	0.00%
93Zr	3.4E+02	1.70E-04	2.49E-03	2.49E-06	1.30E-03	1.30E-03	3.24E-09	3.24E-09	0.00%

APPENDIX D. POTENTIAL UNABATED EMISSIONS AND DOSE FOR PIPE CUTTING ACTIVITIES ASSOCIATED WITH AY AND AZ FARM

Potential Unabated Emissions and Dose for Pipe Cutting Activities in AY Farm

Analyte	Sum of AY101 and AY102 Inventory	Tank Concentration	Pipe Inventory	Released	CAP-88 East Area		Unabated Emissions		% Unabated Emissions
					Offsite MPR	Onsite MPR	Offsite MPR	Onsite MPR	Offsite MPR
	Ci	Ci/gal	Ci	Ci/yr	mrem/Ci		mrem/yr		
	A	B=A/TV	C=B*VP	D=C*RF	E	F	G=D*E	H=D*F	I=G/SumG
99Tc	2.4E+02	1.21E-04	1.77E-03	1.77E-06	2.30E-02	1.40E-03	4.08E-08	2.48E-09	0.00%
106Ru	3.8E-02	1.91E-08	2.80E-07	2.80E-10	2.00E-02	1.90E-02	5.60E-12	5.32E-12	0.00%
113mCd	1.1E+02	5.38E-05	7.91E-04	7.91E-07	1.30E-01	1.50E-01	1.03E-07	1.19E-07	0.00%
125Sb	3.6E+02	1.80E-04	2.65E-03	2.65E-06	2.60E-02	3.30E-02	6.88E-08	8.73E-08	0.00%
126Sn	2.0E+01	1.01E-05	1.48E-04	1.48E-07	4.70E-02	4.10E-02	6.96E-09	6.07E-09	0.00%
129I	7.5E-01	3.76E-07	5.52E-06	5.52E-09	2.00E-01	2.20E-02	1.10E-09	1.21E-10	0.00%
134Cs	4.4E+01	2.18E-05	3.21E-04	3.21E-07	1.00E-01	4.70E-02	3.21E-08	1.51E-08	0.00%
137Cs	8.4E+05	4.19E-01	6.15E+00	6.15E-03	2.40E-01	2.70E-01	1.48E-03	1.66E-03	15.40%
137mBa	7.9E+05	3.95E-01	5.80E+00	5.80E-03	5.30E-13	1.00E-11	3.08E-15	5.80E-14	0.00%
151Sm	4.0E+05	2.00E-01	2.94E+00	2.94E-03	7.50E-04	8.40E-04	2.21E-06	2.47E-06	0.02%
152Eu	5.2E+02	2.61E-04	3.84E-03	3.84E-06	2.40E-01	3.10E-01	9.21E-07	1.19E-06	0.01%
154Eu	1.4E+04	6.86E-03	1.01E-01	1.01E-04	2.00E-01	2.50E-01	2.01E-05	2.52E-05	0.21%
155Eu	5.6E+03	2.78E-03	4.09E-02	4.09E-05	8.00E-03	9.80E-03	3.27E-07	4.01E-07	0.00%
226Ra	2.0E-04	1.02E-10	1.49E-09	1.49E-12	4.60E-01	2.50E-01	6.87E-13	3.73E-13	0.00%
227Ac	1.3E-02	6.55E-09	9.62E-08	9.62E-11	1.50E+01	1.80E+01	1.44E-09	1.73E-09	0.00%
228Ra	1.5E-01	7.26E-08	1.07E-06	1.07E-09	1.90E-01	7.00E-02	2.03E-10	7.47E-11	0.00%
229Th	6.6E-04	3.31E-10	4.87E-09	4.87E-12	1.60E+01	2.00E+01	7.79E-11	9.73E-11	0.00%
231Pa	1.3E-01	6.47E-08	9.50E-07	9.50E-10	1.20E+01	1.40E+01	1.14E-08	1.33E-08	0.00%
232Th	1.3E-01	6.39E-08	9.39E-07	9.39E-10	*8.00E+00*	*1.00E+01*	7.51E-09	9.39E-09	0.00%
232U	8.2E-03	4.12E-09	6.05E-08	6.05E-11	1.10E+01	1.30E+01	6.65E-10	7.86E-10	0.00%
233U	3.9E-01	1.95E-07	2.87E-06	2.87E-09	3.10E+00	3.70E+00	8.89E-09	1.06E-08	0.00%
234U	1.1E+00	5.36E-07	7.87E-06	7.87E-09	3.10E+00	3.70E+00	2.44E-08	2.91E-08	0.00%
235U	4.5E-02	2.25E-08	3.31E-07	3.31E-10	3.00E+00	3.50E+00	9.92E-10	1.16E-09	0.00%
236U	3.5E-02	1.76E-08	2.59E-07	2.59E-10	2.90E+00	3.50E+00	7.50E-10	9.05E-10	0.00%
237Np	7.9E+00	3.96E-06	5.82E-05	5.82E-08	1.20E+01	1.40E+01	6.98E-07	8.15E-07	0.01%
238Pu	1.4E+02	6.88E-05	1.01E-03	1.01E-06	7.60E+00	8.90E+00	7.68E-06	8.99E-06	0.08%
238U	9.9E-01	4.93E-07	7.24E-06	7.24E-09	2.80E+00	3.30E+00	2.03E-08	2.39E-08	0.00%

APPENDIX D. POTENTIAL UNABATED EMISSIONS AND DOSE FOR PIPE CUTTING ACTIVITIES ASSOCIATED WITH AY AND AZ FARM

Analyte	Sum of AY101 and AY102 Inventory	Tank Concentration	Pipe Inventory	Released	CAP-88 East Area		Unabated Emissions		% Unabated Emissions
					Offsite MPR	Onsite MPR	Offsite MPR	Onsite MPR	Offsite MPR
	Ci	Ci/gal	Ci	Ci/yr	mrem/Ci		mrem/yr		
	A	B=A/TV	C=B*VP	D=C*RF	E	F	G=D*E	H=D*F	I=G/SumG
239Pu	2.5E+03	1.26E-03	1.85E-02	1.85E-05	8.20E+00	9.50E+00	1.51E-04	1.76E-04	1.58%
240Pu	6.5E+02	3.24E-04	4.75E-03	4.75E-06	8.20E+00	9.50E+00	3.90E-05	4.52E-05	0.41%
241Am	2.2E+04	1.08E-02	1.59E-01	1.59E-04	1.30E+01	1.50E+01	2.06E-03	2.38E-03	21.52%
241Pu	6.4E+03	3.21E-03	4.71E-02	4.71E-05	1.30E-01	1.50E-01	6.13E-06	7.07E-06	0.06%
242Cm	3.0E+01	1.52E-05	2.23E-04	2.23E-07	4.10E-01	5.00E-01	9.16E-08	1.12E-07	0.00%
242Pu	6.4E-02	3.19E-08	4.68E-07	4.68E-10	7.80E+00	9.10E+00	3.65E-09	4.26E-09	0.00%
243Am	1.8E+01	8.85E-06	1.30E-04	1.30E-07	1.30E+01	1.50E+01	1.69E-06	1.95E-06	0.02%
243Cm	4.6E+00	2.30E-06	3.38E-05	3.38E-08	8.50E+00	1.00E+01	2.87E-07	3.38E-07	0.00%
244Cm	1.1E+02	5.41E-05	7.94E-04	7.94E-07	6.70E+00	8.00E+00	5.32E-06	6.35E-06	0.06%
						Sum	**9.58E-03**	**4.83E-03**	**100.00%**

APPENDIX D. POTENTIAL UNABATED EMISSIONS AND DOSE FOR PIPE CUTTING ACTIVITIES ASSOCIATED WITH AY AND AZ FARM

Potential Unabated Emissions and Dose for Pipe Cutting Activities in AZ Farm			
2 inch pipe	2	inch	
8 inch pipe	8	inch	
2 inch pipe volume [V2 = (2/2)^2*3.14159*24/231]	0.33	gallons	(2 linear feet per pipe size)
8 inch pipe volume [V8 = (8/2)^2*3.14159*24/231]	5.22	gallons	(2 linear feet per pipe size)
Total Volume in Pipes [VP = V2 +V8]	**5.55**	gallons	
Total Tank Volume (TV)	1,000,000	gallons	
Release Fraction (RF)	1.0E-03		

Potential Unabated Emissions and Dose for Pipe Cutting Activities in AZ Farm									
					CAP-88		Unabated Emissions		% Unabated Emissions
Analyte	Total Curie in AZ101 and AZ102	Tank Concentration	Pipe Inventory	Released	Offsite MPR	Onsite MPR	Offsite MPR	Onsite MPR	Offsite MPR
	Ci	Ci/gal	Ci	Ci/yr	mrem/Ci		mrem/yr		
	A	B=A/TV	C=B*VP	D=C*RF	E	F	G=D*E	H=D*F	I=G/SumG
3H	1.9E+02	1.87E-04	1.04E-03	1.04E-06	2.50E-05	7.10E-06	2.59E-11	7.36E-12	0.00%
14C	1.2E+01	1.17E-05	6.49E-05	6.49E-08	1.90E-03	1.80E-04	1.23E-10	1.17E-11	0.00%
59Ni	3.8E+01	3.83E-05	2.12E-04	2.12E-07	3.10E-04	2.90E-04	6.58E-11	6.16E-11	0.00%
60Co	1.8E+03	1.77E-03	9.80E-03	9.80E-06	2.50E-01	3.00E-01	2.45E-06	2.94E-06	0.01%
63Ni	3.6E+03	3.63E-03	2.02E-02	2.02E-05	2.60E-04	6.90E-05	5.24E-09	1.39E-09	0.00%
79Se	6.2E+00	6.25E-06	3.47E-05	3.47E-08	1.30E-01	1.50E-01	4.51E-09	5.20E-09	0.00%
90Sr	1.1E+07	1.08E+01	5.98E+01	5.98E-02	1.10E-01	9.50E-03	6.58E-03	5.68E-04	26.69%
90Y	1.1E+07	1.08E+01	5.98E+01	5.98E-02	3.40E-04	2.60E-04	2.03E-05	1.56E-05	0.08%
93mNb	2.2E+02	2.20E-04	1.22E-03	1.22E-06	2.10E-03	1.20E-03	2.57E-09	1.47E-09	0.00%
93Zr	3.6E+02	3.62E-04	2.01E-03	2.01E-06	1.30E-03	1.30E-03	2.61E-09	2.61E-09	0.00%
99Tc	2.2E+03	2.16E-03	1.20E-02	1.20E-05	2.30E-02	1.40E-03	2.76E-07	1.68E-08	0.00%
106Ru	1.9E+02	1.93E-04	1.07E-03	1.07E-06	2.00E-02	1.90E-02	2.15E-08	2.04E-08	0.00%
113mCd	9.4E+02	9.42E-04	5.23E-03	5.23E-06	1.30E-01	1.50E-01	6.80E-07	7.84E-07	0.00%
125Sb	1.0E+04	1.02E-02	5.65E-02	5.65E-05	2.60E-02	3.30E-02	1.47E-06	1.86E-06	0.01%
126Sn	1.4E+01	1.40E-05	7.78E-05	7.78E-08	4.70E-02	4.10E-02	3.66E-09	3.19E-09	0.00%
129I	5.2E-01	5.23E-07	2.90E-06	2.90E-09	2.00E-01	2.20E-02	5.80E-10	6.38E-11	0.00%

APPENDIX D. POTENTIAL UNABATED EMISSIONS AND DOSE FOR PIPE CUTTING ACTIVITIES ASSOCIATED WITH AY AND AZ FARM

Potential Unabated Emissions and Dose for Pipe Cutting Activities in AZ Farm

Analyte	Total Curie in AZ101 and AZ102	Tank Concentration	Pipe Inventory	Released	CAP-88		Unabated Emissions		% Unabated Emissions
					Offsite MPR	Onsite MPR	Offsite MPR	Onsite MPR	Offsite MPR
	Ci	Ci/gal	Ci	Ci/yr	mrem/Ci		mrem/yr		
	A	B=A/TV	C=B*VP	D=C*RF	E	F	G=D*E	H=D*F	I=G/SumG
134Cs	2.8E+03	2.84E-03	1.58E-02	1.58E-05	1.00E-01	4.70E-02	1.58E-06	7.41E-07	0.01%
137Cs	1.0E+07	1.01E+01	5.59E+01	5.59E-02	2.40E-01	2.70E-01	1.34E-02	1.51E-02	54.47%
137mBa	9.5E+06	9.51E+00	5.28E+01	5.28E-02	5.30E-13	1.00E-11	2.80E-14	5.28E-13	0.00%
151Sm	3.9E+05	3.88E-01	2.15E+00	2.15E-03	7.50E-04	8.40E-04	1.61E-06	1.81E-06	0.01%
152Eu	3.1E+02	3.06E-04	1.70E-03	1.70E-06	2.40E-01	3.10E-01	4.08E-07	5.27E-07	0.00%
154Eu	2.2E+04	2.22E-02	1.23E-01	1.23E-04	2.00E-01	2.50E-01	2.47E-05	3.08E-05	0.10%
155Eu	2.8E+04	2.81E-02	1.56E-01	1.56E-04	8.00E-03	9.80E-03	1.25E-06	1.53E-06	0.01%
226Ra	5.2E-04	5.21E-10	2.89E-09	2.89E-12	4.60E-01	2.50E-01	1.33E-12	7.23E-13	0.00%
227Ac	3.1E-03	3.11E-09	1.72E-08	1.72E-11	1.50E+01	1.80E+01	2.59E-10	3.10E-10	0.00%
228Ra	1.0E-02	1.03E-08	5.73E-08	5.73E-11	1.90E-01	7.00E-02	1.09E-11	4.01E-12	0.00%
229Th	4.2E-06	4.20E-12	2.33E-11	2.33E-14	1.60E+01	2.00E+01	3.73E-13	4.66E-13	0.00%
231Pa	8.0E-03	8.00E-09	4.44E-08	4.44E-11	1.20E+01	1.40E+01	5.33E-10	6.21E-10	0.00%
232Th	3.2E-02	3.17E-08	1.76E-07	1.76E-10	*8.00E+00*	*1.00E+01*	1.41E-09	1.76E-09	0.00%
232U	9.3E-03	9.25E-09	5.14E-08	5.14E-11	1.10E+01	1.30E+01	5.65E-10	6.68E-10	0.00%
233U	5.0E-01	5.02E-07	2.79E-06	2.79E-09	3.10E+00	3.70E+00	8.64E-09	1.03E-08	0.00%
234U	4.3E+00	4.32E-06	2.40E-05	2.40E-08	3.10E+00	3.70E+00	7.43E-08	8.87E-08	0.00%
235U	1.7E-01	1.72E-07	9.53E-07	9.53E-10	3.00E+00	3.50E+00	2.86E-09	3.33E-09	0.00%
236U	3.7E-01	3.69E-07	2.05E-06	2.05E-09	2.90E+00	3.50E+00	5.94E-09	7.16E-09	0.00%
237Np	3.7E+01	3.68E-05	2.04E-04	2.04E-07	1.20E+01	1.40E+01	2.45E-06	2.86E-06	0.01%
238Pu	3.5E+02	3.47E-04	1.93E-03	1.93E-06	7.60E+00	8.90E+00	1.46E-05	1.72E-05	0.06%
238U	3.2E+00	3.18E-06	1.77E-05	1.77E-08	2.80E+00	3.30E+00	4.95E-08	5.83E-08	0.00%
239Pu	2.8E+03	2.83E-03	1.57E-02	1.57E-05	8.20E+00	9.50E+00	1.29E-04	1.49E-04	0.52%
240Pu	7.7E+02	7.71E-04	4.28E-03	4.28E-06	8.20E+00	9.50E+00	3.51E-05	4.06E-05	0.14%
241Am	6.1E+04	6.09E-02	3.38E-01	3.38E-04	1.30E+01	1.50E+01	4.39E-03	5.07E-03	17.81%
241Pu	1.8E+04	1.76E-02	9.78E-02	9.78E-05	1.30E-01	1.50E-01	1.27E-05	1.47E-05	0.05%
242Cm	4.0E+01	3.98E-05	2.21E-04	2.21E-07	4.10E-01	5.00E-01	9.06E-08	1.10E-07	0.00%
242Pu	9.0E-02	9.04E-08	5.02E-07	5.02E-10	7.80E+00	9.10E+00	3.91E-09	4.56E-09	0.00%

APPENDIX D. POTENTIAL UNABATED EMISSIONS AND DOSE FOR PIPE CUTTING ACTIVITIES ASSOCIATED WITH AY AND AZ FARM

Potential Unabated Emissions and Dose for Pipe Cutting Activities in AZ Farm									
					CAP-88		Unabated Emissions		% Unabated Emissions
Analyte	Total Curie in AZ101 and AZ102	Tank Concentration	Pipe Inventory	Released	Offsite MPR	Onsite MPR	Offsite MPR	Onsite MPR	Offsite MPR
	Ci	Ci/gal	Ci	Ci/yr	mrem/Ci		mrem/yr		
	A	B=A/TV	C=B*VP	D=C*RF	E	F	G=D*E	H=D*F	I=G/SumG
243Am	2.1E+01	2.13E-05	1.18E-04	1.18E-07	1.30E+01	1.50E+01	1.53E-06	1.77E-06	0.01%
243Cm	4.3E+00	4.29E-06	2.38E-05	2.38E-08	8.50E+00	1.00E+01	2.02E-07	2.38E-07	0.00%
244Cm	9.8E+01	9.82E-05	5.45E-04	5.45E-07	6.70E+00	8.00E+00	3.65E-06	4.36E-06	0.01%
						Sum	**2.47E-02**	**2.10E-02**	**100.00%**

APPENDIX E: POTENTIAL UNABATED EMISSIONS AND DOSE FOR EQUIPMENT INSTALLATION REMOVAL ACTIVITIES ASSOCIATED WITH AY AND AZ FARM

Potential Unabated Emissions and Dose for Equipment Removal Activities in AY Farm

		R_1 (in)	R_2 (in)	A_1 (in^2)	A_2 (in^2)	Vw (gal)
#	Equipment removal from each tank					
4	Profile thermocouple probe	2	2.06	12.6	13.4	1.26
3	Sludge thermocouple probe	2				
1	Multi-function instrument tree	2				
8	**Total for probe removals**					10
1	75-hp pump in pit 02B	17	17.06	907.9	914.7	10.59
1	Transfer pump in pit 02D	17				
1	Suction/booster pump in pit 02E	17				
3	**Total for pump removals**					32
	Total for equipment removal					**42**

Waste Layer Thickness (T)	0.063	inch	
Equipment Length (L)	363	inches	
R_1 & R_2 are radii; $R_2 = R_1 + T$			
Areas are A_1 & $A_2 = 3.14159 * R^2$			
$Vw = ((A_2 - A_1) * L)/231$			
Waste Volume on Equipment (Vw)	42	gallons	
Total Number of Tanks (N)	2		
Total Waste Volume (Vtw=Vw*N)	84	gallons	
AY Tank Farm Total Volume (Vtf)	1,036,000	gallons	HNF-EP-0182, Rev 193
Release Fraction (RF)	1.0E-03		

APPENDIX E: POTENTIAL UNABATED EMISSIONS AND DOSE FOR EQUIPMENT INSTALLATION REMOVAL ACTIVITIES ASSOCIATED WITH AY and AZ FARM

Potential Unabated Emissions and Dose for Equipment Removal Activities in AY Farm

					CAP-88		Unabated Emissions		% Unabated Emissions
Analyte	Sum of AY101 and AY102 Inventory (Ci)	Average Concentration (Ci/gal)	Inventory on Equipment (Ci)	Released (Ci)	Offsite MPR mrem/Ci	Onsite MPR mrem/Ci	Offsite MPR mrem/yr	Onsite MPR mrem/yr	Offsite MPR
	C	D=C/Vtf)	E=D*Vtw	F=E*RF	G	H	I=F*G	J=F*H	K=I/SumI
3H	3.2E+01	3.05E-05	2.55E-03	2.55E-06	2.50E-05	7.10E-06	6.39E-11	1.81E-11	0.00%
14C	1.1E+01	1.02E-05	8.54E-04	8.54E-07	1.90E-03	1.80E-04	1.62E-09	1.54E-10	0.00%
59Ni	6.6E+01	6.41E-05	5.37E-03	5.37E-06	3.10E-04	2.90E-04	1.66E-09	1.56E-09	0.00%
60Co	6.5E+02	6.30E-04	5.28E-02	5.28E-05	2.50E-01	3.00E-01	1.32E-05	1.58E-05	0.01%
63Ni	6.1E+03	5.92E-03	4.96E-01	4.96E-04	2.60E-04	6.90E-05	1.29E-07	3.42E-08	0.00%
79Se	1.9E+00	1.81E-06	1.52E-04	1.52E-07	1.30E-01	1.50E-01	1.97E-08	2.27E-08	0.00%
90Sr	7.2E+06	6.92E+00	5.80E+02	5.80E-01	1.10E-01	9.50E-03	6.38E-02	5.51E-03	60.41%
90Y	7.2E+06	6.92E+00	5.80E+02	5.80E-01	3.40E-04	2.60E-04	1.97E-04	1.51E-04	0.19%
93mNb	2.0E+02	1.97E-04	1.65E-02	1.65E-05	2.10E-03	1.20E-03	3.47E-08	1.98E-08	0.00%
93Zr	3.4E+02	3.27E-04	2.74E-02	2.74E-05	1.30E-03	1.30E-03	3.56E-08	3.56E-08	0.00%
99Tc	2.4E+02	2.33E-04	1.95E-02	1.95E-05	2.30E-02	1.40E-03	4.49E-07	2.73E-08	0.00%
106Ru	3.8E-02	3.68E-08	3.09E-06	3.09E-09	2.00E-02	1.90E-02	6.17E-11	5.86E-11	0.00%
113mCd	1.1E+02	1.04E-04	8.71E-03	8.71E-06	1.30E-01	1.50E-01	1.13E-06	1.31E-06	0.00%
125Sb	3.6E+02	3.48E-04	2.91E-02	2.91E-05	2.60E-02	3.30E-02	7.58E-07	9.62E-07	0.00%
126Sn	2.0E+01	1.95E-05	1.63E-03	1.63E-06	4.70E-02	4.10E-02	7.66E-08	6.68E-08	0.00%
129I	7.5E-01	7.25E-07	6.08E-05	6.08E-08	2.00E-01	2.20E-02	1.22E-08	1.34E-09	0.00%
134Cs	4.4E+01	4.21E-05	3.53E-03	3.53E-06	1.00E-01	4.70E-02	3.53E-07	1.66E-07	0.00%
137Cs	8.4E+05	8.08E-01	6.77E+01	6.77E-02	2.40E-01	2.70E-01	1.63E-02	1.83E-02	15.40%
137mBa	7.9E+05	7.63E-01	6.39E+01	6.39E-02	5.30E-13	1.00E-11	3.39E-14	6.39E-13	0.00%
151Sm	4.0E+05	3.87E-01	3.24E+01	3.24E-02	7.50E-04	8.40E-04	2.43E-05	2.72E-05	0.02%
152Eu	5.2E+02	5.04E-04	4.23E-02	4.23E-05	2.40E-01	3.10E-01	1.01E-05	1.31E-05	0.01%
154Eu	1.4E+04	1.32E-02	1.11E+00	1.11E-03	2.00E-01	2.50E-01	2.22E-04	2.77E-04	0.21%
155Eu	5.6E+03	5.37E-03	4.50E-01	4.50E-04	8.00E-03	9.80E-03	3.60E-06	4.41E-06	0.00%

APPENDIX E. POTENTIAL UNABATED EMISSIONS AND DOSE FOR EQUIPMENT INSTALLATION REMOVAL ACTIVITIES ASSOCIATED WITH AY AND AZ FARM

Potential Unabated Emissions and Dose for Equipment Removal Activities in AY Farm

					CAP-88		Unabated Emissions		% Unabated Emissions
Analyte	Sum of AY101 and AY102 Inventory (Ci)	Average Concentration (Ci/gal)	Inventory on Equipment (Ci)	Released (Ci)	Offsite MPR mrem/Ci	Onsite MPR mrem/Ci	Offsite MPR mrem/yr	Onsite MPR mrem/yr	Offsite MPR
	C	D=C/Vtf)	E=D*Vtw	F=E*RF	G	H	I=F*G	J=F*H	K=I/SumI
226Ra	2.0E-04	1.96E-10	1.64E-08	1.64E-11	4.60E-01	2.50E-01	7.56E-12	4.11E-12	0.00%
227Ac	1.3E-02	1.26E-08	1.06E-06	1.06E-09	1.50E+01	1.80E+01	1.59E-08	1.91E-08	0.00%
228Ra	1.5E-01	1.40E-07	1.17E-05	1.17E-08	1.90E-01	7.00E-02	2.23E-09	8.22E-10	0.00%
229Th	6.6E-04	6.40E-10	5.36E-08	5.36E-11	1.60E+01	2.00E+01	8.57E-10	1.07E-09	0.00%
231Pa	1.3E-01	1.25E-07	1.05E-05	1.05E-08	1.20E+01	1.40E+01	1.26E-07	1.47E-07	0.00%
232Th	1.3E-01	1.23E-07	1.03E-05	1.03E-08	*8.00E+00*	*1.00E+01*	8.27E-08	1.03E-07	0.00%
232U	8.2E-03	7.95E-09	6.66E-07	6.66E-10	1.10E+01	1.30E+01	7.32E-09	8.66E-09	0.00%
233U	3.9E-01	3.77E-07	3.16E-05	3.16E-08	3.10E+00	3.70E+00	9.79E-08	1.17E-07	0.00%
234U	1.1E+00	1.03E-06	8.67E-05	8.67E-08	3.10E+00	3.70E+00	2.69E-07	3.21E-07	0.00%
235U	4.5E-02	4.35E-08	3.64E-06	3.64E-09	3.00E+00	3.50E+00	1.09E-08	1.27E-08	0.00%
236U	3.5E-02	3.40E-08	2.85E-06	2.85E-09	2.90E+00	3.50E+00	8.26E-09	9.96E-09	0.00%
237Np	7.9E+00	7.65E-06	6.41E-04	6.41E-07	1.20E+01	1.40E+01	7.69E-06	8.97E-06	0.01%
238Pu	1.4E+02	1.33E-04	1.11E-02	1.11E-05	7.60E+00	8.90E+00	8.46E-05	9.90E-05	0.08%
238U	9.9E-01	9.52E-07	7.97E-05	7.97E-08	2.80E+00	3.30E+00	2.23E-07	2.63E-07	0.00%
239Pu	2.5E+03	2.43E-03	2.03E-01	2.03E-04	8.20E+00	9.50E+00	1.67E-03	1.93E-03	1.58%
240Pu	6.5E+02	6.25E-04	5.23E-02	5.23E-05	8.20E+00	9.50E+00	4.29E-04	4.97E-04	0.41%
241Am	2.2E+04	2.09E-02	1.75E+00	1.75E-03	1.30E+01	1.50E+01	2.27E-02	2.62E-02	21.52%
241Pu	6.4E+03	6.19E-03	5.19E-01	5.19E-04	1.30E-01	1.50E-01	6.75E-05	7.78E-05	0.06%
242Cm	3.0E+01	2.94E-05	2.46E-03	2.46E-06	4.10E-01	5.00E-01	1.01E-06	1.23E-06	0.00%
242Pu	6.4E-02	6.16E-08	5.16E-06	5.16E-09	7.80E+00	9.10E+00	4.02E-08	4.69E-08	0.00%
243Am	1.8E+01	1.71E-05	1.43E-03	1.43E-06	1.30E+01	1.50E+01	1.86E-05	2.15E-05	0.02%
243Cm	4.6E+00	4.44E-06	3.72E-04	3.72E-07	8.50E+00	1.00E+01	3.16E-06	3.72E-06	0.00%
244Cm	1.1E+02	1.04E-04	8.75E-03	8.75E-06	6.70E+00	8.00E+00	5.86E-05	7.00E-05	0.06%
						Total	**1.06E-01**	**5.32E-02**	**1.00E+00**

APPENDIX E. POTENTIAL UNABATED EMISSIONS AND DOSE FOR EQUIPMENT INSTALLATION REMOVAL ACTIVITIES ASSOCIATED WITH AY AND AZ FARM

Potential Unabated Emissions and Dose for Equipment Removal Activities in AZ Farm					
Mixer Pump Surface Area	500	ft^2			
Transfer Pump Surface Area	44	ft^2			
Total Contaminate Surface Area	544	ft^2			
Waste Layer Thickness (T)	0.063	inch			
Waste Volume on Equipment (Vw)	21.20	gallons			
Total Number of Tanks (N)	2				
Total Waste Volume (Vtw=Vw*N)	42.392	gallons			
AY Tank Farm Total Volume (Vtf)	885,500	gallons	HNF-EP-0182, Rev 137		
Release Fraction (RF)	1.0E-03				

Potential Unabated Emissions and Dose for Equipment Removal Activities in AZ Farm									
					CAP-88		Unabated Emissions		% Unabated Emissions
Analyte	Total Curie in AZ101 and AZ102	Average Concentration (Ci/gal)	Inventory on Equipment (Ci)	Released (Ci)	Offsite MPR mrem/Ci	Onsite MPR mrem/Ci	Offsite MPR mrem/yr	Onsite MPR mrem/yr	Offsite MPR
	C	D=C/Vtf)	E=D*Vtw	F=E*RF	G	H	I=F*G	J=F*H	K=I/SumI
3H	1.9E+02	2.11E-04	8.95E-03	8.95E-06	2.50E-05	7.10E-06	2.24E-10	6.35E-11	0.00%

APPENDIX E. POTENTIAL UNABATED EMISSIONS AND DOSE FOR EQUIPMENT INSTALLATION REMOVAL ACTIVITIES ASSOCIATED WITH AY AND AZ FARM

63Ni	3.6E+03	4.10E-03	1.74E-01	1.74E-04	2.60E-04	6.90E-05	4.52E-08	1.20E-08	0.00%
79Se	6.2E+00	7.06E-06	2.99E-04	2.99E-07	1.30E-01	1.50E-01	3.89E-08	4.49E-08	0.00%
90Sr	1.1E+07	1.22E+01	5.16E+02	5.16E-01	1.10E-01	9.50E-03	5.68E-02	4.90E-03	26.69%
90Y	1.1E+07	1.22E+01	5.16E+02	5.16E-01	3.40E-04	2.60E-04	1.75E-04	1.34E-04	0.08%
93mNb	2.2E+02	2.49E-04	1.05E-02	1.05E-05	2.10E-03	1.20E-03	2.21E-08	1.27E-08	0.00%
93Zr	3.6E+02	4.09E-04	1.73E-02	1.73E-05	1.30E-03	1.30E-03	2.25E-08	2.25E-08	0.00%
99Tc	2.2E+03	2.44E-03	1.04E-01	1.04E-04	2.30E-02	1.40E-03	2.38E-06	1.45E-07	0.00%
106Ru	1.9E+02	2.18E-04	9.26E-03	9.26E-06	2.00E-02	1.90E-02	1.85E-07	1.76E-07	0.00%
113mCd	9.4E+02	1.06E-03	4.51E-02	4.51E-05	1.30E-01	1.50E-01	5.86E-06	6.76E-06	0.00%
125Sb	1.0E+04	1.15E-02	4.87E-01	4.87E-04	2.60E-02	3.30E-02	1.27E-05	1.61E-05	0.01%
126Sn	1.4E+01	1.58E-05	6.72E-04	6.72E-07	4.70E-02	4.10E-02	3.16E-08	2.75E-08	0.00%

Potential Unabated Emissions and Dose for Equipment Removal Activities in AZ Farm									
					CAP-88		Unabated Emissions		% Unabated Emissions
Analyte	Total Curie in AZ101 and AZ102	Average Concentration (Ci/gal)	Inventory on Equipment (Ci)	Released (Ci)	Offsite MPR mrem/Ci	Onsite MPR mrem/Ci	Offsite MPR mrem/yr	Onsite MPR mrem/yr	Offsite MPR
	C	D=C/Vtf)	E=D*Vtw	F=E*RF	G	H	I=F*G	J=F*H	K=I/SumI
129I	5.2E-01	5.91E-07	2.50E-05	2.50E-08	2.00E-01	2.20E-02	5.01E-09	5.51E-10	0.00%
134Cs	2.8E+03	3.21E-03	1.36E-01	1.36E-04	1.00E-01	4.70E-02	1.36E-05	6.39E-06	0.01%
137Cs	1.0E+07	1.14E+01	4.83E+02	4.83E-01	2.40E-01	2.70E-01	1.16E-01	1.30E-01	54.47%
137mBa	9.5E+06	1.07E+01	4.55E+02	4.55E-01	5.30E-13	1.00E-11	2.41E-13	4.55E-12	0.00%
151Sm	3.9E+05	4.38E-01	1.86E+01	1.86E-02	7.50E-04	8.40E-04	1.39E-05	1.56E-05	0.01%
152Eu	3.1E+02	3.46E-04	1.47E-02	1.47E-05	2.40E-01	3.10E-01	3.52E-06	4.54E-06	0.00%
154Eu	2.2E+04	2.51E-02	1.06E+00	1.06E-03	2.00E-01	2.50E-01	2.13E-04	2.66E-04	0.10%
155Eu	2.8E+04	3.18E-02	1.35E+00	1.35E-03	8.00E-03	9.80E-03	1.08E-05	1.32E-05	0.01%
226Ra	5.2E-04	5.88E-10	2.49E-08	2.49E-11	4.60E-01	2.50E-01	1.15E-11	6.24E-12	0.00%
227Ac	3.1E-03	3.51E-09	1.49E-07	1.49E-10	1.50E+01	1.80E+01	2.23E-09	2.68E-09	0.00%
228Ra	1.0E-02	1.17E-08	4.94E-07	4.94E-10	1.90E-01	7.00E-02	9.39E-11	3.46E-11	0.00%
229Th	4.2E-06	4.74E-12	2.01E-10	2.01E-13	1.60E+01	2.00E+01	3.21E-12	4.02E-12	0.00%
231Pa	8.0E-03	9.03E-09	3.83E-07	3.83E-10	1.20E+01	1.40E+01	4.59E-09	5.36E-09	0.00%
232Th	3.2E-02	3.58E-08	1.52E-06	1.52E-09	*8.00E+00*	*1.00E+01*	1.21E-08	1.52E-08	0.00%

APPENDIX E. POTENTIAL UNABATED EMISSIONS AND DOSE FOR EQUIPMENT INSTALLATION REMOVAL ACTIVITIES ASSOCIATED WITH AY AND AZ FARM

235U	1.7E-01	1.94E-07	8.22E-06	8.22E-09	3.00E+00	3.50E+00	2.47E-08	2.88E-08	0.00%
236U	3.7E-01	4.17E-07	1.77E-05	1.77E-08	2.90E+00	3.50E+00	5.12E-08	6.18E-08	0.00%
237Np	3.7E+01	4.16E-05	1.76E-03	1.76E-06	1.20E+01	1.40E+01	2.12E-05	2.47E-05	0.01%
238Pu	3.5E+02	3.92E-04	1.66E-02	1.66E-05	7.60E+00	8.90E+00	1.26E-04	1.48E-04	0.06%
238U	3.2E+00	3.60E-06	1.52E-04	1.52E-07	2.80E+00	3.30E+00	4.27E-07	5.03E-07	0.00%
239Pu	2.8E+03	3.19E-03	1.35E-01	1.35E-04	8.20E+00	9.50E+00	1.11E-03	1.29E-03	0.52%
240Pu	7.7E+02	8.71E-04	3.69E-02	3.69E-05	8.20E+00	9.50E+00	3.03E-04	3.51E-04	0.14%
241Am	6.1E+04	6.88E-02	2.91E+00	2.91E-03	1.30E+01	1.50E+01	3.79E-02	4.37E-02	17.81%
241Pu	1.8E+04	1.99E-02	8.43E-01	8.43E-04	1.30E-01	1.50E-01	1.10E-04	1.27E-04	0.05%
242Cm	4.0E+01	4.50E-05	1.91E-03	1.91E-06	4.10E-01	5.00E-01	7.81E-07	9.53E-07	0.00%
242Pu	9.0E-02	1.02E-07	4.33E-06	4.33E-09	7.80E+00	9.10E+00	3.38E-08	3.94E-08	0.00%

Potential Unabated Emissions and Dose for Equipment Removal Activities in AZ Farm									
					CAP-88		Unabated Emissions		% Unabated Emissions
Analyte	Total Curie in AZ101 and AZ102	Average Concentration (Ci/gal)	Inventory on Equipment (Ci)	Released (Ci)	Offsite MPR mrem/Ci	Onsite MPR mrem/Ci	Offsite MPR mrem/yr	Onsite MPR mrem/yr	Offsite MPR
	C	D=C/Vtf)	E=D*Vtw	F=E*RF	G	H	I=F*G	J=F*H	K=I/SumI
243Am	2.1E+01	2.40E-05	1.02E-03	1.02E-06	1.30E+01	1.50E+01	1.32E-05	1.53E-05	0.01%
243Cm	4.3E+00	4.84E-06	2.05E-04	2.05E-07	8.50E+00	1.00E+01	1.75E-06	2.05E-06	0.00%
244Cm	9.8E+01	1.11E-04	4.70E-03	4.70E-06	6.70E+00	8.00E+00	3.15E-05	3.76E-05	0.01%
						Total	**2.13E-01**	**1.81E-01**	**1.00E+00**

APPENDIX F. POTENTIAL UNABATED EMISSIONS FOR PIT ENTRY ACTIVITIES IN AY AND AZ FARMS

Potential Unabated Emissions and Dose for Pit Entry Activities in AY Farm						
	length (L-ft)	width (W -ft)	depth (D -ft)			
Tank Pit Work Dimensions	12	8	8			
Pit Surface Area (Psa=2*L*W+2*W*D+2*L*D)	512	ft^2				
Total AY-101 & AY-102 Pit Surface (A = 10*Psa)	5,120	ft^2				
Core Drilling (equivalent surface area of 10, 14 inch diameter cuts) (B=10*3.14159*(14/12/2)^2)	10.7	ft^2				
Number of Pit Entries (N)	2					
Total Pit Surface Area (Pt=N*A+B)	10,251	ft^2				
Total Pit Surface Area (Ptm=Pt*(12*2.54)^2)	9.52E+06	cm^2				
Curies - definition (Df)	2.22E+12	dpm/curie				
Average Surface Contamination (beta/gamma) (Rcbd)	1,000,000	dpm/($100cm^2$)				
Rad Concentration (beta/gamma) (Rcbc=Rcbd/Df)	4.50E-07	curies/(100cm2)				
Average Surface Contamination (alpha) (Rcad)	700,000	dpm/($100cm^2$)				
Rad Concentration (alpha) (Rcac=Rcad/Df)	3.15E-07	curies/(100cm2)				
Release Fraction (RF)	1.0E-03		**CAP-88 East Area**		**Unabated Emissions**	
			Offsite MPR	**Onsite MPR**	**Offsite MPR**	**Onsite MPR**
Assumed Isotope	Total Possession Quantity (Ci)	Unabated Release (Ci)	mrem/Ci		mrem/yr	
	TPQ=eq	UR=TPQ*RF	F	G	H=UR*F	I=UR*G
beta/gamma: Sr-90	4.29E-02	4.29E-05	1.10E-01	9.50E-03	4.72E-06	4.08E-07
alpha: Am-241	3.00E-02	3.00E-05	1.30E+01	1.50E+01	3.90E-04	4.50E-04
Total	7.29E-02	7.29E-05			3.95E-04	4.51E-04
*eq = Rcbc(Rcac)*Ptm/100*						

APPENDIX F. POTENTIAL UNABATED EMISSIONS FOR PIT ENTRY ACTIVITIES IN AY AND AZ FARMS

Potential Unabated Emissions and Dose for Pit Entry Activities in AZ Farm						
AZ-101 Pump Pit (A)	508	ft^2				
AZ-102 Pump Pit (B)	508	ft^2				
Core Drilling (equivalent surface area of 100, 14 inch diameter cuts) (C=100*3.14159*(14/12/2)^2)	106.9	ft^2				
Number of Pit Entries (N)	10					
Total Pit Surface Area (Pt=N*(A+B+C)	11,229	ft^2				
Total Pit Surface Area (Ptm=Pt*(12*2.54)^2)	1.04E+07	cm^2				
Curies - definition (Df)	2.22E+12	dpm/curie				
Average Surface Contamination (beta/gamma) (Rcbd)	1,000,000	dpm/(100cm^2)				
Rad Concentration (beta/gamma) (Rcbc=Rcbd/Df)	4.50E-07	curies/(100cm2)				
Average Surface Contamination (alpha) (Rcad)	700,000	dpm/(100cm^2)				
Rad Concentration (alpha) (Rcac=Rcad/Df)	3.2E-07	curies/(100cm2)				
Release Fraction (RF)	1.0E-03		**CAP-88 East Area**		**Unabated Emissions**	
			Offsite MPR	**Onsite MPR**	**Offsite MPR**	**Onsite MPR**
Assumed Isotope	Total Possession Quantity (Ci)	Unabated Release (Ci)	mrem/Ci		mrem/yr	
	TPQ=eq	UR=TPQ*RF	F	G	H=UR*F	I=UR*G
beta/gamma: Sr-90	4.70E-02	4.70E-05	1.10E-01	9.50E-03	5.17E-06	4.46E-07
alpha: Am-241	3.29E-02	3.29E-05	1.30E+01	1.50E+01	4.28E-04	4.93E-04
Total	7.99E-02	7.99E-05			4.33E-04	4.94E-04
*eq = Rcbc(Rcac)*Ptm/100*						

APPENDIX G.

POTENTIAL UNABATED AND ABATED EMISSIONS AND DOSE FOR ALL TANKS VENTING THROUGH 296-A-42 INCLUSIVE OF MIXER PUMP OPERATIONS

Potential Unabated and Abated Emissions for the 296-A-42 Emission Unit

								CAP-88		Unabated Emissions		Abated Emissions		% Unabated Emissions	% Abated Emissions
								East Area							
Analyte	AY-101 Inventory (Ci)	AY-102 Inventory (Ci)	AZ-101 Inventory (Ci)	AZ-102 Inventory (Ci)	Total Farm Inventory Ci)	Release Fraction	Released (Ci/yr)	Offsite MPR	Onsite MPR	Offsite MPR	Onsite MPR	Offsite MPR	Onsite MPR	Offsite MPR	
								mrem/Ci		mrem/yr		mrem/yr			
	B	C	D	E	F=B+C+D+E	RF	H=F*RF	I	J	K=H*I	L=H*J	M=K/2000 except for 3H and 14C	N=L/2000 except for 3H and 14C	O=100* K/SumK	P=100* M/SumM
3H	1.6E+01	1.5E+01	6.5E+01	1.2E+02	2.2E+02	1.00E+00	2.19E+02	2.50E-05	7.10E-06	5.46E-03	1.55E-03	5.46E-03	1.55E-03	0.00%	0.19%
14C	9.6E+00	9.4E-01	7.9E+00	3.8E+00	2.2E+01	1.00E+00	2.23E+01	1.90E-03	1.80E-04	4.23E-02	4.01E-03	4.23E-02	4.01E-03	0.00%	1.45%
59Ni	4.1E+01	2.5E+01	2.6E+01	1.3E+01	1.0E+02	1.00E-03	1.05E-01	3.10E-04	2.90E-04	3.24E-05	3.04E-05	1.62E-08	1.52E-08	0.00%	0.00%
60Co	5.7E+02	8.0E+01	9.3E+02	8.3E+02	2.4E+03	1.00E-03	2.42E+00	2.50E-01	3.00E-01	6.05E-01	7.26E-01	3.02E-04	3.63E-04	0.01%	0.01%
63Ni	3.8E+03	2.3E+03	2.4E+03	1.2E+03	9.8E+03	1.00E-03	9.76E+00	2.60E-04	6.90E-05	2.54E-03	6.74E-04	1.27E-06	3.37E-07	0.00%	0.00%
79Se	1.4E+00	4.4E-01	4.4E+00	1.8E+00	8.1E+00	1.00E-03	8.12E-03	1.30E-01	1.50E-01	1.06E-03	1.22E-03	5.28E-07	6.09E-07	0.00%	0.00%
90Sr	2.4E+06	4.7E+06	6.6E+06	4.2E+06	1.8E+07	1.00E-03	1.79E+04	1.10E-01	9.50E-03	1.97E+03	1.71E+02	9.87E-01	8.53E-02	34.35%	33.79%
90Y	2.4E+06	4.7E+06	6.6E+06	4.2E+06	1.8E+07	1.00E-03	1.79E+04	3.40E-04	2.60E-04	6.10E+00	4.67E+00	3.05E-03	2.33E-03	0.11%	0.10%
93mNb	1.6E+02	4.7E+01	1.5E+02	7.1E+01	4.2E+02	1.00E-03	4.24E-01	2.10E-03	1.20E-03	8.91E-04	5.09E-04	4.46E-07	2.55E-07	0.00%	0.00%
93Zr	2.8E+02	5.7E+01	2.4E+02	1.2E+02	7.0E+02	1.00E-03	7.01E-01	1.30E-03	1.30E-03	9.12E-04	9.12E-04	4.56E-07	4.56E-07	0.00%	0.00%
99Tc	5.6E+01	1.9E+02	1.3E+03	8.4E+02	2.4E+03	1.00E-03	2.41E+00	2.30E-02	1.40E-03	5.53E-02	3.37E-03	2.77E-05	1.68E-06	0.00%	0.00%
106Ru	3.8E-02	6.1E-04	9.6E+01	9.8E+01	1.9E+02	1.00E-03	1.94E-01	2.00E-02	1.90E-02	3.87E-03	3.68E-03	1.94E-06	1.84E-06	0.00%	0.00%
113mCd	5.8E+01	5.0E+01	6.2E+02	3.2E+02	1.0E+03	1.00E-03	1.05E+00	1.30E-01	1.50E-01	1.36E-01	1.57E-01	6.82E-05	7.87E-05	0.00%	0.00%
125Sb	3.3E+02	3.4E+01	5.8E+03	4.4E+03	1.1E+04	1.00E-03	1.05E+01	2.60E-02	3.30E-02	2.74E-01	3.48E-01	1.37E-04	1.74E-04	0.00%	0.00%
126Sn	3.6E+00	1.7E+01	1.1E+01	3.1E+00	3.4E+01	1.00E-03	3.42E-02	4.70E-02	4.10E-02	1.61E-03	1.40E-03	8.03E-07	7.01E-07	0.00%	0.00%
129I	2.6E-01	5.0E-01	4.7E-01	5.2E-02	1.3E+00	1.00E-03	1.27E-03	2.00E-01	2.20E-02	2.55E-04	2.80E-05	1.27E-07	1.40E-08	0.00%	0.00%
134Cs	1.6E+00	4.2E+01	1.8E+03	1.1E+03	2.9E+03	1.00E-03	2.89E+00	1.00E-01	4.70E-02	2.89E-01	1.36E-01	1.44E-04	6.78E-05	0.01%	0.00%
137Cs	1.6E+05	6.8E+05	6.4E+06	3.7E+06	1.1E+07	1.00E-03	1.09E+04	2.40E-01	2.70E-01	2.62E+03	2.95E+03	1.31E+00	1.47E+00	45.60%	44.85%
137mBa	1.5E+05	6.4E+05	6.0E+06	3.5E+06	1.0E+07	1.00E-03	1.03E+04	5.30E-13	1.00E-11	5.46E-09	1.03E-07	2.73E-12	5.15E-11	0.00%	0.00%
151Sm	3.2E+05	8.3E+04	1.6E+05	2.3E+05	7.9E+05	1.00E-03	7.89E+02	7.50E-04	8.40E-04	5.91E-01	6.62E-01	2.96E-04	3.31E-04	0.01%	0.01%
152Eu	4.6E+02	6.6E+01	1.9E+02	1.2E+02	8.3E+02	1.00E-03	8.29E-01	2.40E-01	3.10E-01	1.99E-01	2.57E-01	9.94E-05	1.28E-04	0.00%	0.00%
154Eu	7.1E+03	6.6E+03	1.3E+04	9.3E+03	3.6E+04	1.00E-03	3.59E+01	2.00E-01	2.50E-01	7.19E+00	8.98E+00	3.59E-03	4.49E-03	0.13%	0.12%
155Eu	2.9E+03	2.7E+03	1.5E+04	1.4E+04	3.4E+04	1.00E-03	3.37E+01	8.00E-03	9.80E-03	2.70E-01	3.30E-01	1.35E-04	1.65E-04	0.00%	0.00%
226Ra	1.1E-04	9.1E-05	3.6E-04	1.6E-04	7.2E-04	1.00E-03	7.24E-07	4.60E-01	2.50E-01	3.33E-07	1.81E-07	1.67E-10	9.05E-11	0.00%	0.00%
227Ac	3.8E-03	9.3E-03	2.1E-03	9.7E-04	1.6E-02	1.00E-03	1.62E-05	1.50E+01	1.80E+01	2.43E-04	2.92E-04	1.22E-07	1.46E-07	0.00%	0.00%
228Ra	1.0E-01	4.4E-02	3.3E-03	7.0E-03	1.6E-01	1.00E-03	1.56E-04	1.90E-01	7.00E-02	2.96E-05	1.09E-05	1.48E-08	5.44E-09	0.00%	0.00%

Radioactive Air Emissions Notice of
Construction Application for Operation of the
296-A-42 Exhauster

Potential Unabated and Abated Emissions for the 296-A-42 Emission Unit

								CAP-88		Unabated Emissions		Abated Emissions		% Unabated Emissions	% Abated Emissions
								East Area							
Analyte	AY-101 Inventory (Ci)	AY-102 Inventory (Ci)	AZ-101 Inventory (Ci)	AZ-102 Inventory (Ci)	Total Farm Inventory Ci)	Release Fraction	Released (Ci/yr)	Offsite MPR	Onsite MPR	Offsite MPR	Onsite MPR	Offsite MPR	Onsite MPR	Offsite MPR	
								mrem/Ci		mrem/yr		mrem/yr			
	B	C	D	E	F=B+C+D+E	RF	H=F*RF	I	J	K=H*I	L=H*J	M=K/2000 except for 3H and 14C	N=L/2000 except for 3H and 14C	O=100* K/SumK	P=100* M/SumM
229Th	6.2E-04	3.8E-05	3.0E-06	1.2E-06	6.7E-04	1.00E-03	6.67E-07	1.60E+01	2.00E+01	1.07E-05	1.33E-05	5.33E-09	6.67E-09	0.00%	0.00%
231Pa	3.2E-02	9.7E-02	5.6E-03	2.4E-03	1.4E-01	1.00E-03	1.37E-04	1.20E+01	1.40E+01	1.65E-03	1.92E-03	8.25E-07	9.62E-07	0.00%	0.00%
232Th	7.4E-02	5.4E-02	9.8E-03	2.2E-02	1.6E-01	1.00E-03	1.60E-04	*8.00E+00*	*1.00E+01*	1.28E-03	1.60E-03	6.38E-07	7.98E-07	0.00%	0.00%
232U	5.5E-03	2.7E-03	3.2E-03	6.0E-03	1.7E-02	1.00E-03	1.75E-05	1.10E+01	1.30E+01	1.92E-04	2.27E-04	9.62E-08	1.14E-07	0.00%	0.00%
233U	1.9E-01	2.0E-01	1.8E-01	3.2E-01	8.9E-01	1.00E-03	8.93E-04	3.10E+00	3.70E+00	2.77E-03	3.30E-03	1.38E-06	1.65E-06	0.00%	0.00%
234U	3.4E-01	7.4E-01	9.4E-01	3.4E+00	5.4E+00	1.00E-03	5.39E-03	3.10E+00	3.70E+00	1.67E-02	2.00E-02	8.36E-06	9.98E-06	0.00%	0.00%
235U	1.4E-02	3.1E-02	3.5E-02	1.4E-01	2.2E-01	1.00E-03	2.17E-04	3.00E+00	3.50E+00	6.50E-04	7.58E-04	3.25E-07	3.79E-07	0.00%	0.00%
236U	1.2E-02	2.3E-02	8.6E-02	2.8E-01	4.0E-01	1.00E-03	4.04E-04	2.90E+00	3.50E+00	1.17E-03	1.41E-03	5.86E-07	7.07E-07	0.00%	0.00%
237Np	4.0E+00	3.9E+00	1.6E+01	2.1E+01	4.5E+01	1.00E-03	4.47E-02	1.20E+01	1.40E+01	5.37E-01	6.26E-01	2.68E-04	3.13E-04	0.01%	0.01%
238Pu	7.5E+01	6.3E+01	1.4E+02	2.1E+02	4.8E+02	1.00E-03	4.85E-01	7.60E+00	8.90E+00	3.69E+00	4.32E+00	1.84E-03	2.16E-03	0.06%	0.06%
238U	2.9E-01	6.9E-01	6.6E-01	2.5E+00	4.2E+00	1.00E-03	4.17E-03	2.80E+00	3.30E+00	1.17E-02	1.38E-02	5.84E-06	6.88E-06	0.00%	0.00%
239Pu	8.8E+02	1.6E+03	1.4E+03	1.4E+03	5.3E+03	1.00E-03	5.34E+00	8.20E+00	9.50E+00	4.38E+01	5.08E+01	2.19E-02	2.54E-02	0.76%	0.75%
240Pu	2.7E+02	3.8E+02	4.0E+02	3.7E+02	1.4E+03	1.00E-03	1.42E+00	8.20E+00	9.50E+00	1.16E+01	1.35E+01	5.82E-03	6.74E-03	0.20%	0.20%
241Am	1.7E+04	5.1E+03	3.1E+04	3.0E+04	8.2E+04	1.00E-03	8.25E+01	1.30E+01	1.50E+01	1.07E+03	1.24E+03	5.36E-01	6.19E-01	18.65%	18.35%
241Pu	3.8E+03	2.7E+03	9.8E+03	7.8E+03	2.4E+04	1.00E-03	2.40E+01	1.30E-01	1.50E-01	3.12E+00	3.61E+00	1.56E-03	1.80E-03	0.05%	0.05%
242Cm	2.5E+01	5.7E+00	1.3E+01	2.6E+01	7.0E+01	1.00E-03	7.02E-02	4.10E-01	5.00E-01	2.88E-02	3.51E-02	1.44E-05	1.76E-05	0.00%	0.00%
242Pu	3.9E-02	2.5E-02	5.0E-02	4.0E-02	1.5E-01	1.00E-03	1.54E-04	7.80E+00	9.10E+00	1.20E-03	1.40E-03	6.01E-07	7.01E-07	0.00%	0.00%
243Am	1.5E+01	2.8E+00	1.1E+01	1.0E+01	3.9E+01	1.00E-03	3.90E-02	1.30E+01	1.50E+01	5.07E-01	5.84E-01	2.53E-04	2.92E-04	0.01%	0.01%
243Cm	2.4E+00	2.2E+00	1.2E+00	3.0E+00	8.9E+00	1.00E-03	8.89E-03	8.50E+00	1.00E+01	7.55E-02	8.89E-02	3.78E-05	4.44E-05	0.00%	0.00%
244Cm	5.7E+01	5.1E+01	2.9E+01	6.9E+01	2.1E+02	1.00E-03	2.06E-01	6.70E+00	8.00E+00	1.38E+00	1.65E+00	6.91E-04	8.25E-04	0.02%	0.02%
										5.75E+03	**4.45E+03**	**2.92E+00**	**2.23E+00**	**100.00%**	**100.00%**

Huffman, Lori A

From: ^Environmental Portal
Sent: Tuesday, March 12, 2013 10:14 AM
To: Adams, M R (Margie); Allen, Ruth M; Anderson, Robert H; Atwood, Julie M; Bang, Reese; Barnett, Matthew; Bates, John A; Beam, Thomas G; Borneman, Lucinda E; Bowers, Holly M; Bowser, Dennis W; Breshears, Jerralee A; Brunke, Ronald C; Cammann, Jerry W; Cawrse, Allan E; Cherry, Stephen B; Clement, Curt J; Colby, Julie M; Crummel, Gary M; Davis, Greta P; Dixon, Brian J; Donnelly, Jack W; Engelmann, Richard H; Erlandson, Brad; Faust, Toni L; Fox, Randal E; Fritz, Lori L; Greene, Michael R; Hadley, Karl A; Hagel, Darlene L; Hoglen, Susan T; Homan, Nancy A; Hopkins, Andrea M; Horton, Lori J; Huffman, Lori A; Hummer, Amy L; Jackson, Dale E; Jaraysi, Moses; Johansen, Stephanie K; Johnson, Daniel L; Joyner, Jessica A; Kemp, Christopher J; Killoy, Steven E; Landon, Roger J; Luke, Jeffrey J; McPherson, Robert B; Miskho, Anthony G; Mulkey, Charles H; Ollero, Jennifer F; Parker, Dan L (Danny); Peistrup, Philip E; Peloquin, Michael G; Penn, Lucinda L; Perry, Jon K; Petersen, Linda C; Peterson, Kirk A; Proctor, Megan L; Pysto, Thomas H; Ramos, Mary C; Rohan, Leah C; Rokkan, Donald J; Rumburg, Brian P; Seaver, Jennie R; Simmons, Fen M; Smith, Stephen T; Strickland, Michael S; Stubblebine, Scott D; Toebe, Wayne E; Tuott, Lee C; Voogd, Jeffry A; Warriner, Richard D; Watson, David J (Dave); Wiegman, Rebecca S; Williams, Joel F Jr; Williamson, Barbara D; Woodruff, Rodger K; Woolard, Joan G
Subject: 13-ECD-0012 - [1303110172] -- U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF

"13-ECD-0012 - [1303110172]" can be accessed via the following link:
http://idmsweb.rl.gov/idms/livelink.exe/open/175372579

U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER

OFFICE OF RIVER PROTECTION
P.O. Box 450, MSIN H6-60
Richland, Washington 99352

MAR 0 7 2013

13-ECD-0012

Mr. John Martell, Manager
Radioactive Air Emissions Section
Washington State Department of Health
309 Bradley Blvd., Suite 201
Richland, Washington 99352
(Hanford Mailstop: B1-42)

Mr. Martell:

U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER

Reference: ORP letter from S. J. Olinger to J. Martell, WDOH, "Request for Approval of Modification to the Notice of Construction and Approval Order for the 296-A-42 Exhauster Operation and Amendment to Hanford Site Air Operating Permit (AOP) for Emission Unit 200E P-296A042," 08-ESQ-085, dated May 9, 2008.

Attached for Washington State Department of Health (WDOH) review and approval is a request for an off-permit change to license operation of the AY-102 tank annulus exhauster. The documents provided are: Notice of Construction Application/Permit Revision/AOP Off-Permit Change Notification (Attachment 1), and Radioactive Air Emissions Notice of Construction Application for Operation of the 296-A-42 Exhauster (Attachment 2). Electronic versions of the subject Notice of Construction Application were provided separately to your staff.

If you have any questions, please contact Dennis W. Bowser, Environmental Compliance Division, (509) 373-2566.

Kevin W. Smith
Manager

ECD:DWB

Attachments: (2)

cc: See page 2

cc w/attachs:
L. Bostic, BNI
B. G. Erlandson, BNI
J. A. Bates, CHPRC
J. Cox, CTUIR
S. Harris, CTUIR
K. A. Conaway, Ecology
P. M. Gent, Ecology
D. Bartus, EPA (Region 10, Seattle)
D. Zhen, EPA (Region 10, Seattle)
R. H. Anderson, MSA
T. G. Beam, MSA
G. Bohnee, NPT
K. Niles, Oregon Energy
D. E. Jackson, RL
J. W. Schmidt, WDOH
R. M. Allen, WRPS
L. L. Penn, WRPS
B. P. Rumburg, WRPS
R. Jim, YN
Administrative Record
BNI Correspondence
Environmental Portal, LMSI
WRPS Correspondence

Attachment 1
13-ECD-0012
(5 Pages)

NOC Application/Permit Revision/AOP Off-Permit Change Notification

NOC Application/Permit Revision/AOP Off-Permit Change Notification

NOTE: Any increase to abated or unabated PTE requires a full NOC modification

REASON FOR CHANGE

Submittal Date: _____

☒ **NOC Application Revision**
: _____

☐ **Condition Change/ Clarification**
WDOH Condition Number: 2 & 3
AOP Condition Number: 2 & 3

☐ **ALARACT Revision**
New ALARACT Rev Number: _____

PROJECT IDENTIFICATION

Project Title: License to Operate Ventilation of the 241 AY/AZ Tank Farm
NOC Application Number: 08-ESQ-085
AEI ID Number (AOP Emission Unit Number(s): 93 & 218
Current WDOH Approval Letter Number(s): AIR 12-319
WDOH NOC ID Number: 840

DESCRIPTION OF CHANGE

Number of Attachments 1

WDOH will provide a new approval letter containing any new or modified conditions that result from the following proposed change.

Proposed Change (provide original and proposed wording):

Please allow changes to the NOC application and revise the subject approval as indicated in this Off-Permit Change Notification. Attached is the NOC Application, originally submitted via letter 08-ESQ-085, from Shirley J. Olinger, Office of River Protection, to Mr, John Martell, Washington State Department of Health, subject "Request for Approval of Modification to the Notice of Construction and Approval Order for the 296-A-42 Exhauster Operation and Amendment to Hanford Site Air Operating Permit (AOP) for Emission Unit 200E-P-296A024," dated May 9, 2008. Requested changes appear in the attached application in the color **blue**. A summary of those changes are as follows:

The Executive Summary was updated.

Section 1.0, "Location" of the NOC Application was updated by adding the following:

> The exhauster that ventilates the 241-AY-102 tank annulus is assigned stack number 296-A-19 and is listed in 00-05-006, the *Hanford Site Air Operating Permit* under number 200E P-296A019-001, Emission Unit ID 218.

Section 2.0, "Responsible Manager" was changed from:

Shirley J. Olinger, Manager
U.S. Department of Energy, Office of River Protection
P.O. Box 550
Richland, Washington 99352
(509) 372-2315

Change to Section 2.0, "Responsible Manager" were:

Kevin W Smith, Manager
U.S. Department of Energy, Office of River Protection
P.O. Box 450, MSIN H6-60
Richland, Washington 99352
(509) 372-3062

Section 3.0, "Proposed Actions" of the NOC Application was updated to include the following:

Additional activities include those activities necessary to mitigate potential waste which has entered the annulus from the primary tank 241-AY-102. This annulus is ventilated by its own exhauster, stack number 296-A-19.

Section 5.0, "Process Description" was updated to include the following:

The tank annulus is located between the 75-ft diameter primary tank and the 80-ft diameter secondary liner, resulting in a nominal 2.5-ft wide annular space wrapping around the entire circumference of the primary tank. Several penetrations, or risers, of various sizes exist at the top of the secondary liner, which allows access into the annulus space. This access is used for a variety of activities, including but not limited to visual inspection cameras, sampling, ultrasonic testing crawlers, emergency pumps, and leak detection instruments. The annulus provides secondary containment when the primary tank fails and also provides the ability to cool the primary tank to reduce thermal stresses.

The annulus systems for the AY/AZ Tank Farms include three separate ventilation systems. The annuli of the two AY Tank Farm tanks are ventilated by separate ventilation systems, while the two AZ Tank Farm tanks share a common ventilation system. The annulus ventilation systems minimize potential corrosion due to condensation by removing moisture through evaporation. The ventilation air accelerates the evaporation rate by circulating outside air through the annulus. The ventilation air also dilutes and removes any flammable gas generated within the annulus if there is waste in the annulus.

Each AY Tank Farm annulus ventilation system's exhaust fan draws outside air into an intake consisting of a damper and two prefilters configured in series. For Tank 241-AY-102, all of the air is distributed to a central air-distribution chamber below the primary tank. The air flows from the distribution chamber through the air-distribution grid to the annulus. For Tank 241-AY-101, the air flows proportionally between the air-distribution

grid under the primary tank and directly into the annulus space using flow restricting orifices.

The title of Section 5.1.4 was changed from "Removal of In-Tank Equipment" to the following:

"Removal of In-Tank or In-Annulus Equipment"

The title of Section 5.1.5 was changed from "In-Tank Equipment Installation" to the following:

"In-Tank or In-Annulus Equipment Installation"

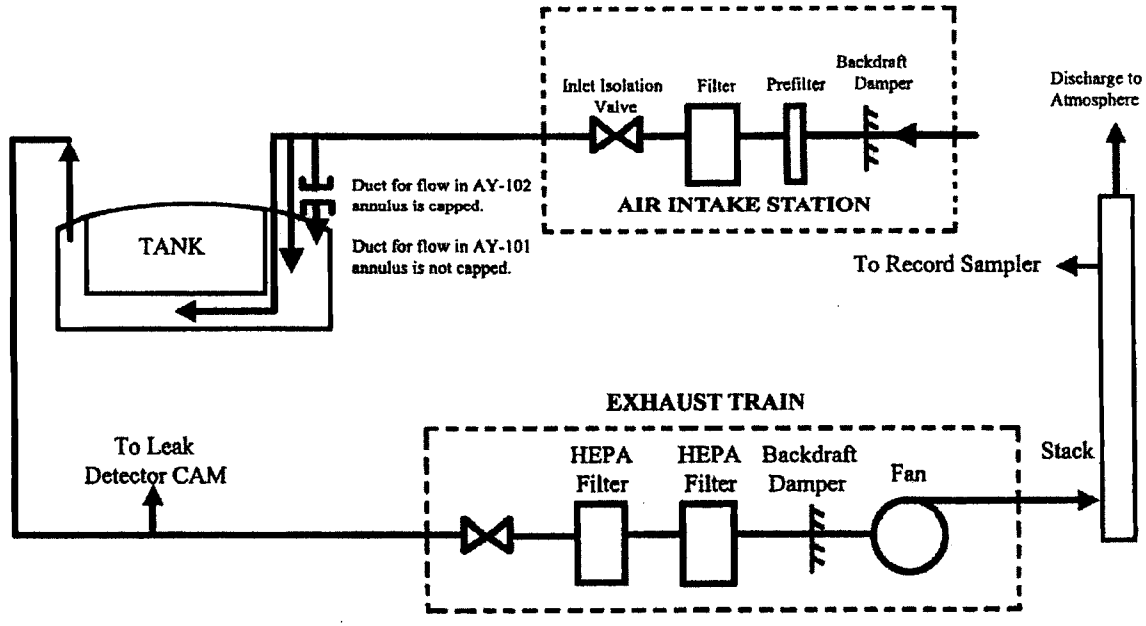
Section 6.2, "Tank Ventilation and Emissions Control System" was updated to include the following:

The annulus of tank 241-AY-102 is ventilated via exhauster stack numbered 296-A-19. This stack has an internal diameter of 15 inches (1.25 feet, 0.38 meters). It is approximately 12.9 feet (3.9 meters) in height. The exhaust fan is capable of providing a maximum capacity of 3,850 cubic feet per minute (cfm) (52.3 feet per second or 15.9 meters per second) at 12 inches (w.g.). Recent measured flow rates through this system have ranged from 787 dry standard cubic feet per minute (dscfm) to 1,173 dscfm, the average of which is 992 dscfm (13.5 feet/second or 4.1 meters/second). The average temperature of these measured flow rates was 83 degrees F (28.3 degrees C).

The Tank 241-AY-102 annulus ventilation system's exhaust fan draws outside air into an intake consisting of a damper and two pre-filters configured in series. Currently, the air is routed to the air distribution ring centered under the primary tank floor. The air flows from the air distribution ring through the air distribution slots in the refractory to the annulus. Exhaust air from the tank annulus is drawn out through underground ducts. The ducts merge aboveground to form a common vent header. For leak-detection purposes, a vacuum pump extracts an air sample from the header located upstream of the exhauster HEPA filters and feeds this air sample to a CAM. The header connects to the exhaust train where tank annulus exhaust air continues through a two banks of HEPA filters configured in series. Filtered air exits the annulus ventilation system through an exhaust fan and stack and is released to the environment. The stack is fitted with a record sampler system that samples the air stream for radioactive particulates.

Add to Section 7.0, "Drawings of Controls" the following figure:

AY Tank Farm Ventilation Tank Annulus System Flow Diagram.



NOTE: Tanks 241-AY-101 and 241-AY-102 have seperate annulus ventilation systems. The configuration of both systems is identical except as shown.

Huffman, Lori A

From: ^Environmental Portal
Sent: Wednesday, January 30, 2013 4:13 PM
To: Adams, M R (Margie); Allen, Ruth M; Atwood, Julie M; Bang, Reese; Beam, Thomas G; 'blcurn@bechtel.com'; Borneman, Lucinda E; Bowers, Holly M; Breshears, Jerralee A; Brunke, Ronald C; Cammann, Jerry W; Cawrse, Allan E; Cherry, Stephen B; Colby, Julie M; Davis, Greta P; Dixon, Brian J; Donnelly, Jack W; Engelmann, Richard H; Erlandson, Brad; Faust, Toni L; Fox, Randal E; Fritz, Lori L; Greene, Michael R; Grohs, Eugene L; Hadley, Karl A; Hagel, Darlene L; Hoglen, Susan T; Hopkins, Andrea M; Horton, Lori J; Huffman, Lori A; Hummer, Amy L; Jaraysi, Moses; Johansen, Stephanie K; Joyner, Jessica A; Kaldor, Reed A; Kemp, Christopher J; Killoy, Steven E; Landon, Roger J; Luke, Jeffrey J; Mattlin, Ellen M; McKarns, Anthony C (Tony); McPherson, Robert B; Miera, Felix R Jr; Miskho, Anthony G; Mulkey, Charles H; Neath, Gae M; Noland, Terry W; Ollero, Jennifer F; Parker, Dan L (Danny); Peck, Bret D; Peistrup, Philip E; Peloquin, Michael G; Perry, Jon K; Petersen, Linda C; Peterson, Kirk A; 'Pezzetti, Angela R'; Proctor, Megan L; Pysto, Thomas H; Ranade, Digambar G (Raja); Ruck, Fred A III; Rumburg, Brian P; Russell, Woody; Seaver, Jennie R; Simmons, Fen M; Slack, Carol L; Smith, Stephen T; Strickland, Michael S; Stubblebine, Scott D; Thompson, Wendy S; Tilden, Harold T II; Toebe, Wayne E; Tuott, Lee C; Vedder, Barry L; Voogd, Jeffry A; Warriner, Richard D; Watson, David J (Dave); Weil, Stephen R; Wiegman, Rebecca S; Williams, Joel F Jr; Williamson, Barbara D; Woolard, Joan G; Wooley, Theodore A; Yasek, Donna M; Zelen, Benjamin J
Subject: 13-NWP-009 - [1301300719] --- REGULATORY INFO --- Washington State Department of Ecology (Ecology) Assessment Report for Field Monitoring Activities Conducted December 27, 2012, of the Waste Material Near Riser 83 of the 241-AY-102 Double Shell Tank

"13-NWP-009 - [1301300719]" can be accessed via the following link:
http://idmsweb.rl.gov/idms/livelink.exe/open/174799471

Washington State Department of Ecology (Ecology) Assessment Report for Field Monitoring Activities Conducted December 27, 2012, of the Waste Material Near Riser 83 of the 241-AY-102 Double Shell Tank (DST)

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
3100 Port of Benton Blvd • Richland, WA 99354 • (509) 372-7950
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

January 25, 2013 13-NWP-009

Mr. Kevin W. Smith, Manager
Office of River Protection
United States Department of Energy
PO Box 450, MSIN: H6-60
Richland, Washington 99352

Re: Washington State Department of Ecology (Ecology) Assessment Report for Field Monitoring Activities Conducted December 27, 2012, of the Waste Material Near Riser 83 of the 241-AY-102 Double Shell Tank (DST)

Dear Mr. Smith:

On December 27, 2012, Ecology visited the 241-AY Farm to witness the weekly visual inspection of the waste material found near Riser 83 of the 241-AY-102 DST. Ecology's Assessment Report and photographs from the field visit are enclosed. The following notes are important highlights from the Visual Inspection:

- The weather reported at the pre-job was cloudy and low winds. According to the Hanford Meteorological Station, the area had received approximately 3 inches of snow on December 25 and additional moisture on December 26 and December 27, 2012.
- The camera viewed the waste in respect to the different in-annular space "landmarks" including the black dot or rock, two white pebbles, orange pieces of insulation/foam, and ventilation slots. It was noted by all witnessing the video that the area of the waste material did appear to have slightly increased in size, near the upper portion of the leak where the waste material extends outward in "finger channels," and near the smaller piece of orange insulation/foam. The extent of the leak seemed to slowly expand as compared to the amount of waste material viewed during the visual inspections conducted on October 25, 2012, and November 12, 2012.
- The increase in the extent of the waste material present within the annulus may be due to an increase in material or as a result of the draining of the deeper pools of waste material outward onto the annulus floor. Many of these "deeper pools" of waste material as indicated by a darker green color of material, appeared to be lighter green in nature and not as thick, which may indicate they are draining.
- The waste material in the ventilation slot appeared to be wider and thicker, especially on the base near the 6 ½ inch ring. The top of the material appeared to have dried where it contacted the concrete. However, moisture streaks on either side of the waste material within the ventilation slot were again visible.

- The waste material in the finger channels of the waste or pools of waste (that are dark green, light green, and yellow) appear to look deeper, extend in length, and had split to flow toward another direction creating an additional finger channel.

The United States Department of Energy-Office of Rive Protection, Washington River Protection Solutions (WRPS), and Ecology Integrated Project Team continues to meet to develop and evaluate options for the interim and longer term management of this tank and its contents.

It is undetermined at this time if the 241-AY-102 DST will be repaired or closed. Regardless, the waste (supernatant, sludge, and interstitial liquids) must be removed. WRPS has completed the necessary procurement, testing, and construction/installation requirements to be able to pump the supernatant from the tank. However, the capability to remove the sludge is still in the planning phase.

If you have any questions, please contact me at Michelle.Hendrickson@ecy.wa.gov or (509) 372-7970.

Sincerely,

Michelle L. Hendrickson

Michelle L. Hendrickson, CHMM, PE
Tank System Operations and Closure Engineer
Nuclear Waste Program

tkb
Enclosures (2)

cc electronic w/enc:
Dennis Faulk, EPA
Lisa Domnoske-Rauch, USDOE
Tom Fletcher, USDOE
Jeremy Johnson, USDOE
Derek Wright, USDOE
Randall Robinson, DNFSB
Jason Engeman, WRPS
Steve Killoy, WRPS
Jeff Voogd, WRPS
Dennis Washenfelder, WRPS
David Bernhard, NPT
Dirk Dunning, ODOE
Ken Niles, ODOE
John Martell, WDOH
John Schmidt, WDOH
USDOE-ORP Correspondence Control
WRPS Correspondence Control

cc w/enc:
Stuart Harris, CTUIR
Alex Nazarali, CTUIR
Gabriel Bohnee, NPT
Russell Jim, YN
Steve Hudson, HAB
Administrative Record:
DST/TWS/214-AY-102/S-2-3
Environmental Portal, LMSI

ASSESSMENT REPORT

Field Monitoring Activities

A. GENERAL INFORMATION

Project:	241-AY-102 Field Monitoring, Riser 83 Video
Project Contact:	Jeremy Johnson (ORP) Phone: (509) 376-1866
Review Date:	12/27/2012
Reviewer:	Michelle Hendrickson, CHMM, PE
USDOE Project:	US Department of Energy-Office of River Protection (USDOE-ORP)
USDOE Contact::	Tom Fletcher/Jeremy Johnson
Prime Contractor:	Washington River Protection Solutions (WRPS)
Project Manager:	Michael Hardesty Phone: (509) 373-4573
Location:	241-AY-102, 200 East Area, Hanford
Scheduled Start Date:	12/27/2012 Actual Start Date: 12/27/2012 Completion Date: 12/27/2012
Contract Amount:	Approximately $75,000 for 4 Riser Visual Inspections
Sub-Contractor:	N/A
Location:	200 East Area, Hanford Nuclear Reservation, Richland, WA

PROJECT DESCRIPTION:

- On an 8/8/12 visual inspection, material was found in the Annulus Space at AY-102. On 10/23/2012, USDOE-ORP reported that the DST was leaking and more material was accumulating in the Annulus Space.
- To monitor the slow leak, WRPS is conducting weekly and often twice weekly video inspections of the material through the AY-102 Tank's Riser #83.
- As the leak in question has remained very slow, the Integrated Project Team (IPT) has provided guidance that the visual inspections at the AY-102 Tank could be reduced to once a week.

The Pre-job meeting was conducted at 12:30 PM, including the conditions of RWP WTO0399, Rev. 2. The job in the field consisted of:

1. We entered the farm at approximately 12:45 PM. The ventilation exhauster was throttled down in the annulus from -14 inch to a -1 inch vacuum. The ventilation vacuum was lessened as the air currents generated by the vacuum create air currents which cool the sludge. However, these currents also impede the collection of a flammable gas sample and cause the camera to swing, making camera manipulation within the annular space very difficult.

2. A flammable gas sampled was collected and indicated that the annulus space was less than 25% lower flammability limit.

3. The camera was in a plastic bag and wire attached in a sleeve. The sleeve was carefully inspected and then the camera was removed from the bag and lowered into the annulus space. The camera was lowered to the 53-foot mark for the video/photographs. The camera completed a 360-degree scan and was raised and tilted. Also, a zoom of 10-times was used for close-up observation of the waste. Close-ups of the material along the entire area of waste deposition were viewed. The "landmarks" within the tank (black dot or rock, two white pebbles, and ventilation slots) were specifically viewed.

4. Once all of the views were captured, the camera was raised and re-bagged.

5. We surveyed out of the 241-AY Farm.

B. RECORDS AND PROCEDURES

1. Personnel Contacted During Assessment

	Name	Title or Duties/Organization	Phone
a.	Steve Stamper	Camera Operator - WRPS	509-392-3977
b.	Michael Hardesty	Field Work Supervisor - WRPS	509-373-4573
c.	Roger Hammer	Camera Operator - WRPS	509-373-3355
d.	Derek Wright	Facility Representative- USDOE-ORP	509-373-1011

2. Progress
   a. Scheduled Percentage 100 %

	Yes	No	NA	See Remarks
3. Stockpiled equipment or materials				
a. Records adequate?	X	☐	☐	☐
b. Protected?	X	☐	☐	☐
4. Monitoring Procedures up to date?	X	☐	☐	☐
5. Work Packages up to date?	X	☐	☐	☐
6. Adequate involvement in changes?	X	☐	☐	☐
7. Change of monitoring procedures appropriate and submitted to Ecology?	☐	☐	X	☐
8. Instrument(s) Calibrated adequately?	X	☐	☐	☐
9. Permit No/TPA Requirement.: DST System Unit RCRA Permit				

C. FIELD MONITORING

- The weather was reported at the Plan of the Day meeting was cloudy and low winds. The area had received approximately 3 inches of snow on 12/25/2012 and additional moisture yesterday and earlier today.
- The video taken of the waste material was near Riser 83 of the 241-AY-102 Annulus Space.
- The video was viewed and camera manipulated in the AY-801 Building.
- As the camera descended to the bottom of the annular space, a thermocouple became visible. The camera zoomed in and the off-riser sampler/crawler's tracks were no longer visible.
- All witnessing the inspection noted that the color of the waste appeared to be changing. The dark green was changing to a lighter green in some locations. The lighter green was becoming a dark yellow. The darker yellow was changing to a lighter yellow. The lighter yellow was turning to a white color along the waste perimeter. Ecology also noted that some of the waste material that was white in color was now yellow. This indicates that some of the waste material may be drying, most likely due to the ventilation.
- The camera viewed the waste in respect to the different in-annular space "landmarks" including the black dot or rock, two white pebbles, orange pieces of insulation/foam, and ventilation slots. It was noted by all witnessing the video that the size of the area of the waste material did appear to have slightly increased in size, near the upper portion of the leak where the waste material extends outward in "finger channels" and near the smaller piece of orange insulation/foam. The extent of the leak seemed to slowly expand as compared to the amount of waste material viewed during the visual inspection conducted on 10/25/12 and 11/12/2012.
- Ecology noted that the increase in the extent of the waste material present within the annulus may be due to an increase in material or as a result of the draining of the

deeper pools of waste material outward onto the annulus floor. Many of these "deeper pools" of waste material as indicated by a darker green color of material, appeared to be lighter green in nature and not as thick, which may indicate they are draining.

- Ecology noted that the waste material in the ventilation slot appeared to be wider and thicker, especially on the base near the 6 ½ inch ring. The top of the material appeared to have dried where it contacted the concrete. However, moisture streaks on either side of the waste material within the ventilation slot were again visible.
- Ecology also noted that the waste material the finger channels of the waste or pools of waste (that are dark green, light green, and yellow) appear to look deeper, extend in length, and had split to flow toward another direction creating and additional finger channel.
- Ecology could not visually distinguish if any visual damage indicators such as staining, cracking, pitting, etc. of the 6 inch wide carbon steel refractory ring, annulus floor, primary tank liner, or the refractory/concrete material where the waste was in direct contact with the tank structures. This lack of visual assessment is due to the increased growth of crystals, especially in the lower 2/3rds of the leak area and increased amount of deposition of mineralization around the perimeter of the leak area within the annulus. It is unknown at this time what influence the waste will have that is contacting the annulus floor and refractory/concrete pedestal.

	Yes	No	NA	See Remarks
1. Comply with Procedures and QA/QC Specifications?	X	☐	☐	☐
2. Field Test Being Accomplished?	X	☐	☐	☐
3. Satisfactory Contractor Quality Control?	X	☐	☐	☐
4. Inspection Documentation Satisfactory?	X	☐	☐	☐
5. Site Condition				
a. Orderly?	X	☐	☐	☐
b. Control room interface adequate?	X	☐	☐	☐
c. Equipment set-up adequate?	X	☐	☐	☐
6. Monitoring bypassing satisfactory?	☐	☐	X	☐
7. Unsafe Conditions/Health Hazards Observed?	☐	X	☐	☐
8. Is Project on Schedule?	X	☐	☐	☐
9. Is the Operations and Maintenance Documentation on Schedule?	☐	☐	X	☐
10. Is the Maintenance Management System on Schedule?	☐	☐	X	☐
11. Traffic control and traffic safety?	☐	☐	X	☐

REMARKS:

Photographs from this field monitoring event are attached.

Assessment Completed:

Michael L. Hendrickson, CHMM, PE

Project Engineer's Signature

1/25/13

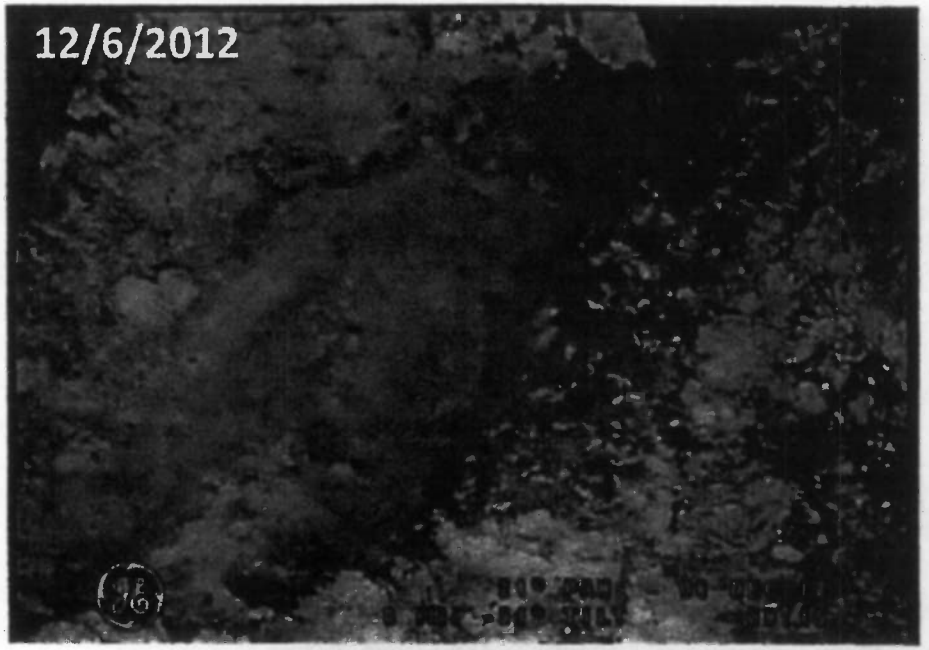
Date

12/6/2012

12/10/2012

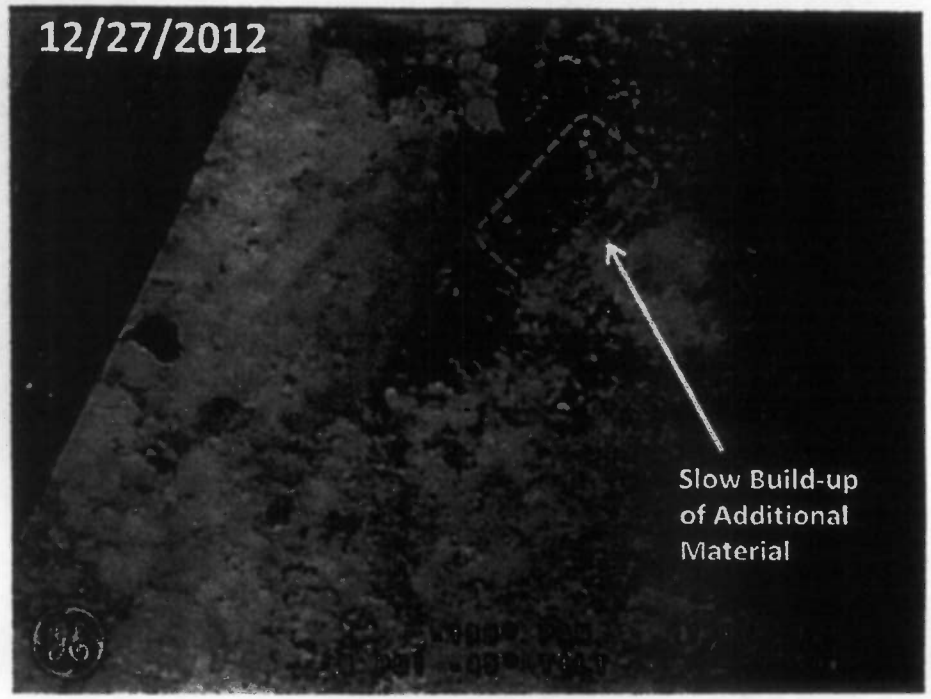
12/18/2012

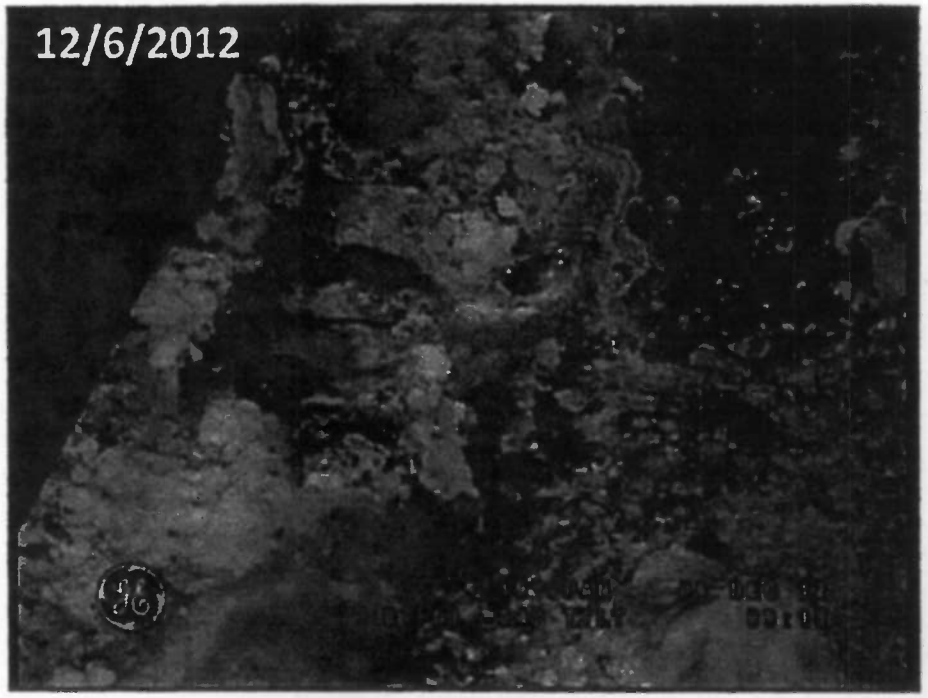
12/27/2012


12/6/2012

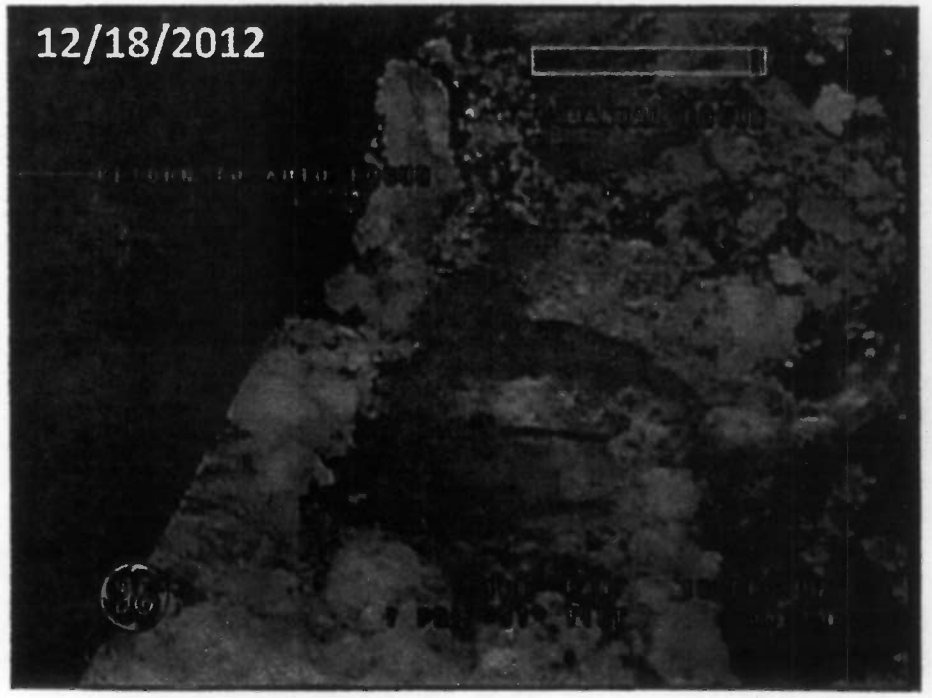
12/10/2012

12/18/2012


12/27/2012
Slow Build-up
of Additional
Material


12/6/2012

12/10/2012


12/18/2012

12/27/2012

Huffman, Lori A

From: ^Environmental Portal
Sent: Monday, March 25, 2013 11:16 AM
To: Adams, M R (Margie); Allen, Ruth M; Atwood, Julie M; Bang, Reese; Beam, Thomas G; blcurn@bechtel.com; Borneman, Lucinda E; Bowers, Holly M; Breshears, Jerralee A; Brunke, Ronald C; Cammann, Jerry W; Cawrse, Allan E; Cherry, Stephen B; Colby, Julie M; Davis, Greta P; Dixon, Brian J; Donnelly, Jack W; Engelmann, Richard H; Erlandson, Brad; Faust, Toni L; Fox, Randal E; Fritz, Lori L; Greene, Michael R; Grohs, Eugene L; Hadley, Karl A; Hagel, Darlene L; Hoglen, Susan T; Hopkins, Andrea M; Horton, Lori J; Huffman, Lori A; Hummer, Amy L; Jaraysi, Moses; Johansen, Stephanie K; Joyner, Jessica A; Kaldor, Reed A; Kemp, Christopher J; Killoy, Steven E; Landon, Roger J; Luke, Jeffrey J; Mattlin, Ellen M; McKarns, Anthony C (Tony); McPherson, Robert B; Miera, Felix R Jr; Miskho, Anthony G; Mulkey, Charles H; Neath, Gae M; Noland, Terry W; Ollero, Jennifer F; Parker, Dan L (Danny); Peistrup, Philip E; Peloquin, Michael G; Penn, Lucinda L; Perry, Jon K; Petersen, Linda C; Peterson, Kirk A; Proctor, Megan L; Pysto, Thomas H; Ranade, Digambar G (Raja); Ruck, Fred A III; Rumburg, Brian P; Seaver, Jennie R; Shattuck, Ann F; Simmons, Fen M; Smith, Stephen T; Strickland, Michael S; Strickling, Lana R; Stubblebine, Scott D; Thompson, Wendy S; Tilden, Harold T II; Toebe, Wayne E; Tuott, Lee C; Vedder, Barry L; Voogd, Jeffry A; Warriner, Richard D; Watson, David J (Dave); Wiegman, Rebecca S; Williams, Joel F Jr; Williamson, Barbara D; Woolard, Joan G; Wooley, Theodore A; Yasek, Donna M; Zelen, Benjamin J
Subject: 13-TF-0010 - REISSUE - [1303220617] -- REGULATORY INFO -- THE U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) RESPONSE TO WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) LETTER 13-NWP-009, REGARDING TANK AY-102

"13-TF-0010 - REISSUE - [1303220617]" can be accessed via the following link:
http://idmsweb.rl.gov/idms/livelink.exe/open/175545322

THE U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) RESPONSE TO WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) LETTER 13-NWP-009, REGARDING TANK AY-102

OFFICE OF RIVER PROTECTION
P.O. Box 450, MSIN H6-60
Richland, Washington 99352

13-TF-0010

MAR 20 2013

Ms. Michelle L. Hendrickson, CHMM, PE
Tank System Operations and Closure Engineer
Nuclear Waste Program
Washington State
Department of Ecology
3100 Port of Benton Blvd.
Richland, Washington 99354

Ms. Hendrickson:

THE U. S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) RESPONSE TO WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) LETTER 13-NWP-009, REGARDING TANK AY-102

Reference: Ecology letter from M. L. Hendrickson to K. W. Smith, ORP, "Washington State Department of Ecology (Ecology) Assessment Report for Field Monitoring Activities Conducted December 27, 2012, of the Waste Material Near Riser 83 of the 241-AY-102 Double-Shell Tank (DST)," 11-NWP-009, dated January 25, 2013.

Thank you for your continued support of the AY-102 Integrated Project Team (IPT) and your ongoing field activities related to AY-102. DOE appreciates your input and values the results of your field monitoring activities.

As you stated in your letter, it is undetermined at this time if Double-Shell Tank AY-102 will be repaired or closed. That determination requires Double-Shell Tank AY-102 be inspected, which will require the contents to be emptied. ORP will continue collaborating with Ecology through the IPT, to assess how and when emptying the tank should take place.

Thank you again for your support and input related to this very important issue.

If you have any questions, please contact Ellen M. Mattlin, Tank Farms Programs Division Director, (509) 376-1900.

Hay Charbonneau for

Kevin W. Smith
Manager

TPD:JMJ

cc:
Administrative Record
Environmental Portal, LMSI

Huffman, Lori A

From: Trenchard, Glyn D
Sent: Thursday, October 18, 2012 4:05 PM
To: Fletcher, Thomas W; Huffman, Lori A; Stubblebine, Scott D
Subject: FW: Presentation - AY-102 Path Forward.pptx
Attachments: Presentation - AY-102 Path Forward.pptx

This is Terry's presentation for tomorrow

Glyn Trenchard
DOE - ORP
509-373-4016
509-438-0448

From: Sams, Terry L
Sent: Thursday, October 18, 2012 3:59 PM
To: Trenchard, Glyn D
Subject: FW: Presentation - AY-102 Path Forward.pptx

From: Sams, Terry L
Sent: Thursday, October 18, 2012 12:59 PM
To: Blank, Betsy S
Subject: Presentation - AY-102 Path Forward.pptx

Two minor changes

Page 6 and 15

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AY-102 Path Forward

Terry L. Sams
Manager, Process Engineering Analysis
October 19, 2012

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Purpose

- Brief ESRB on AY-102 Regulatory Status
- Explain Washington Administrative Code (WAC) 173-303-640 and how it applies
- Review Decision Logic
- Explain DST Emergency Pumping Guide and its application
- Recommend Path Forward and Obtain ESRB Concurrence

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AY-102 Regulatory Status

- AY-102 has been declared an assumed leaking tank
- WAC 173-303-640 is applicable
- HNF-3484 *"Double Shell Tank Emergency Pumping Guide"*, rev.10 is applicable
- TPA milestone (M-46-21, "Complete Implementation of Double Shell Tank Space Optimization Study Recommendations, RPP-7702") is applicable. Reserve emergency space was maintained to reflect compliance with DOE Order 435.1.

Washington Administrative Code 173-303-640 and Application to AY-102

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(7) Response to leaks or spills and disposition of leaking or unfit-for-use tank systems.

A tank system or secondary containment system from which there has been a leak or spill, or which is unfit for use, must be removed from service immediately, and the owner or operator must satisfy the following requirements:

Washington Administrative Code 173-303-640 and Application to AY-102

(a) Cessation of use; prevent flow or addition of wastes.

We have stopped usage of the tank and inspected the system to determine the cause of the leak.

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Washington Administrative Code 173-303-640 and Application to AY-102

(b) Removal of waste from tank system or secondary containment system.

There are no pumpable liquids inside the annulus. There was no release to the environment. Released material to the secondary containment system is stable and presents no hazard to human health or the environment. Removal of the waste when technically practical is subject to further discussion.

Washington Administrative Code 173-303-640 and Application to AY-102

(c) Containment of visible releases to the environment

No releases to the environment. Material is contained within the annular space.

Washington Administrative Code 173-303-640 and Application to AY-102

(d) Notifications, reports

Communications with ORP have been continuous. ORP has been in communication with Ecology.

Washington Administrative Code 173-303-640 and Application to AY-102

(e) Provision of secondary containment, repair, or closure.

Tank will be maintained in a stable condition and will not be repaired. Closure will occur when an approved Closure Plan is in place.

Washington Administrative Code 173-303-640 and Application to AY-102

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(f) Certification of major repairs.

There will be no repairs.

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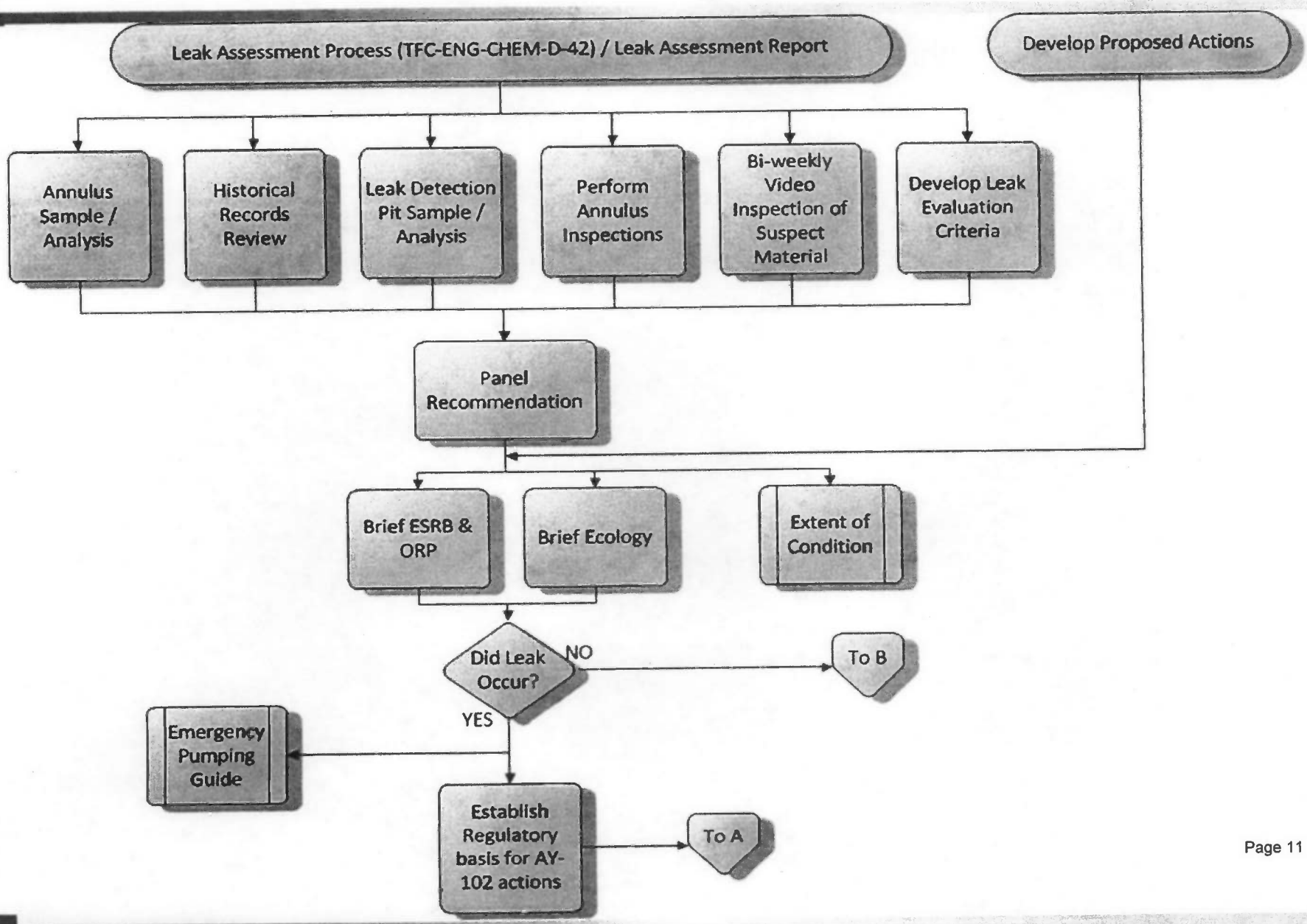
Review Decision Logic



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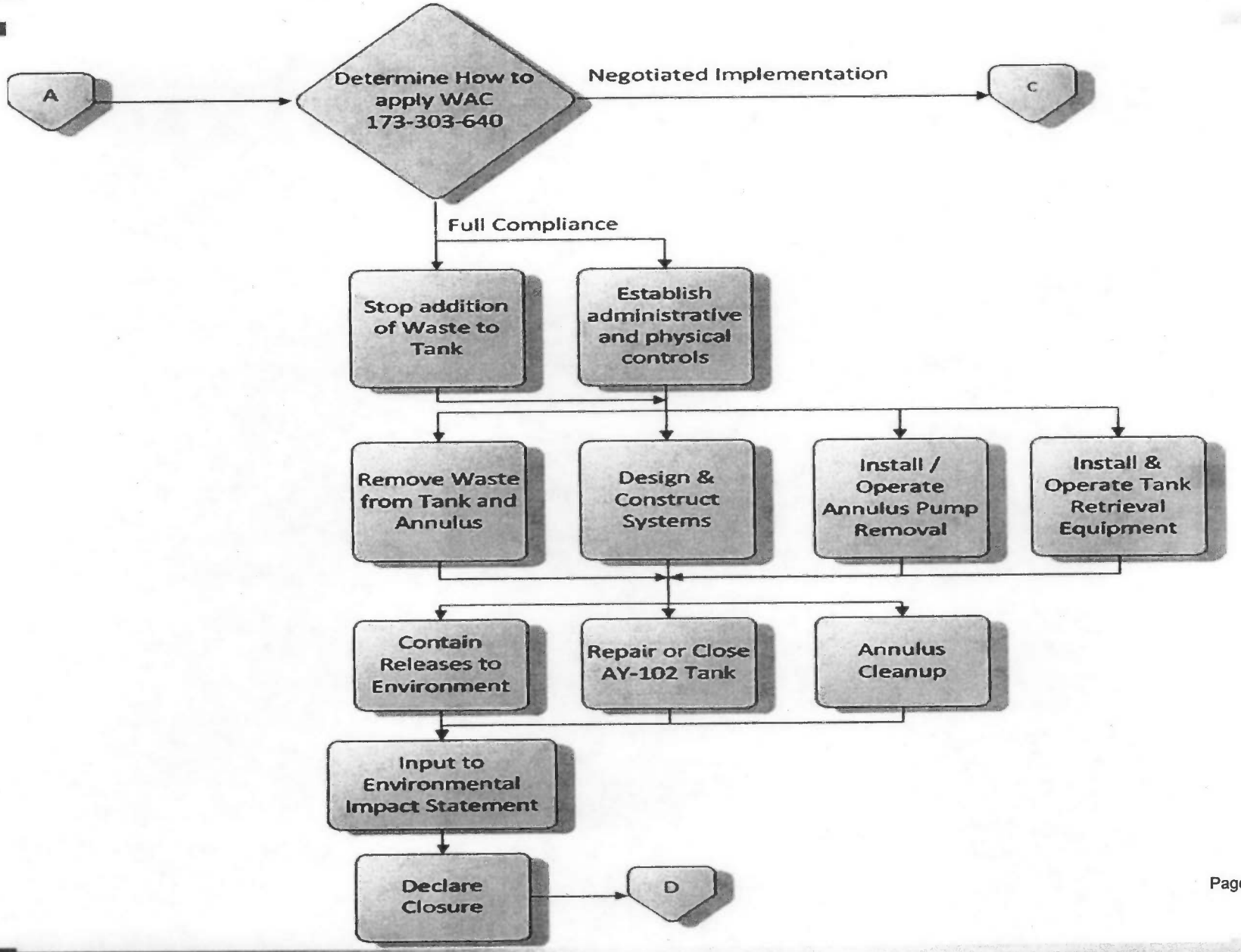
Review Decision Logic, part A



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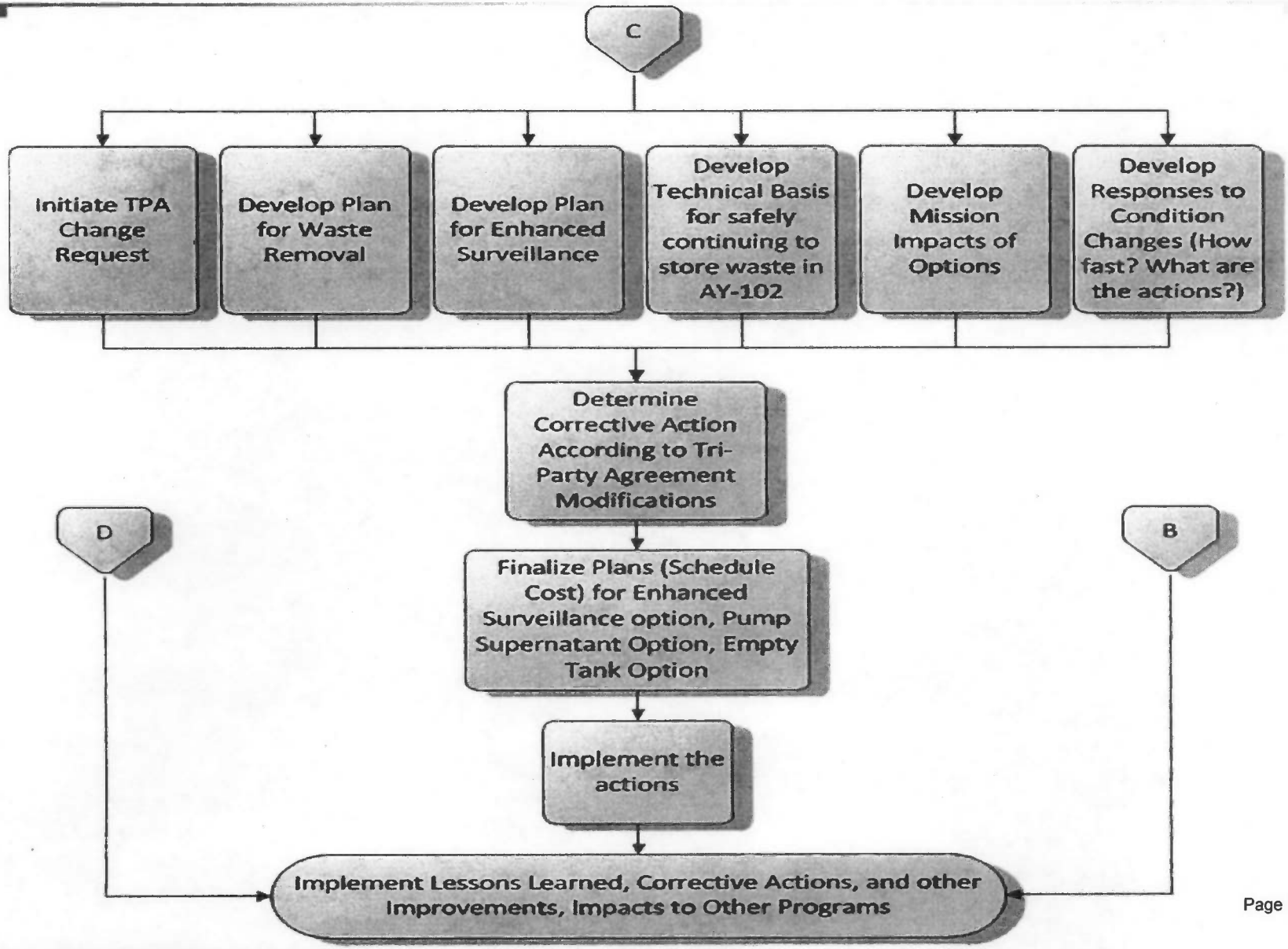
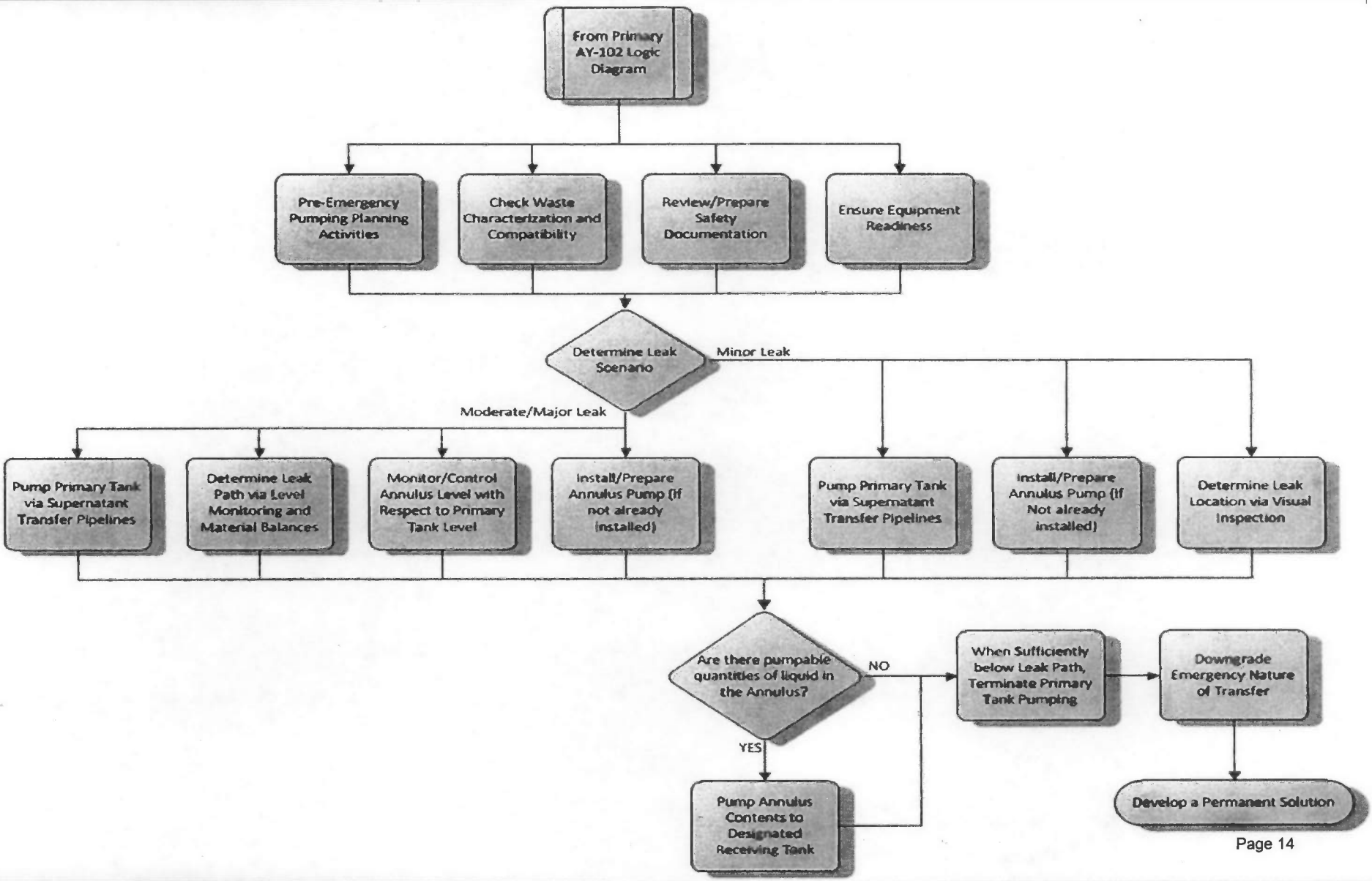
Review Decision Logic, part C



Explain DST Emergency Pumping Guide and its application



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Recommend Path Forward and Obtain ESRB Concurrence

- Leave tank as-is. Do not pump. Tank is stable.
- Continue visual inspections, but perform on a monthly basis
- Continue monitoring with ENRAF
- Continue monitoring leak detection pit
- Continue monitoring liquid level changes in tank
- Evaluate extent of condition of similar tanks
- Prepare Tri-Party Agreement change request

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Summary

Minimize additional tank leakage by maintaining chemical, thermal, and hydrodynamic stability.

- Ensure supernatant and interstitial liquid comply with OSD-00007 limits. Use a chemical lance to adjust interstitial chemistry if necessary
- Maximize annulus airflow to maintain tank temperature as low as possible
- Reduce or minimize waste disturbing activities
- Monitor 100% of annulus perimeter, using the 10 risers with visual baselines

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Summary

- Ensure secondary confinement by monitoring leak detection pit increase; reestablish radiation monitoring surveillance of leak detection pit via the permanent radiation well mounted on the side of the leak detection pit well.
- Maintain contingency pumping capability in the event of a significant primary tank leak by installing an annulus pump and pump out route.

Huffman, Lori A

From: Trenchard, Glyn D
Sent: Tuesday, October 30, 2012 11:38 AM
To: Stubblebine, Scott D; Huffman, Lori A
Subject: FW: [DRAFT] Tank AY-102 Leak Assessment Briefing for Friday, October 17, 2012 ESRB Meeting
Attachments: ESRB Briefing Final 2012-10-17.ppt

Glyn Trenchard
DOE - ORP
509-373-4016
509-438-0448

From: Washenfelder, Dennis J
Sent: Wednesday, October 17, 2012 5:06 PM
To: Clark, Wyatt C; Trenchard, Glyn D; Fletcher, Thomas W; Little, David B; Isom, Walter L
Subject: [DRAFT] Tank AY-102 Leak Assessment Briefing for Friday, October 17, 2012 ESRB Meeting

Sent per D. Little request, 2012-10-17.

Dennis

Dennis J. Washenfelder
Washington River Protection Solutions LLC
509-373-2641 Work
509-531-5386 Cell

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Tank AY-102 Leak Assessment

D. J. Washenfelder

October 19, 2012

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Purpose

- Review Tank AY-102 Formal Leak Assessment Results
- Request ESRB Concurrence with Tank AY-102 Leak Assessment Finding

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Leak Assessment Conclusion

- *Leak Conclusion*

  The source of radioactive material discovered in the tank AY-102 annulus near Risers 83 and 90 is a leak from the primary tank.

- *Probable Cause*

  Possible corrosion at high waste temperatures compounded by mechanical impacts to a tank whose waste containment margins had been reduced by construction difficulties.

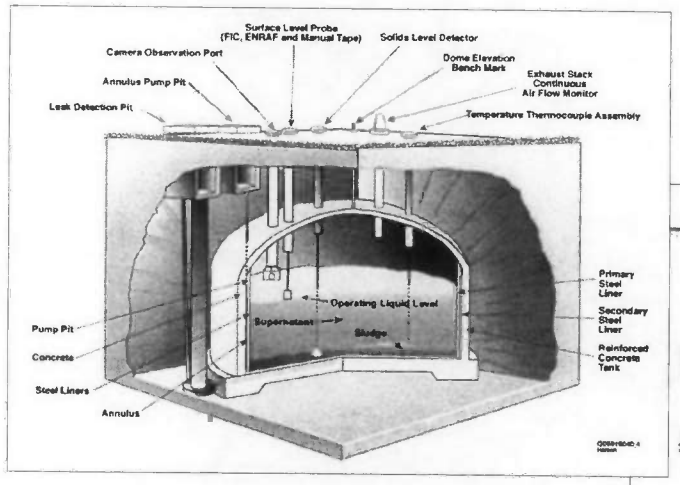
- *Estimated Leak Volume*

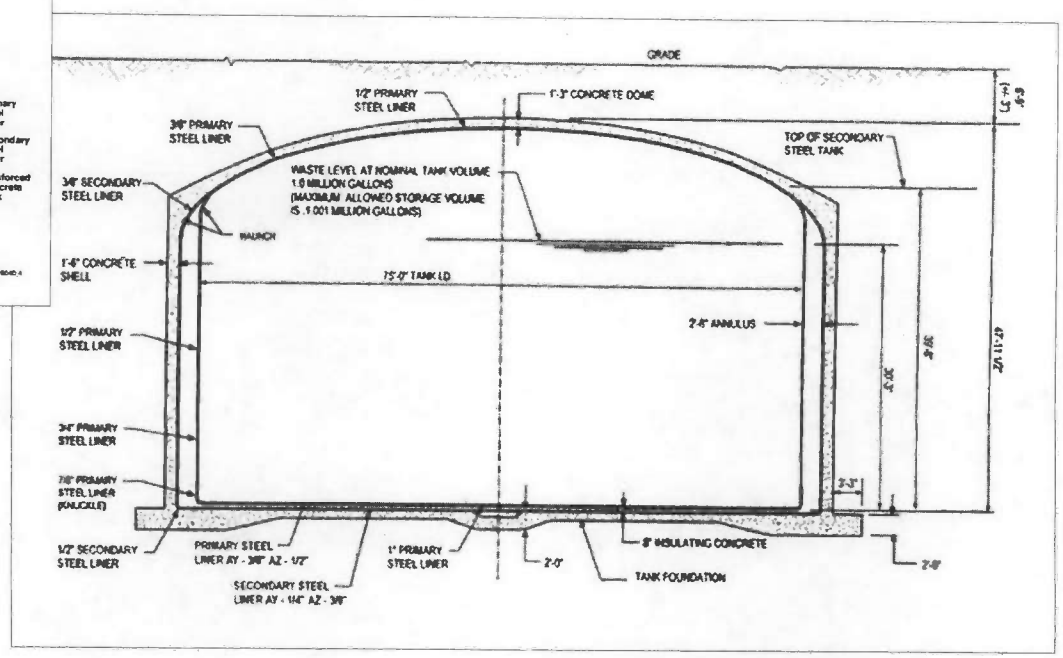
  190 – 670 gallons of waste liquid as of September 26, 2012 leaving ~ 40 – 70 gallons of dried material in the annulus.[1]

[1] Assumes 10:1 volume reduction for liquid to solid conversion for interstitial liquid in tank AY-102.

241-AY Double Shell Tank Cross-Section

- Tank AY-102 was the first double-shell tank constructed at Hanford





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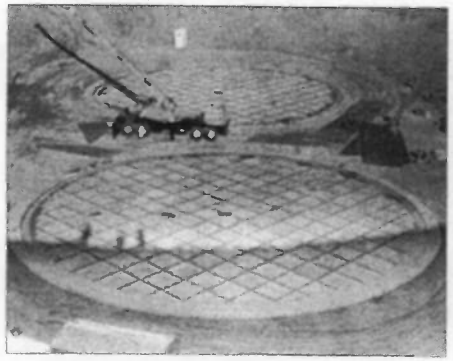
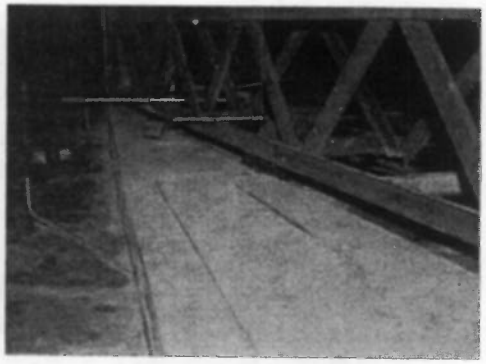
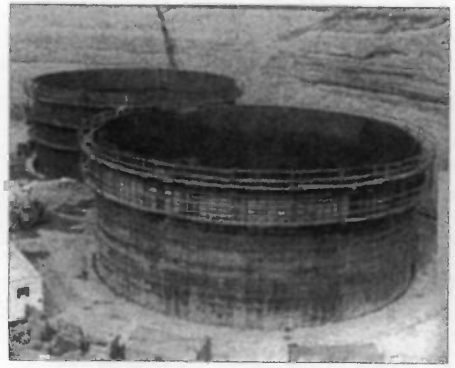
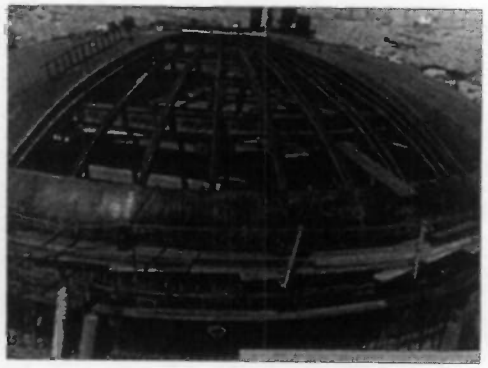
Construction Sequence





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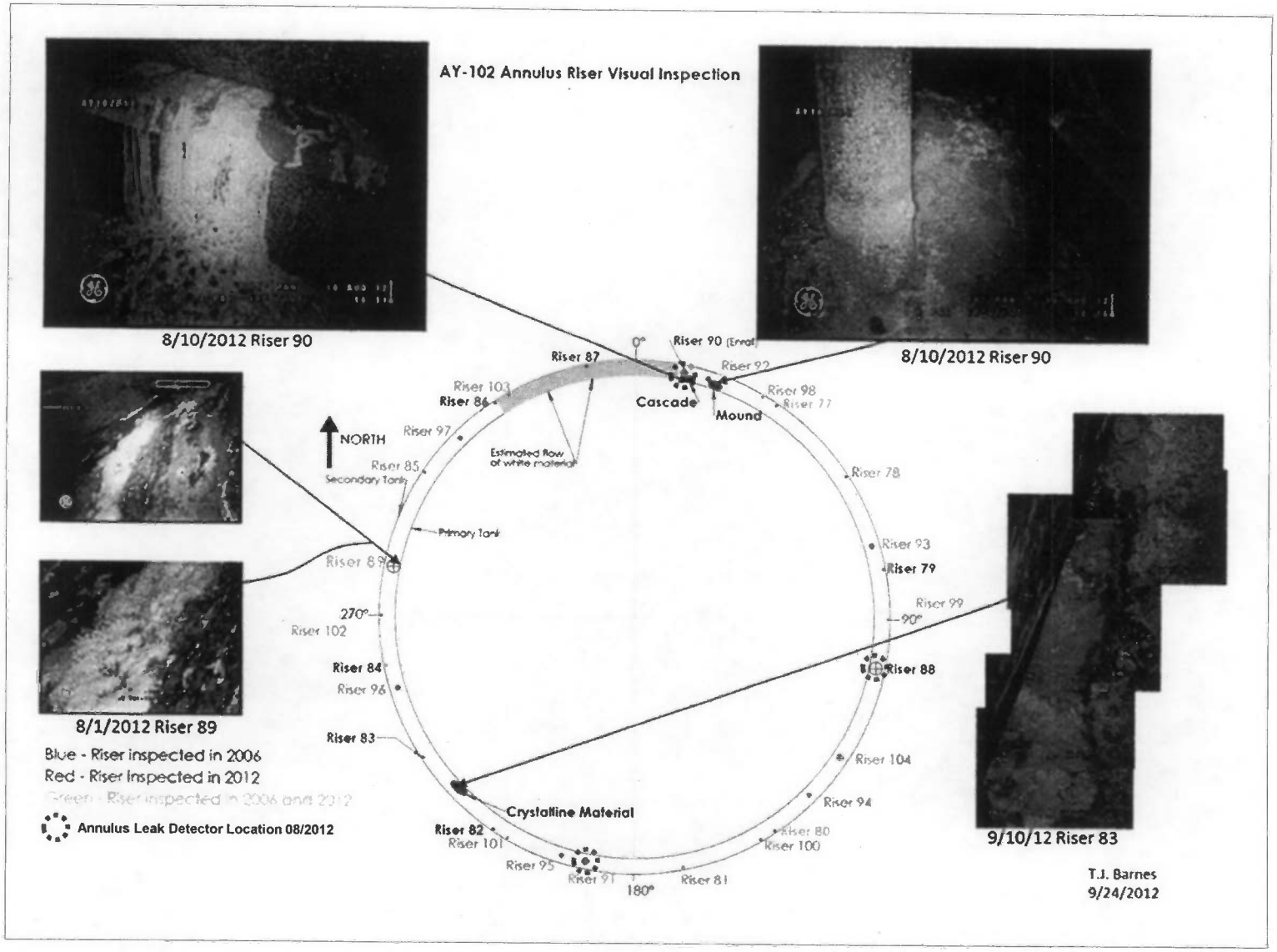
Leak Integrity Evidence

- Annulus Inspections
- Continuous Air Monitor Alarms
- Annulus Sample Results

Annulus Inspections: Sites with Found Material



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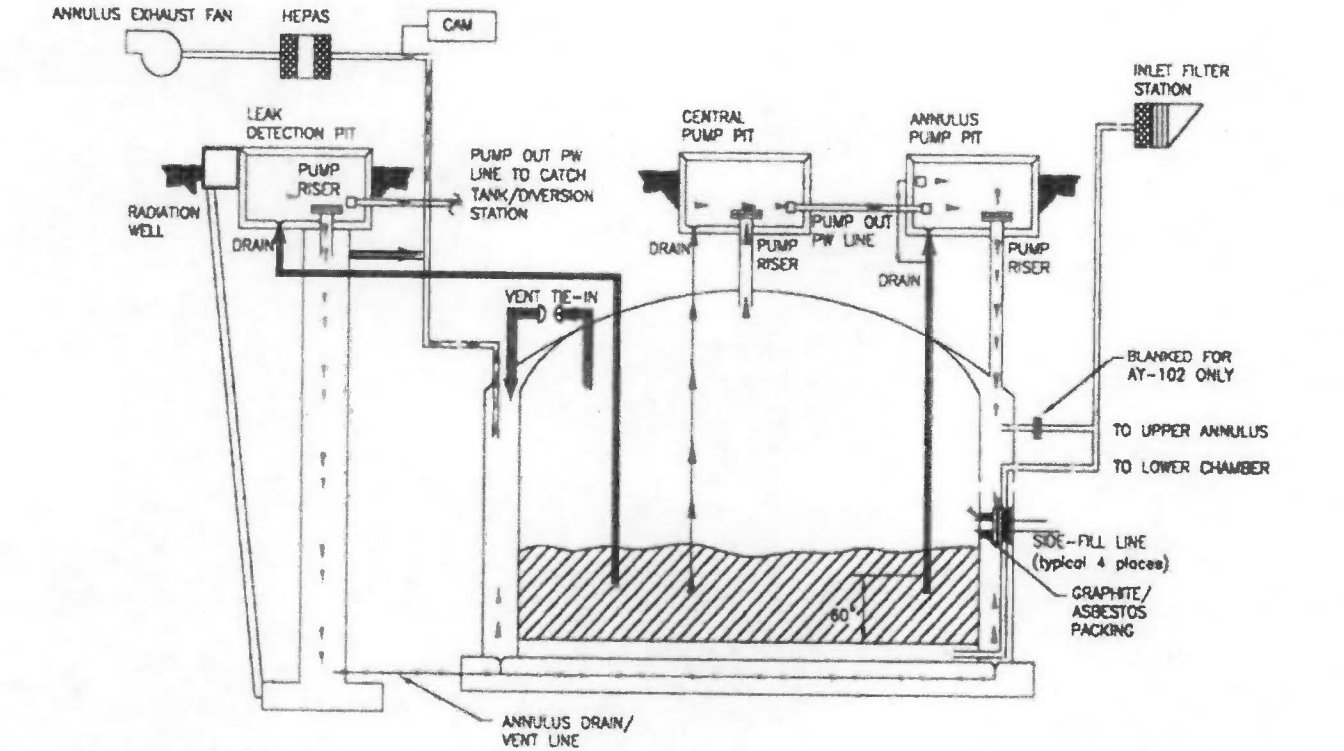
Continuous Air Monitor Alarms - I

- Source of CAM alarms and high filter paper counts historically assigned to legacy contamination from open drop legs in primary tank
  - Commonly associated with significant shifts in HVAC flow or primary tank – annulus pressure shifts
  - Smearable contamination 2,000 – 3,000 dpm/100 cm^2 in annulus pump pit typical
- Recent CAM alarms no longer associated with classic causes – changes in HVAC or uncovered drop legs
  - October 26, 2011: Alarm two days after flushing Riser 90 ENRAF
  - September 27, 2012: Alarm one day after annulus floor sampling

241-AY Double-Shell Tank Annulus and Leak Detection Pit Cross-Connections



PRIMARY TO ANNULUS VIA ANNULUS PUMP PIT

PRIMARY TO ANNULUS VIA CENTRAL PUMP PIT AND ANNULUS PUMP PIT

PRIMARY TO ANNULUS VIA LEAK DETECTION PIT AND ANNULUS VENT

CATCH TANK/DIVERSION STATION TO ANNULUS VIA LEAK DETECTION PIT AND ANNULUS VENT

PRIMARY TO ANNULUS VIA PRIMARY AND ANNULUS VENT TIE-IN

PRIMARY TO ANNULUS VIA SIDE-FILL LINE PACKING

PRIMARY TO ANNULUS VIA INLET FILTER STATION

POTENTIAL CROSS CONNECTIONS BETWEEN PRIMARY AND ANNULUS HEADSPACE

AGING WASTE FACILITY TANKS (TYPICAL)

Continuous Air Monitor Alarms - II

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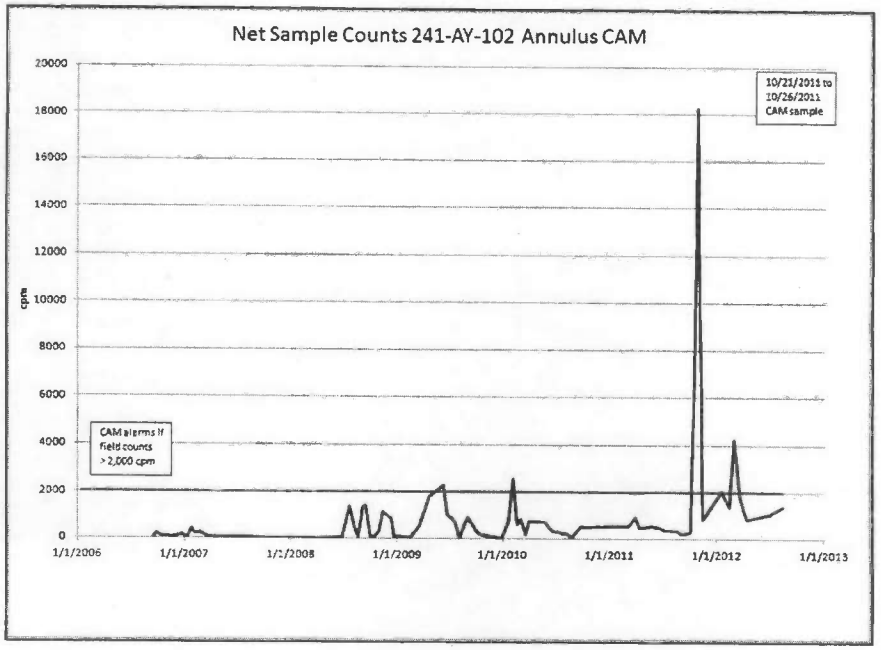
Elevated Tank AY-102 Annulus CAM Sample Results

Count Room Sample ID	Sample Number	Sample Collection Period (Date and Time)		Samples Activity (Net Counts)		Concentration	
		On	Off	α	β	α (μCi/cm³)	β (μCi/cm³)
CR11-02077	S875035	10/03/11	10/21/11	3	8657	2.7E-15	5.7E-12
CR11-02070	S875083	10/21/11	10/26/11	10	18270	3.1E-14	4.1E-11
CR12-00228	S889530	02/15/12	02/29/12	6	4233	6.9E-15	3.6E-12
CR12-01194	S904011	06/29/12	08/13/12	28	1370	1.1E-14	4.0E-13
CR12-01573	S905886	09/21/12	09/27/12	12	7734	3.60E-14	1.67E-11

Tank AY-102 Annulus CAM Results (October 26, 2011)

Sample CR12-02070	α μCi/mL	β μCi/mL	β ncpm
Initial	6.40E-13	4.32E-11	18,840
1 day decay	2.16E-13	4.22E-11	18,400
7 day decay	3.06E-14	4.14E-11	18,270



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Annulus Sample Results - I

- Annulus Floor Material near Riser 83, September 26, 2012:
  - 45 mR/hr "Window Open"
  - Principal Chemical Constituents: $NaNO_3$, Na_2CO_3, $NaNO_2$, KNO_3[1]
  - Principal Radionuclide Constituents: Sr-90, 0.120 µCi/gm; Cs-137, 90.9 µCi/gm (202 million disintegrations per minute per gram)
- Annulus Floor Material near Riser 90, August 10, 2012:
  - 800,000 dpm reading reported with detector near sample[2]

[1] In 1994, 4,000 gallons of KOH containing about 2,600 pounds of potassium were added to tank AY-102 to increase the pH. The tank AP-101 supernatant transferred into tank AY-102 in contained a significant potassium inventory. Tank AY-102 has second highest potassium inventory of any Hanford waste tank.

[2] Preliminary laboratory results from material collected near Riser 90 on October 15, 2012 are consistent with the results from the Riser 83 sample.

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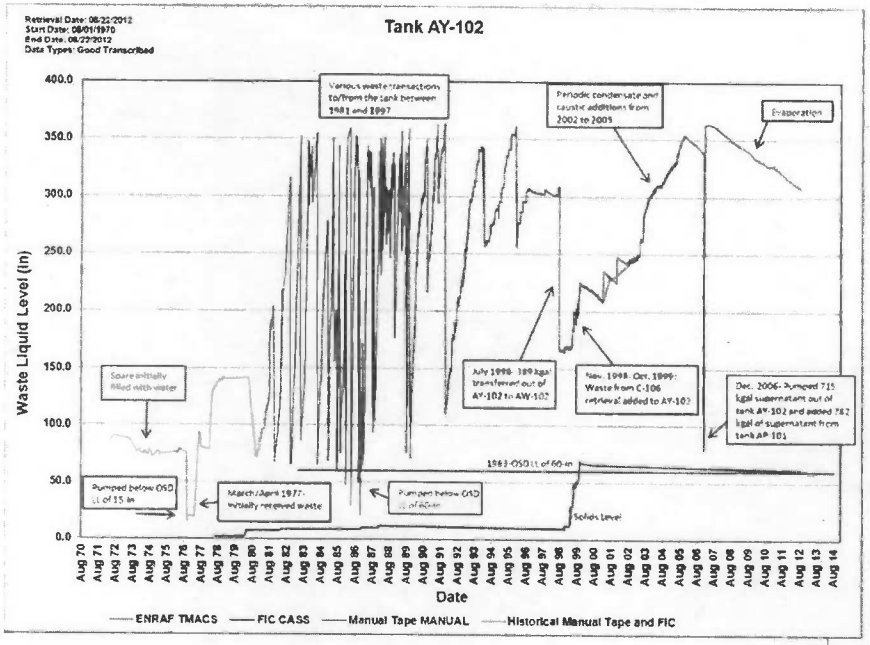
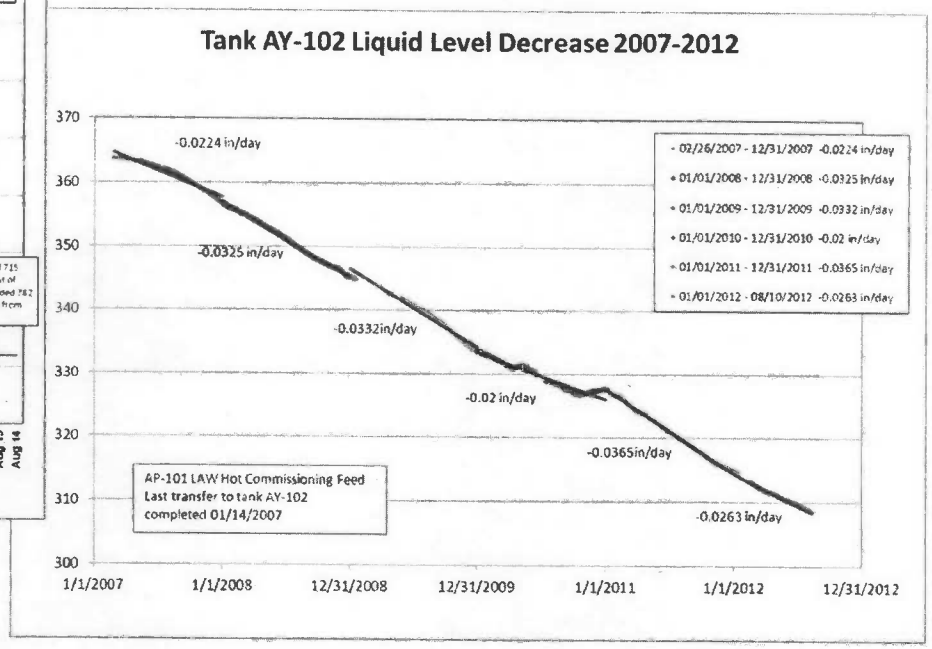
Corroborating Evidence of Leakage

Corroborating Evidence of Leakage	Yes	No
Liquid Level Changes		X
Chemistry	X	
In-Tank Corrosion Probe		X
Primary Tank Ultrasonic Wall Inspections		X
Waste Temperature		X
Tank Dome Deflection and Tank Settlement		X
Fill Cycle Fatigue		X
Tank Construction	X	

Liquid Level Changes





- Tank C-106 sludge retrieval during 1998 – 1999 increased the tank heat load by ~ 94,000 BTU/hr
- Since AP-101 transfer in 2007, evaporation rate has averaged ~ 77 gal/day, or ~ 28,000 gal/year
- **A small, episodic leak could occur undetected inside the evaporation rate**

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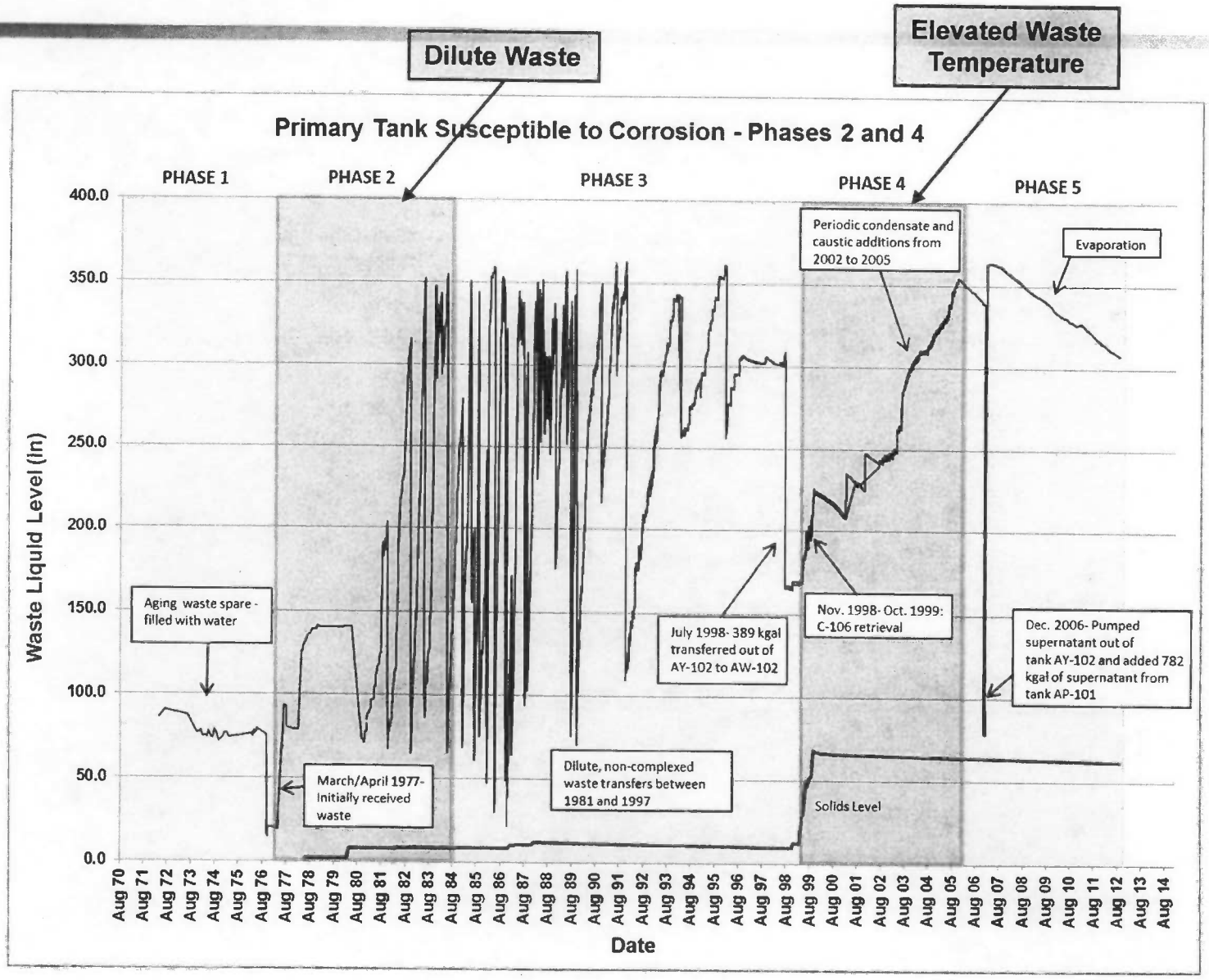
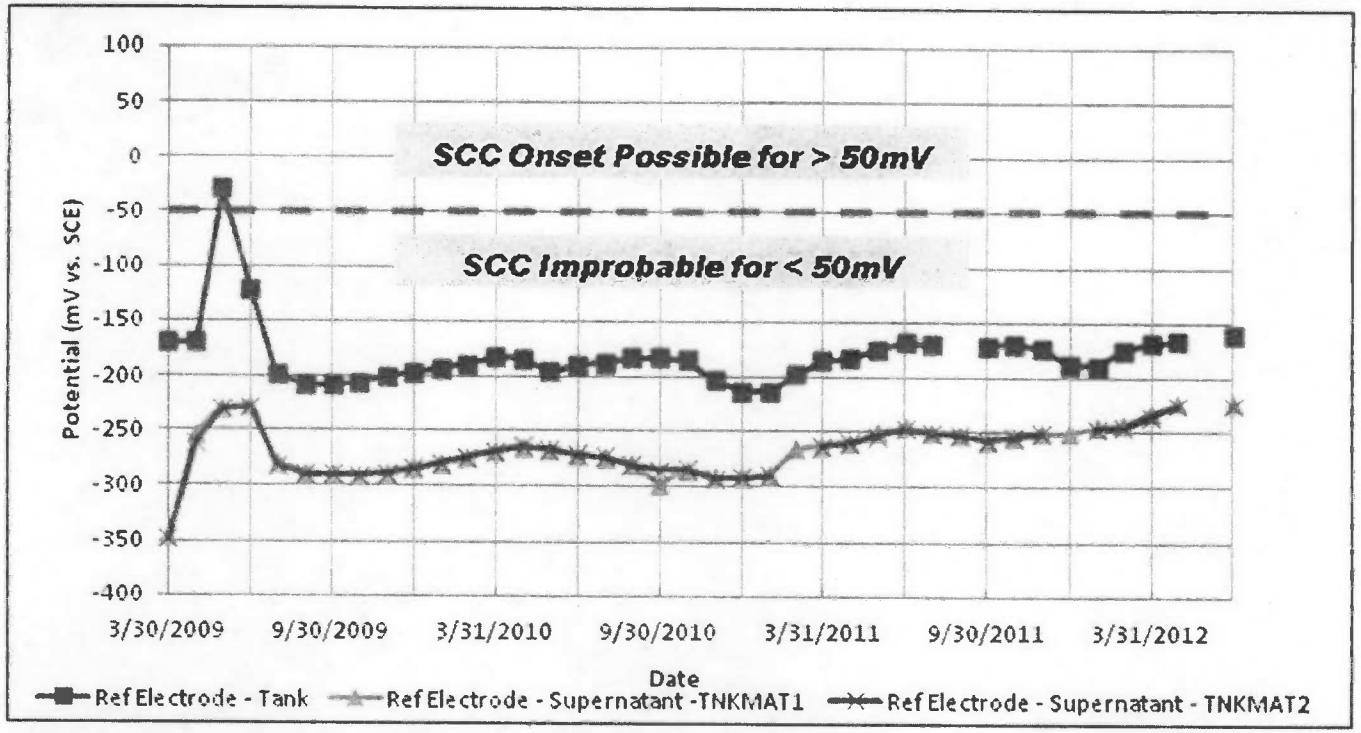
Chemistry

- Parameters influencing corrosion of carbon steel liner:
  - Aggressive ions (Nitrate, Carbonate, Chloride)
  - Inhibitory ions (hydroxide and nitrite)
  - Temperature
- Two main corrosion concerns for Hanford waste types:
  - Stress Corrosion Cracking in presence of high nitrate ion or carbonate ion concentrations
  - Pitting Corrosion in presence of nitrate or chloride ion concentrations
- Five chronological chemistry phases based on susceptibility to corrosion
  - The first solids layer deposited in tank AY-102 in 1979 – 1984 ("Phase 2") may have the characteristics which cause corrosion when subjected to higher temperatures experienced after 1999 ("Phase 4").

Chemistry (cont.)



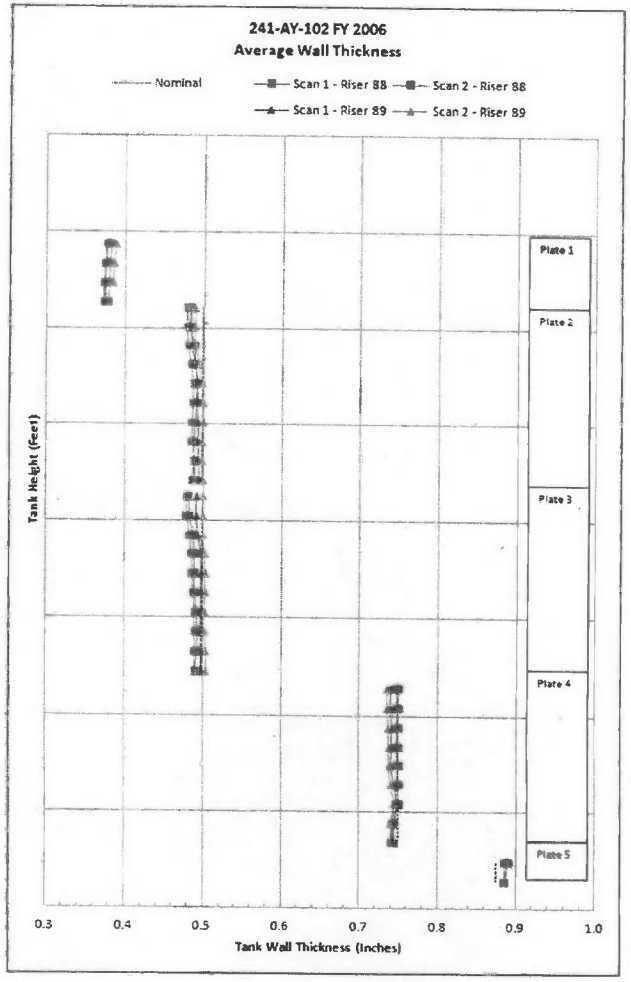
In-Tank Corrosion Probe



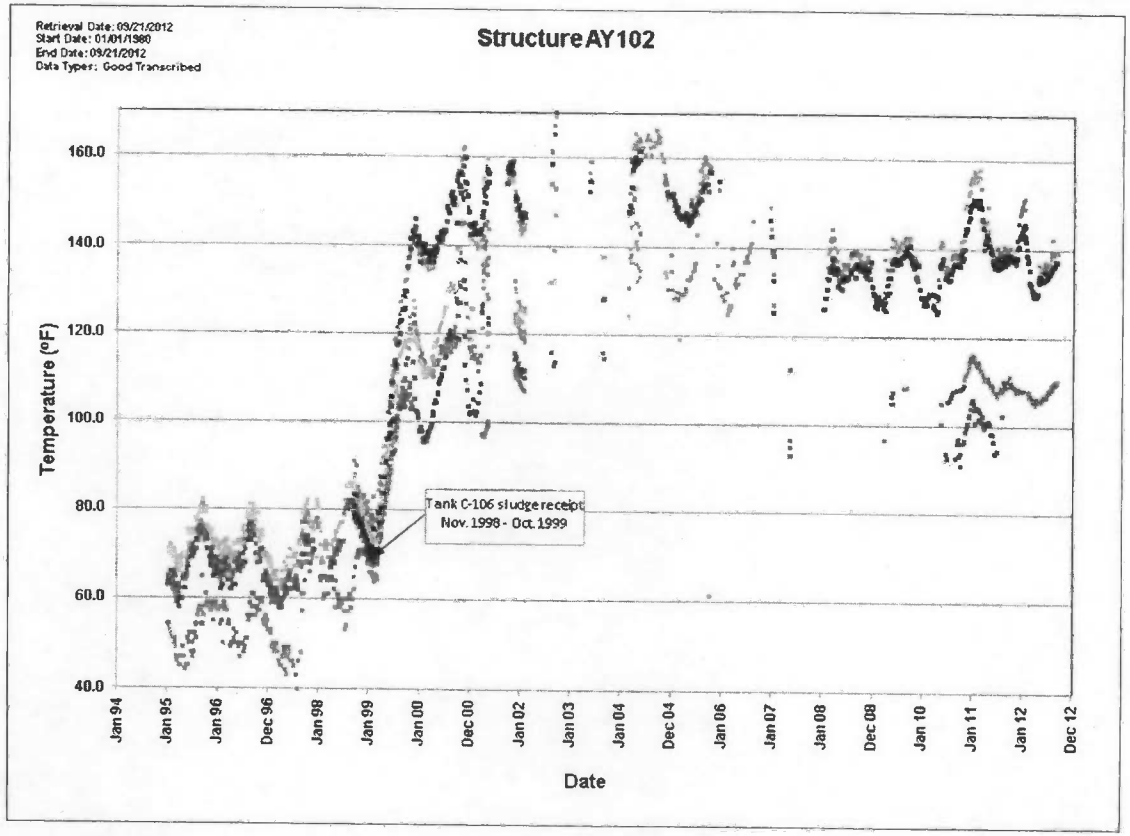
- Installed in March, 2009
- Electrodes located in supernatant and sludge layers and vapor space
- Sludge electrodes failed during corrosion probe installation. No readings are available.

Primary Tank Ultrasonic Wall Inspections

- In 2006 vertical scan pairs were completed in Risers 88 and 89 on surfaces
- **No significant primary tank wall loss has been detected by ultrasonic wall thickness scans**

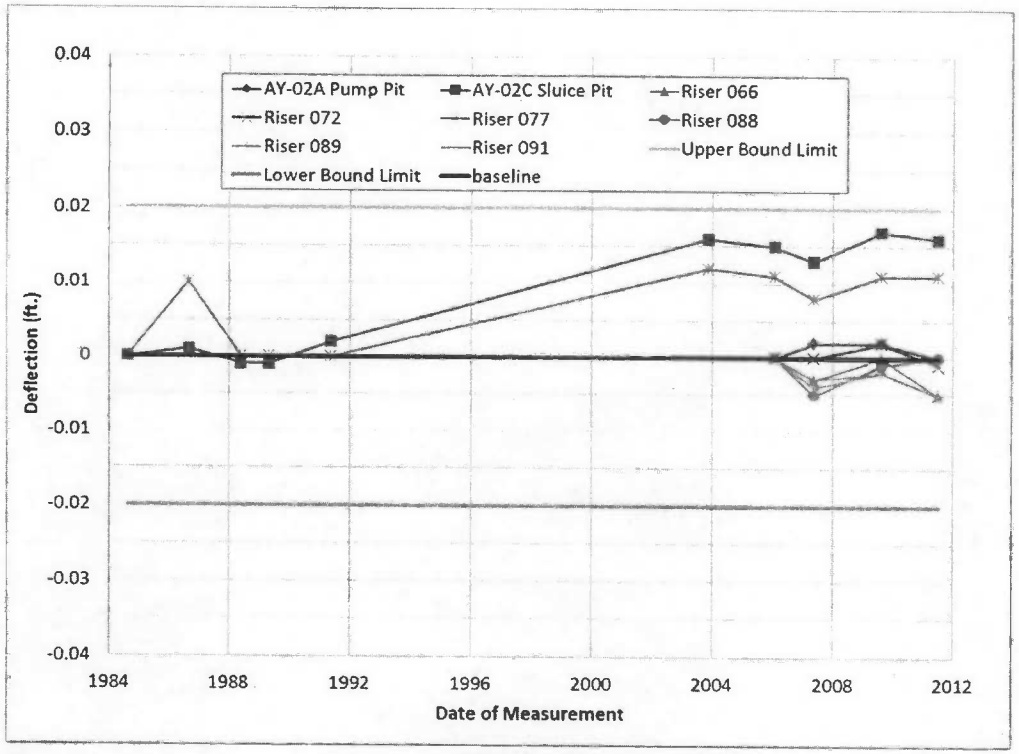


Waste Temperature



- Tank design and structural modeling temperature was 350°F; operating limit is 260°F
- From available records, highest waste temperature recorded is ~189°F in the sludge
- **Waste temperatures have been well within analyzed and allowable limits.**

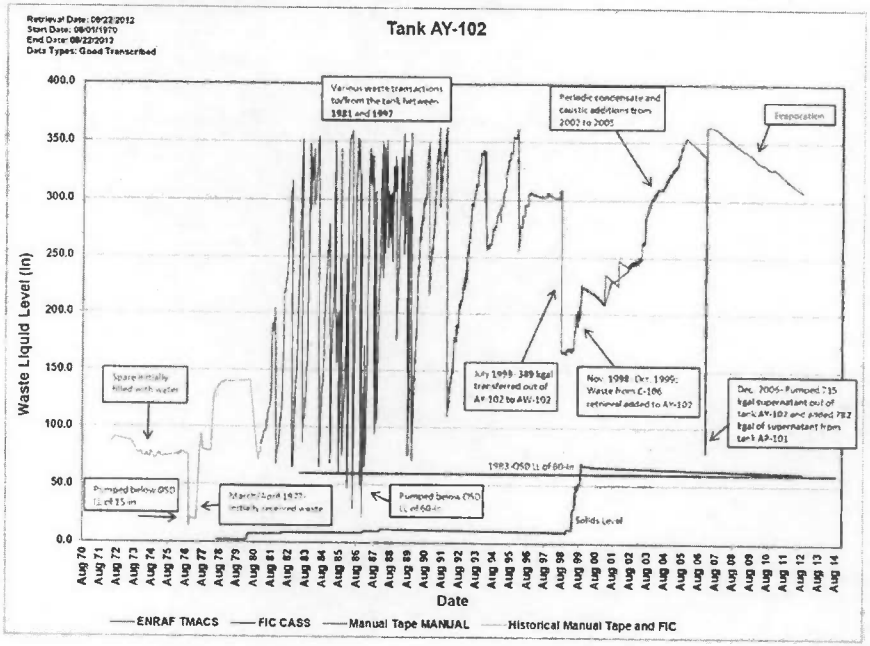
Tank Dome Deflection and Tank Settlement

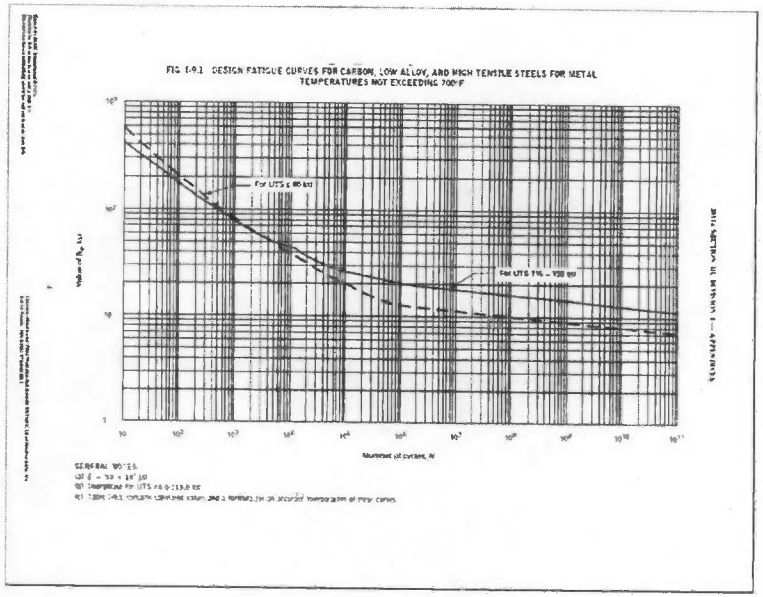


- Eight benchmarks in use – two with data since 1984 and six new benchmarks first recorded in 2006
- Dome deflections up to 0.5-inches (~ 0.04-feet) are within load limits[1]
- Survey data show a maximum dome deflection of < 0.02-feet since record keeping began
- **No evidence of dome deflection or tank settlement.**

[1]RPP-25782, *DST Dome Survey Program, and* RPP-RPT-25608, *Hanford Double-Shell Tank Thermal and Seismic Project- Increased Concentrated Load Analysis*

Fill Cycle Fatigue





- Cycle Fatigue evaluated in 1968 after structural modeling identified a region of the primary tank dome predicted to exceed minimum tensile stress.
- **Using ASME Section III Division I cycle fatigue guidance, safe cycles estimated to be 17,600**
- Backcheck using 2008 structural model results and 2010 version of code indicates ~ 25,000 safe cycles[1]

[1]ASME Section III Division 1 *Rules for Construction of Nuclear Facility Components*, Appendices, Figure I.9-1 "Design Fatigue Curves for Carbon, Low Alloy, and High Tensile Steels for Metal Temperatures not Exceeding 700°F," and RPP-RPT-28968, Rev. 1, *Hanford Double-shell Tank Thermal and Seismic Project – Summary of Combined Thermal and Operating Loads with Seismic Analysis*

Tank Construction (Highlights)

- Tank Construction Difficulties
  - Secondary Liner Warpage
  - Refractory Concrete Cracking
  - Primary Tank Bottom Weld Rejection
  - Primary Tank Bottom Placement Refractory Concrete Depth Implications
  - Insulating Refractory Damage during Stress Relief and Hydrostatic Test of Primary Tank
  - Gaps beneath Primary Tank and Insulating Refractory

Welding of Tank AY-102 Secondary Tank Bottom (8051-1-Photo)

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Tank Construction (cont.)

- Secondary Liner Warpage
  - Use of thin ¼-inch plates complicated by work in extreme cold (-20°F to -10°F) caused liner warpage . As plates were preheated and welded, convex bulges and wrinkles appeared.
  - Flame heating and water fast quench partially eliminated wrinkles. But when plates were heated by the sun new wrinkles appeared. These did not disappear as temperatures chilled.
  - February, 1969 survey found 22 liner locations exceeding allowable 2-inch convexity. Root-to-crown slopes up to1-inch per foot were present, exceeding allowable 3/8-inch per foot.
  - These were eventually accepted for placement of the insulating refractory.

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Tank Construction (cont.)

- Primary Tank Bottom Weld Rejection
  - Weld quality was a continuing concern. The floor plate weld rejection rate was ~ 36%.[1] Many welds were repaired several times before passing radiography.
  - The radiography inspector accepted welds that were later rejected by the quality inspector.[2]

[1] By comparison the weld rejection rate for concurrent waste tank construction at the Savannah River Site was 10% - 20% (*Savannah River Plate Waste Tank Discussions and ITT Stress Analysis Study*, Trip Report); the weld rejection rate on AY-101 was 10%.
[2] Of 343 rejected floor plate welds, the inspector found only 294.

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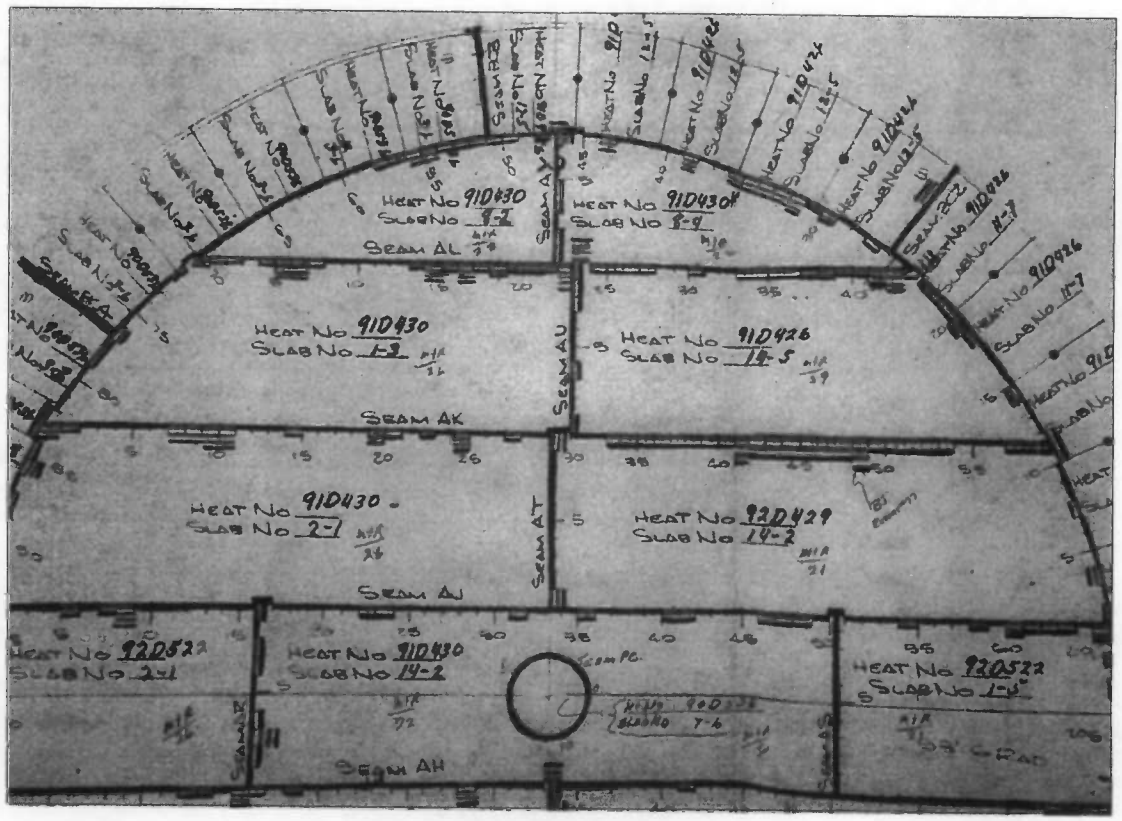
Tank Construction (cont.)



Primary Tank Bottom Plate Weld Map for northern section of tank showing rejected welds in red, and accepted welds in blue. The weld map shows instances of welds being repaired several times before passing inspection.

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Tank Construction (cont.)

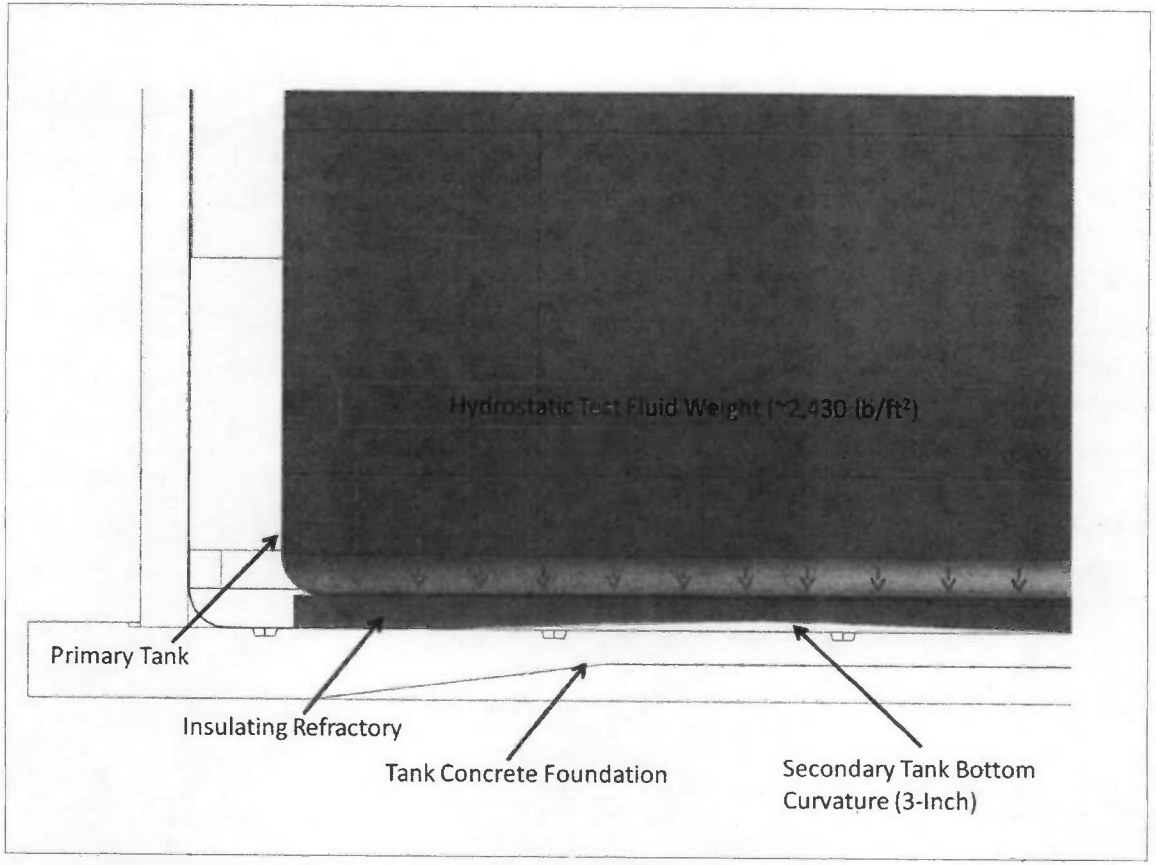
- Insulating refractory damage from stress-relief and hydrostatic test of primary tank
  - Full depth cracks ¼-inch wide extending several feet
  - Spongy top surface; affected depth increased as outer lip approached
  - Air passages blocked with spalled refractory
  - No evidence of tank settlement
  - Thought to result from skin friction as primary tank expanded and contracted across surface of refractory concrete pad during stress-relief, and "oil-canning" of the tank on the outside perimeter of the pad

Tank Construction (cont.)

Preparing Insulating Refractory for modification with use of reinforced concrete

Tank AY-101 Primary Tank Gap over Insulating Refractory (52788-8-Photo). Gaps in Tank AY-102 were reported to be larger.

Summary Effect of Construction Difficulties



Tank Configuration with 3-Inch Secondary Tank Convex Bottom Curvature during Hydrostatic Test.

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Probable Leak Cause

- ***Possible corrosion at high waste temperatures compounded by mechanical impacts to a tank whose waste containment margins had been reduced by construction difficulties.***

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Probable Leak Cause (cont.)

- During 1977 – 1979 and 1983 – 1984 waste with insufficient $NaNO_2$ corrosion inhibitor probably came into contact with tank bottom. The corrosion situation was exacerbated by introduction of high-temperature tank C-106 sludge during 1998-1999.
- Secondary floor liner bulges and primary tank post-stress relief condition created untenable performance demands for insulating refractory and primary tank bottom.
- In 2005, a 125 pound drill string was dropped 27-feet through the waste. Recent inspection photos show the 33-foot long drill string still held upright by 60-inches of waste.
- In 2009 the corrosion probe repeatedly contacted the tank bottom during insertion.

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Estimated Leak Volume – Liquid Basis

- **Liquid Leak Volume Range:**
  - Insulating refractory air channels only, and floor material near Risers 83, Riser 87 – 90 including mound = **~ 190 gallons**[1]
  - Saturated Insulating Refractory 10° Wedge at Riser 90, 5° Wedge at Riser 83, and floor material near Risers 83, 87 – 90 including mound = **~ 670 gallons**
- Assumptions:
  - Refractory concrete absorbs up to 80% liquid by weight[1]
  - 10° Wedge from tank center to perimeter involved, encompassing two air slots and 80 weight% absorption[2] of 1.15 SpG waste by refractory concrete = 300 gallons
  - Floor material between Riser 90 and Riser 87, including cascade over insulating refractory retaining ring, 0.25 inches thick x 21 inches wide x 25 feet long and 10:1 liquid:solid evaporation reduction = ~ 70 gallons
  - Mound near Riser 90, 8 inches thick x 1.5 feet wide x 2 feet long and 10:1 liquid:solid evaporation volume reduction = ~ 150 gallons
  - Floor material below Riser 83, 0.5 inches thick x 6 inches wide x 22-inches long and 10:1 liquid:solid evaporation volume reduction = ~ 3 gallons

[1] Assumes waste drainage filled only the refractory air channel leading to annulus without wetting surrounding material. Volume is about 6 gallons of dried waste per channel for shortest pathway (60 gallons of liquid per channel, using 10:1 liquid:solid reduction).
[2] ARH-1833, *Investigation of the 241-AY Insulating Refractory Task Force* Report, page 6 (Attachment G of RPP-19097 *Evaluation of Insulating Concrete in Hanford Double Shell Tanks*)

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Estimated Leak Volume – Dry Basis

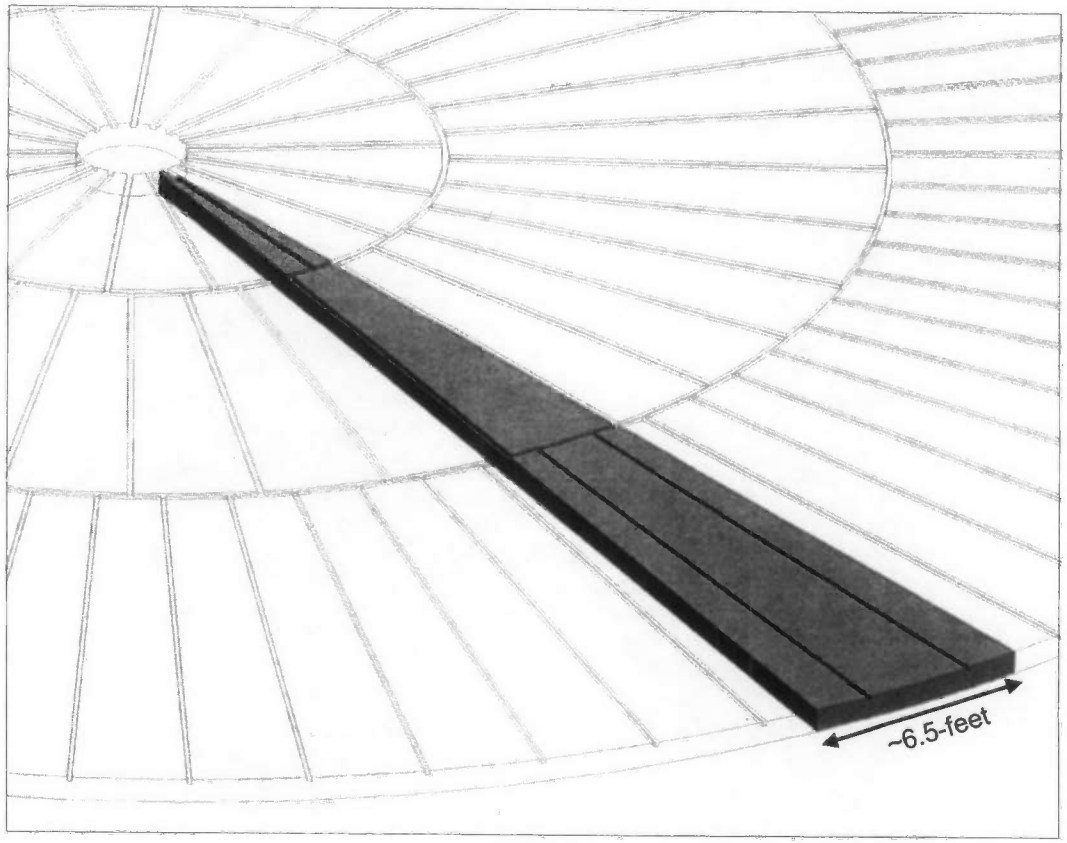
- **Dry Leak Volume Range:**
  - Insulating refractory air channels only, and floor material near Risers 83, Riser 87 – 90 including mound = **~ 40 gallons**[1]
  - Saturated Insulating Refractory 10° Wedge at Riser 90, 5° Wedge at Riser 83, and floor material near Risers 83, 87 – 90 including mound = **~ 70 gallons**
- Assumptions:
  - Refractory concrete absorbs up to 80% liquid by weight[1]
  - 10° Wedge from tank center to perimeter involved, encompassing two air slots and 80 weight% absorption[2] of 1.15 SpG waste by refractory concrete = 30 gallons
  - Floor material between Riser 90 and Riser 87, including cascade over insulating refractory retaining ring, 0.25 inches thick x 21 inches wide x 25 feet long and 10:1 liquid:solid evaporation reduction = ~ 7 gallons
  - Mound near Riser 90, 8 inches thick x 1.5 feet wide x 2 feet long and 10:1 liquid:solid evaporation volume reduction = ~ 15 gallons
  - Floor material below Riser 83, 0.5 inches thick x 6 inches wide x 22-inches long and 10:1 liquid:solid evaporation volume reduction = ~ 0.3 gallons

[1] Assumes waste drainage filled only the refractory air channel leading to annulus without wetting surrounding material. Volume is about 6 gallons of dried waste per channel for shortest pathway

[2] ARH-1833, *Investigation of the 241-AY Insulating Refractory Task Force* Report, page 6 (Attachment G of RPP-19097 *Evaluation of Insulating Concrete in Hanford Double Shell Tanks*)

Estimated Leak Volume – 10° Wedge

- Photographs below Riser 90 suggest two air distribution channels may contain material
- The occupied floor area below Riser 83 suggests a single channel could be involved



Tank AY-102 Leak Assessment Completion Activities

ESRB Review and Concurrence with Leak Assessment Results:

Recommendation: Leak Integrity Status of Tank AY-102 be changed from "Sound" to "Assumed Leaker"

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Additional Information

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Additional Information

- Tank Construction (17 slides)
- Tank AY-102 Myths
- Formal Leak Assessment Process
- Leak Assessment Leak – No-Leak Hypotheses

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Tank Construction - I

- First-of-a-Kind Construction at Hanford
  - Secondary Liner Warpage
  - Insulating Refractory Cracking
  - Primary Tank Bottom Plate Weld Rejection
  - Primary Tank Bottom Placement Insulating Refractory Thickness Implications
  - Insulating Refractory Damage from Stress Relief and Hydrostatic Testing of Primary Tank
  - Gaps beneath Primary Tank and Insulating Refractory

Welding of Tank AY-102 Secondary Tank Bottom (8051-1-Photo)

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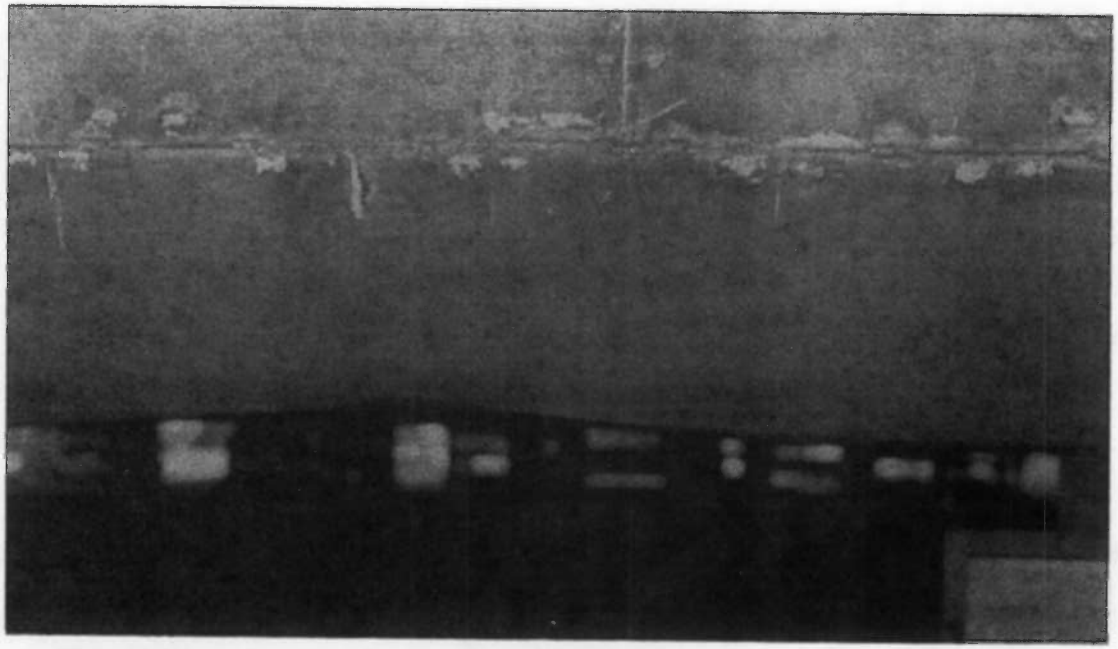
Tank Construction - II

- Secondary Liner Warpage
  - Use of thin ¼-inch plates complicated by work in extreme cold (-20°F to -10°F) caused liner warpage . As plates were preheated and welded, convex bulges and wrinkles appeared.
  - Flame heating and water fast quench partially eliminated wrinkles. But when plates were heated by the sun new wrinkles appeared. These did not disappear as temperatures chilled.
  - February, 1969 survey found 22 liner locations exceeding allowable 2-inch convexity. Root-to-crown slopes up to1-inch per foot were present, exceeding allowable 3/8-inch per foot.
  - These were eventually accepted for placement of the insulating refractory.

Tank Construction - III



Example of Warped Secondary Tank Bottom Knuckle (8074-Photo)

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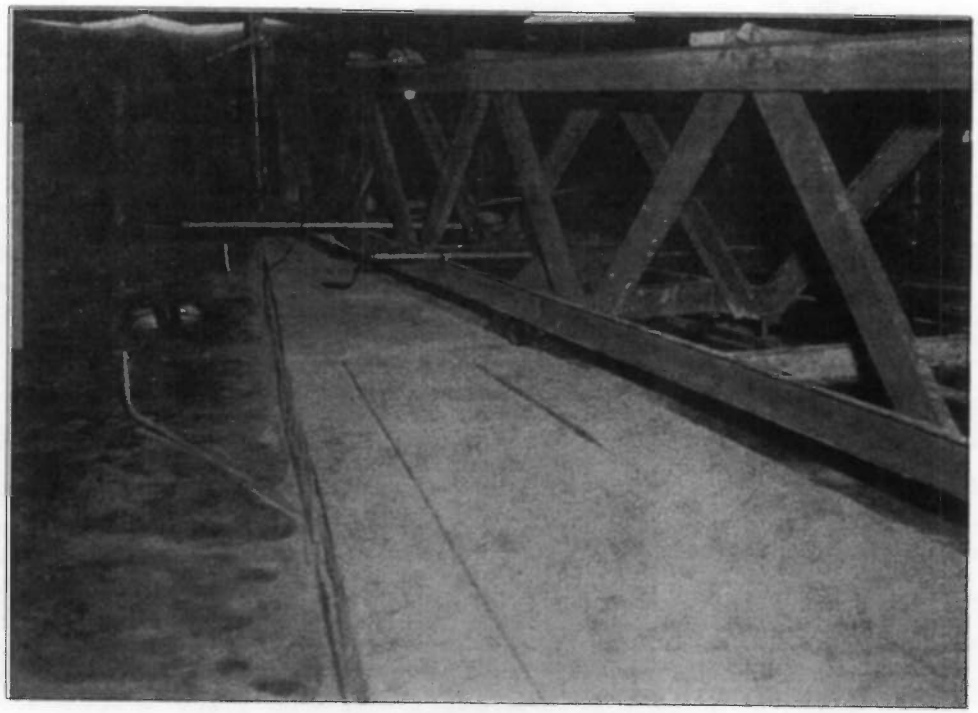
Tank Construction – IV

- Insulating Refractory Placement on Secondary Liner
  - The insulating refractory pad is sandwiched between the bottom of the primary tank and the secondary liner. It supports the primary tank, and protects the structural concrete foundation under the secondary liner from high-temperature damage from the tank contents.
  - The required minimum depth was 5-inches. The actual minimum depth was 7-inches.
  - Cracks 1 to 2-inches deep and up to 7-feet long appeared in cured refractory as pours continued. These were blamed on flexing of the secondary liner from movement of the bulges.
  - The cured surface was not flat or level in some locations. In March, 1969, 25 locations were identified with variations up to 1-1/4-inches between the high points and low points. These were corrected.

Tank Construction - V



Completion of Insulating Refractory Section Pour (8118-Photo)

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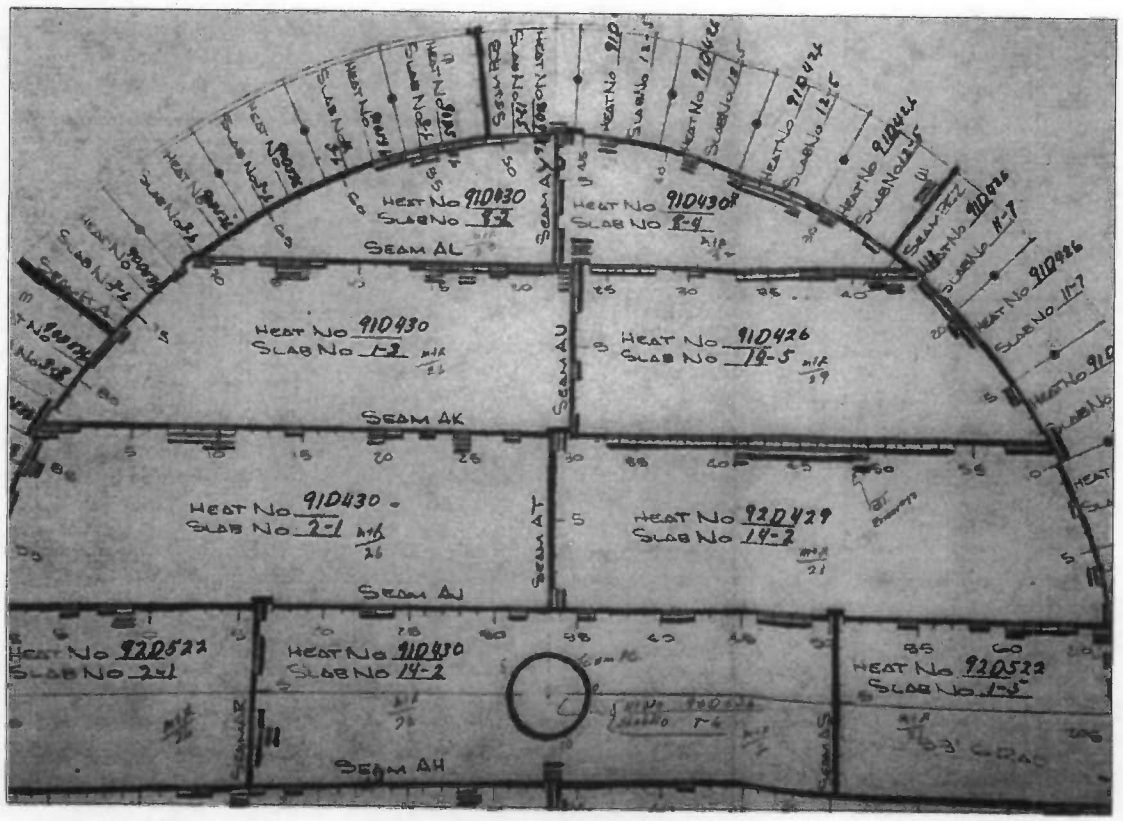
Tank Construction - VI

- Primary Tank Bottom Weld Rejection
  - Weld quality was a continuing concern. The floor plate weld rejection rate was ~ 36%.[1] Many welds were repaired several times before passing radiography.
  - The radiography inspector accepted welds that were later rejected by the quality inspector.[2]

[1] By comparison the weld rejection rate for concurrent waste tank construction at the Savannah River Site was 10% - 20% (*Savannah River Plate Waste Tank Discussions and ITT Stress Analysis Study*, Trip Report); the weld rejection rate on AY-101 was 10%.
[2] Of 343 rejected floor plate welds, the inspector found only 294.

Tank Construction - VII



Primary Tank Bottom Plate Weld Map for northern section of tank showing rejected welds in red, and accepted welds in blue. The weld map shows instances of welds being repaired several times before passing inspection.

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Tank Construction - VIII

- Insight: Primary Tank Bottom Placement Change
  - Centering cleats were welded to the underside of the primary tank bottom and used to center the bottom on the insulating refractory pad as it was lowered into place.
  - The cleats acted as guide pins engaging the metal walls of the circular annulus air distribution chamber welded to the secondary liner at the tank center.
  - The intended engagement was 2 ¾ -inches. Allowing for nominal 8-inch insulating refractory pad, and the 7 ¾ -inch height of the distribution chamber wall, the cleats were 3-inches long.
  - A design change increased the length of the cleats to 5-inches. The increase was to ensure the intended 2-3/4-inch engagement was preserved after the insulating refractory pad was poured. This design change suggests that ***the pad at the center of the tank must have been about 10-inches thick***.
  - With a 10-inch thick pad, and the 7-inch minimum insulating refractory thickness revision, the implication is that ***secondary liner bulges up to 3-inches high were present after fabrication.***

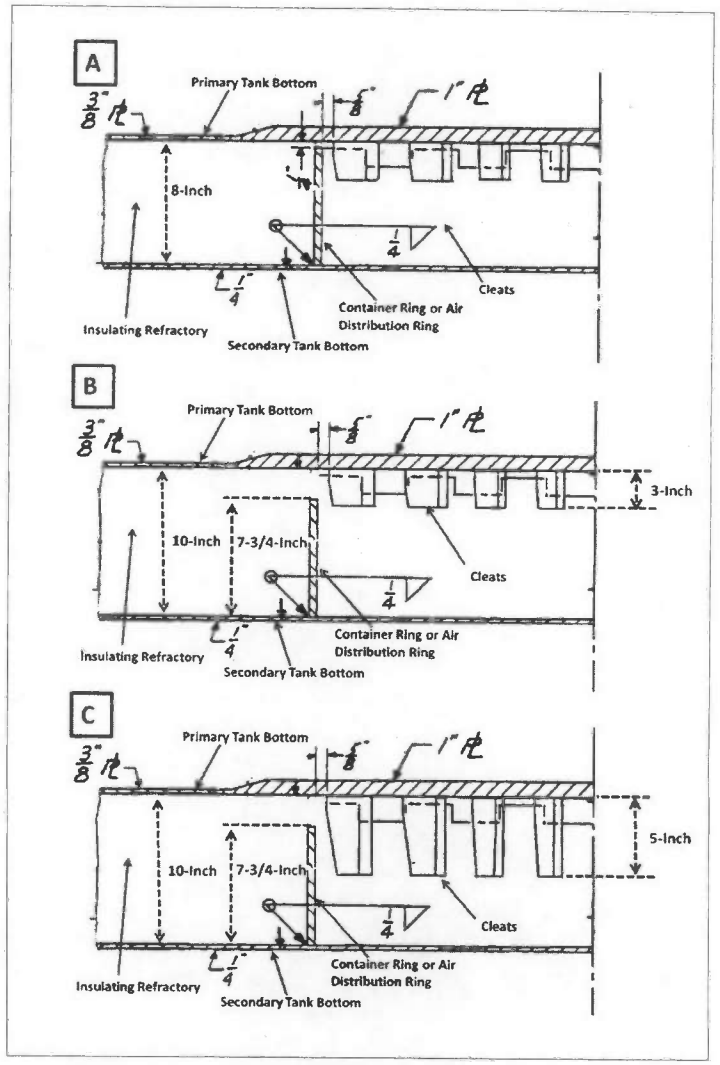
Tank Construction - IX

Primary Tank Centering Cleat Change

A The cleats' intended engagement was of the 3-inch centering cleats was 2 ¾ -inches (2 ¾-inches = 3 inches – [8-inch thick refractory pad – 7 ¾-inch high air distribution chamber]).

B The required minimum depth of the insulating pad was 5-inches. The actual minimum depth was 7-inches. The contractor had poured a 10-inch pad instead of an 8-inch pad to ensure minimum coverage of secondary liner bulges. The change reduced the cleat engagement from 2-3/4 -inches to ¾ -inch.

C The cleats' length was increased from 3-inches to 5-inches to restore the intended 2 ¾ -inch engagement.



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Tank Construction - X

- Implication of 10-Inch Thick Insulating Refractory at Center of Tank
  - Nominal thickness of refractory pad was originally specified as 8-inches, with 5-inch minimum.
  - Photographs of the 6-1/2-inch high refractory pad metal retaining ring show that the repaired portion of the pad varied between ~ 8-inches and ~ 10-inches.[1]
  - If the center of the insulating refractory pad was 10-inches thick, and the outside edge 8-inches to 10-inches thick, then it is possible that the bottom of the primary tank was "oil-canned" as it followed the contour of the pad.[2]

[1] The refractory was damaged during relief and the outside 21-inches of the pad were removed and replaced with structural concrete. It is possible that the apparent difference in pad thickness at the edge is the result of excess concrete being piled against the tank knuckle during placement, rather than actual variation in the pad's thickness.

[2] During removal of the insulating refractory, gaps between the primary tank and refractory concrete were noticed further under the tank. The gaps suggest that the primary tank was raised off the refractory concrete in some locations. The gaps were stuffed with pieces of Styrofoam when they were found.

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Tank Construction - XI

- Insulating Refractory Damage from Stress Relief and Hydrotest of Primary Tank - I
  - Prior to stress relief rain water accumulated in the annulus saturating the insulating refractory pad
  - For the first two days of attempted stress relief, tank temperature could not be raised above 210°F as steam escaped from the refractory concrete[1]
    - Recommended drying regime was 150°F for two weeks before proceeding with stress relief[2]
  - During stress relief thermal expansion increased tank diameter by ~ 7-inches[3]

[1] By contrast tank AY-101 PWHT temperature was 500°F after 4-1/2 hours.
[2] *Savannah River Plant Waste Tank Discussions and ITT Stress Analysis Study* (Trip Report)
[3] *Stress Relief of Primary Steel Tank – Tank 102* (Vitro – HES Quality Assurance Report , October 2, 1969)

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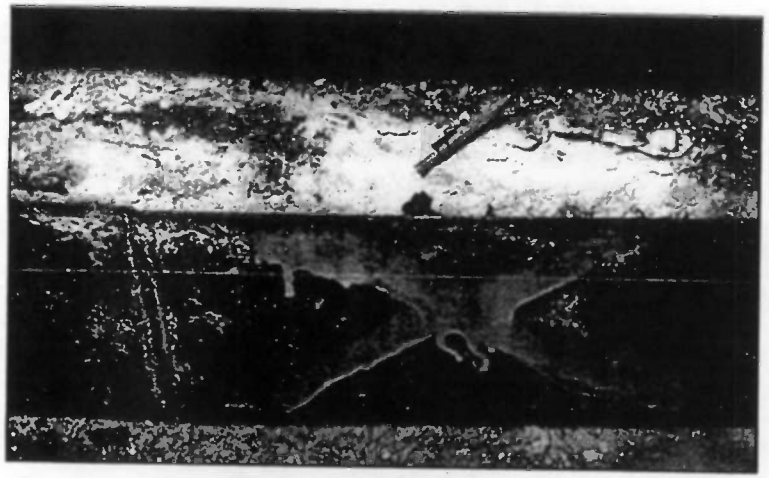
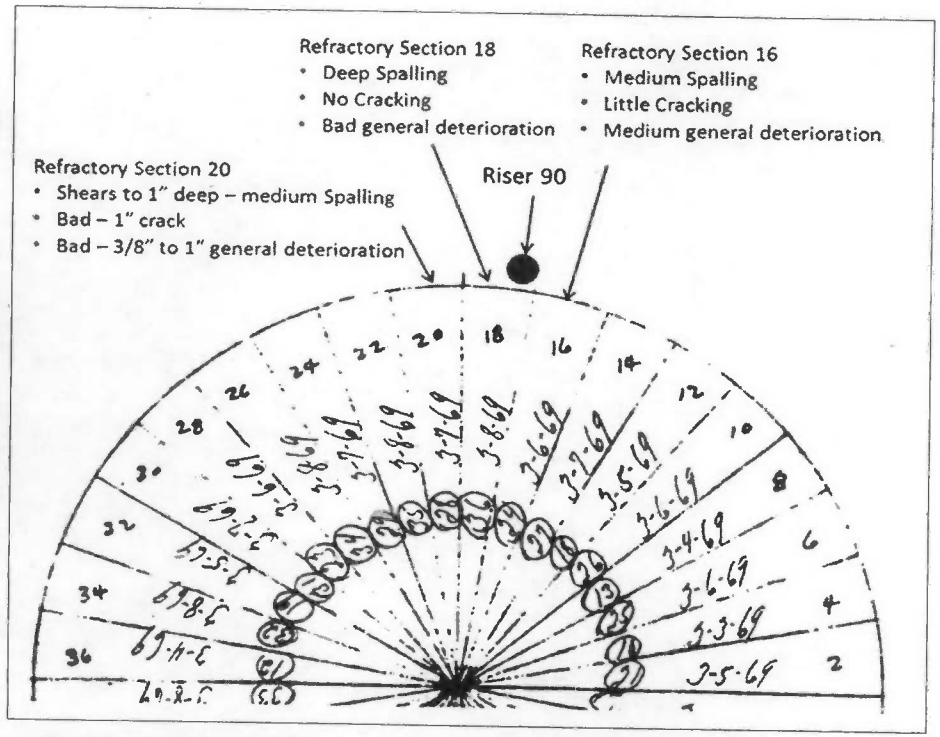
Tank Construction - XII

- Insulating Refractory Damage from Stress Relief and Hydrotest of Primary Tank - II
  - Full depth cracks ¼-inch wide extending several feet
  - Spongy top surface; affected depth increased as outer lip approached
  - Air passages blocked with spalled refractory
  - No evidence of tank settlement
  - Thought to result from skin friction as tank expanded and contracted across the surface of the insulating refractory pad, and "oil-canning" of the tank on the outside perimeter of the pad

Tank Construction - XIII



Damaged Insulating Refractory viewed from the Annulus. Dark Band is Metal Retaining Ring



As-Found Condition of Insulating Refractory after Stress Relief and Hydrostatic Test Near Riser 90.

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Tank Construction - XIV

- Damaged Insulating Refractory Replacement
  - Structural analysis determined tank could tolerate 6-inches of knuckle support loss
  - Depth of friable insulating refractory surface varied from ¾-inches to 1¼ -inches and had no compressive strength.[1] At least one location was "punky" showing no measurable strength.[2]
  - Decision made to replace outer 21-inches with structural concrete
  - Inspections following insulating refractory removal found ***gaps between the refractory surface and the primary tank bottom as much as 1-1/2-inches***
    - Styrofoam was used to fill the gaps

[1] By contrast tank AY-101 friable surface varied from ¼-inch to ½-inch thick
[2] *Inspection of Kaolite in TK-101 and Discussion* (Meeting Minutes, July 21, 1970)

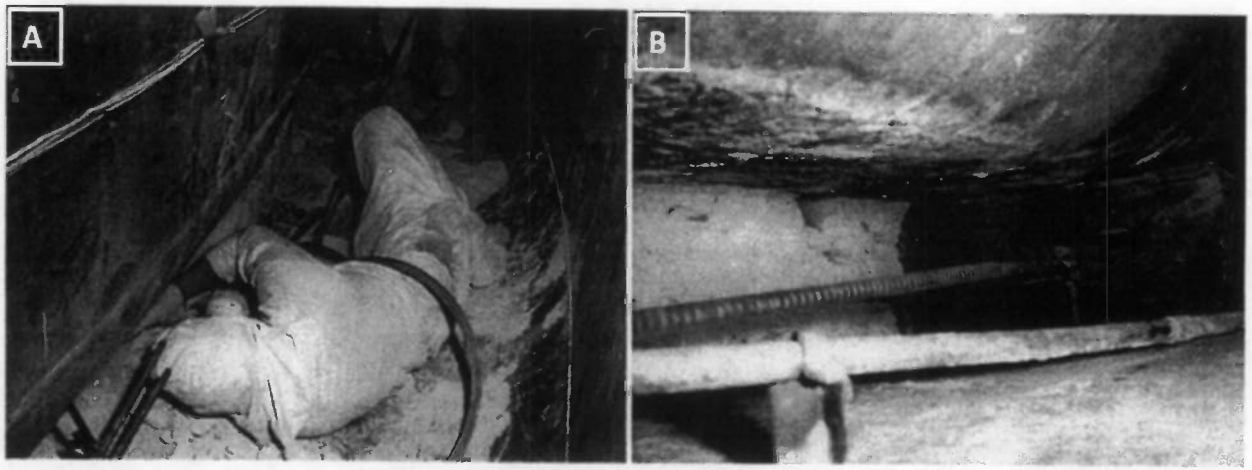
Tank Construction - XV

Preparing Insulating Refractory for modification with use of reinforced concrete

Tank AY-101 Primary Tank Gap over Insulating Refractory (52788-8-Photo). Gaps in Tank AY-102 were reported to be larger.

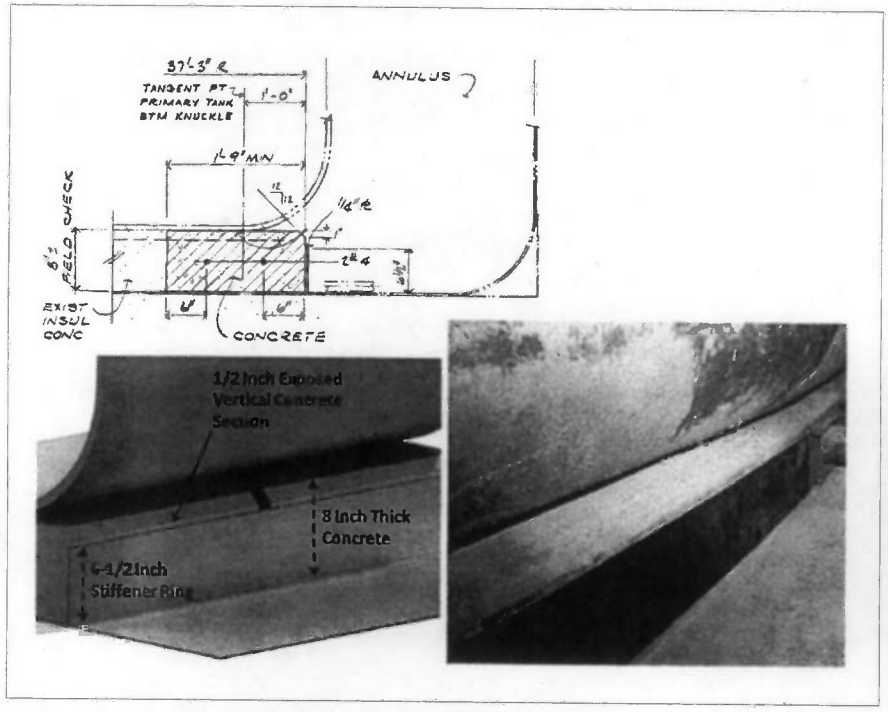
Tank Construction - XVI

- Structural Concrete Placement
  - Initially ten skip pours were equally spaced around the tank
  - ***After forms removed only the first ~ 8-inches of the 21-inches back from the knuckle had been completely filled***
  - Slump was increased, and the remaining sections completed

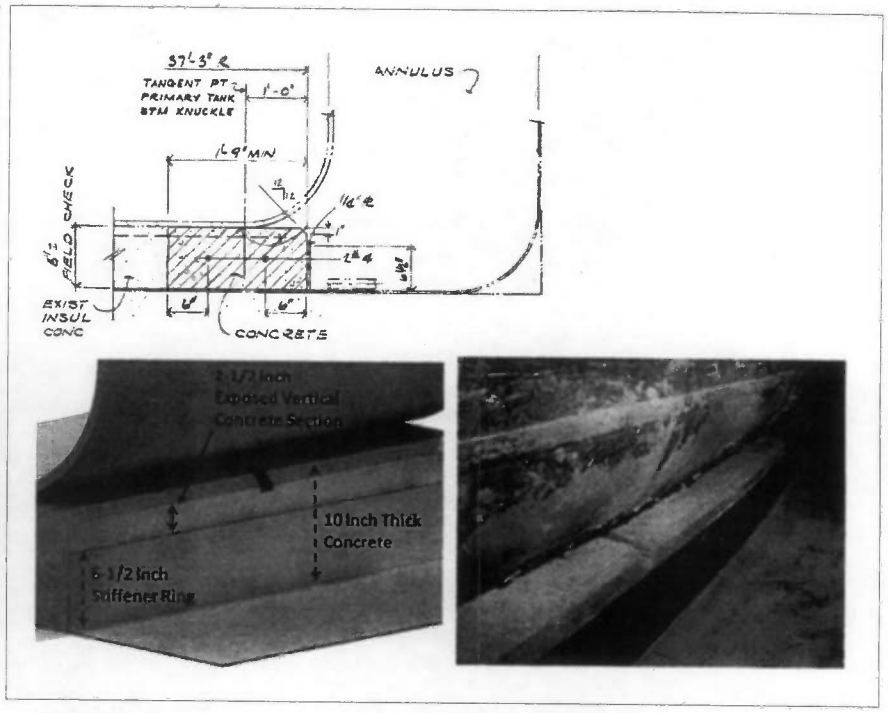


Refractory Removal and Rebar Placement for Structural Concrete Pours (A) (52735-10); Refractory Section Prepared for Structural Concrete Pour with Adjacent Section already Completed (B) (52735-1)

Tank Construction - XVII



Comparison of 8-Inch Thick Concrete Section Thickness to Photo of Southeast Section of Annulus (52720-7)



Comparison of 10-Inch Thick Concrete Section Thickness to Photo of Unknown Section of Annulus (52720-6)

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Tank AY-102 Myths

Myth	Fact
Surface level decrease indicates a leak.	Stored tank C-106 sludge had a heat output of 118,000 BTU/hour in 1998. The tank AY-102 surface level has continuously decreased since the sludge waste was transferred into the tank, and is primarily evidence of evaporation. An small episodic leak would not be evident in the decrease.
Fill Cycle fatigue caused a leak.	Fill cycle fatigue was evaluated in 1968. Analysis showed 241-AY tanks could safely withstand17,600 fill cycles, a far greater number of cycles than any double-shell tank will encounter during its service life.
Annulus floor samples aren't radioactive enough to be tank waste	Work with tank AY-102 core samples published in 2002 concluded that the tank AY-102 sludge has a great affinity for Cs-137 – 81% of the Cs-137 inventory in the tank was associated with the solids. This was thought to result from the presence of aluminosilicates in the sludge. The composition of the Kaolite 2200-LI refractory concrete under the primary tank is about 77 weight % aluminum and silicon, suggesting that Cs-137 may be preferentially adsorbed by the refractory concrete as well. Both of these would reduce the concentration of Cs-137 found in the annulus from a leak source.

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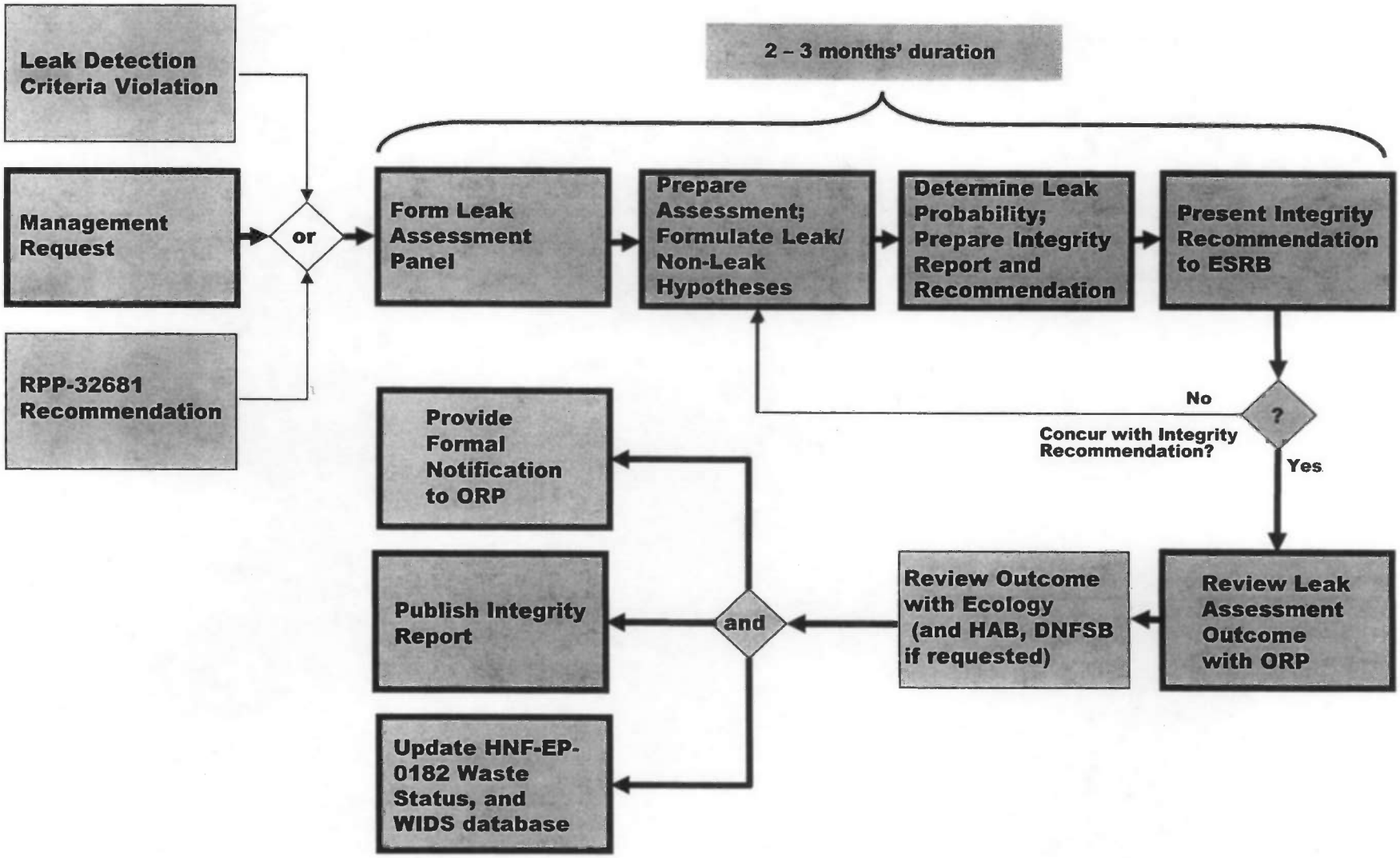
Tank AY-102 Myths (cont.)

Myth	Fact
Raw waste was transferred into the annulus.	There is no record of such an event. In April, 1977, waste was accidentally misrouted into the tank SY-103 leak detection pit.
Acid waste was transferred into the tank.	There is no record of such an event. In October, 1972, 3,700 gallons of PUREX Acidified Sludge acid waste was accidentally transferred from the 244-AR Vault AR-001 tank into tank AY-101. The pH of the solution was 0.7 – 1.3. 150 gallons of concentrated NaOH was added to the tank to neutralize the waste.
"AY-102 was a receiver tank for B Plant processing. Once they got waste ready to go, they would add sodium hydroxide to the tank, but they were in such a hurry that they just dumped the sodium hydroxide into the process tank... "Once the waste in the tank flashed and affected the vent system. The waste was then immediately sent to 102 AY, without a chance to neutralize. He says that he observed brown fumes shooting 40 feet out of 702 A stack (which at the time was connected to AY-102). He stated that this occurred "time and time and time again." Reference: Tom Carpenter Email, dated August 23, 2012	"The source of NO_x emissions, visually observed in the 241-A-702 exhaust stack (296-A-17) during September and October, is degradation of complexant waste in Tank 102-AZ. Several NO_x and NH_3 concentration measurements using Draeger tubes ... support the conclusion of the reference letter that the hot liquid in 102-AZ causes NO_x emissions ... the before and after measurements of NO_x concentrations in the AN Tank Farm ventilation system indicate that the 200 inches of hot AZ-102 liquid transferred into 107-AN also causes NO_x emissions from the AN Farm ventilation system..." Reference: Letter 65950-83-1696, *Source of NOx Fumes in 241-A-702 Ventilation System, Final Report*, dated December 12, 1983 located in RHO-RE-SR-83-26 Book B *Process Aids*, Volume 15, 1983. None of the tank AY-102 sample results reviewed during the leak assessment indicates the tank ever received acidic solution.

Tank AY-102 Formal Leak Assessment Process



Leak Assessment Leak – No-Leak Hypotheses

- Leak Hypothesis:
  - *The source of radioactive material discovered in the tank AY-102 annulus near Risers 83 and 90 is a leak from the primary tank.*
- No-Leak Hypothesis:
  - *The source of the colored material near Riser 83 is radioactively contaminated material deposited by mechanisms other than a breach in primary tank containment. The mound near Riser 90 is to be sampled. The source of the dry cascades near Riser 90 is dissolved insulating refractory. The radioactive contamination in the annulus is the result of cross-connections between the primary tank and annulus ventilation system.*

Johnson, Jeremy M

From: Lyon, Jeffery (ECY) <JLYO461@ecy.wa.gov>
Sent: Wednesday, April 03, 2013 2:29 PM
To: Miskho, Anthony G
Cc: Johnson, Jeremy M
Subject: Re: Need to set up meeting on AY-102

We'll pick the 22nd, in the afternoon.

I know this may surprise you but I am confused about your plans and responsiveness. Ecology has made our best efforts in our discussions to communicate that USDOE should respond expeditiously regarding AY-102 leak response and waste removal. The problem was identified in August 2012. It doesn't seem your progress reflects our understanding of expeditious, but maybe I don't have all of the information.

The time frames you are working in for your letter to us, your efforts to isolate this tank, and to get started with the removal of waste are not what I consider urgent or reflective of the seriousness of the situation. Nor have you been communicating with us on your work, assuming you are doing work on implementing the isolation and waste removal. I hope that our meeting on the 22nd will allay our concerns regarding the schedule to get the waste out by 2016 and on isolating the tank; including work progress, letters of direction, and long lead purchase orders issued.

Looking forward to talking to you on the 22nd.

Sent from my iPhone

On Apr 3, 2013, at 11:18 AM, "Miskho, Anthony G" <Anthony_G_Miskho@rl.gov> wrote:

> Jeff:
> Here are 4 options. Let me know if you need more options, and provide me with some suggestions as I can call people to try and move conflicting meetings.
>
> Monday April 15th 9-10:30
> Monday April 22nd 9-10:30
> Monday April 22nd 3:30 – 4:30
> Tuesday April 23rd 12:30 – 1:30
>
> **From:** Lyon, Jeffery (ECY) [mailto:JLYO461@ecy.wa.gov]
> **Sent:** Wednesday, April 03, 2013 10:42 AM
> **To:** Miskho, Anthony G
> **Cc:** Johnson, Jeremy M; Miskho, Anthony G
> **Subject:** Re: Need to set up meeting on AY-102
>
> Please provide 3 options for your team and we will try to accommodate - I am out today and may have time Thursday PM.
>
> OK?
>
> Sent from my iPhone
>
> On Apr 3, 2013, at 8:18 AM, "Miskho, Anthony G" <Anthony_G_Miskho@rl.gov> wrote:

Hi Jeff:
Jeremy asked me to contact you to set up a meeting on AY-102 tank isolation issues, which we touched upon in our last meeting on February 21st. I can call you and we can look at calendars if you are in the office this week. I will be in today and tomorrow.
Thanks
Tony

Enclosure II

Huffman, Lori A

From:	Voogd, Jeffry A
Sent:	Monday, October 22, 2012 4:07 PM
To:	DL - WRPS-NOT-ECY; DL - WRPS-NOT-WDOH; DL - WRPS-NOT-ORP; DL - WRPS-NOT-MGMT
Cc:	Sams, Terry L; Strasser, David W; Britton, John C; Miera, Felix R Jr
Subject:	TOC-ENV-NOT-2012-0110, Operational Notification 241-AY-102 Leak Determination
Attachments:	Determination on AY-102_Final 102212.docx.docx; TOC-ENV-NOT-2012-0110 AY-102 Leak Determination.pdf

The Department of Energy's Office of River Protection (ORP), working with its Hanford tank operations contractor Washington River Protection Solutions, has determined that there is a slow leak of chemical and radioactive waste into the annulus space in Tank AY-102, the approximately 30-inch area between the inner primary tank and the outer tank that serves as the secondary containment for these types of tanks. Attached is an Operational Notification and news release associated with the determination.

Should you have questions feel free to call.

Jeff Voogd
373-4101

U.S. DEPARTMENT OF
ENERGY

MEDIA CONTACTS:
Lori Gamache, ORP, (509) 372-9130
John Britton, WRPS, (509) 376-5561

FOR IMMEDIATE RELEASE:
October 22, 2012

HANFORD DETERMINES DOUBLE-SHELL TANK LEAKED WASTE FROM INNER TANK

Testing found no indication of leaks outside the outer tank

RICHLAND -- The Department of Energy's Office of River Protection (ORP), working with its Hanford tank operations contractor Washington River Protection Solutions, has determined that there is a slow leak of chemical and radioactive waste into the annulus space in Tank AY-102, the approximately 30-inch area between the inner primary tank and the outer tank that serves as the secondary containment for these types of tanks. This is the first time a double-shell tank (DST) leak from the primary tank into the annulus has been identified. There is no indication of waste in the leak detection pit outside the DST, which means that no waste has leaked out of the annulus and into the environment.

Since the material in the annulus was discovered in August, ORP has conducted a video surveillance of more than 95% of the walls and floor of the annulus through 10 risers, or pipes, that extend from within the interior of the tank annulus up through the tank dome to ground level. The surveillance video revealed material in two locations near Riser 90 and one location near Riser 83. In addition to the video surveillance, DOE has taken samples from all locations and performed sample analysis.

Through the sample analysis, DOE has confirmed that one of the areas of material located near Riser 90 is a 2 foot by 2 foot by 8 inch mound of soil, and is not waste. The Department suspects the soil fell into the annulus during construction repairs to the ventilation system. The additional analyses have also allowed DOE to confirm that the material in the remaining two locations in the tank's annulus is waste. The waste is primarily crystalline in form and does not include any pumpable liquid.

ORP is continuing to conduct regular visual inspections of the tank. Based on the most recent inspections located near Riser 83, there is indication that the inner tank is slowly leaking.

"We will continue to perform visual inspections twice a week of the material inside the annulus, using cameras. In addition, liquid levels inside the primary tank and annulus will continue to be monitored. Liquid level monitors, although they cannot detect small changes like those that have

occurred in Tank AY-102, would record any significant changes in the liquid levels of the tank," said Tom Fletcher, Assistant Manager for the Tank Farms Project. "We are working collaboratively with Washington State Department of Ecology to determine the most effective path forward for AY-102 and ensure that we are effectively protecting the public and the environment."

The material was discovered in the tank annulus space during a regularly scheduled DST Integrity Inspection. The area of the annulus floor is approximately 600 square feet. DOE estimates that the waste near Riser 83 covers an area of about three square feet that is less than ½ inch thick. The waste located near Riser 90 covers an estimated 40 square feet and is less than ¼ inch thick.

The underground DSTs include built-in secondary containment, with the outer shell surrounded by steel-reinforced concrete. There is no indication of waste in the leak detection pit outside the DST, which means that no waste has leaked out of the annulus and into the environment.

Since the discovery of material, ORP has kept the Washington State Department of Ecology and other Hanford stakeholders updated on the status of tank AY-102.

Remote-controlled sampling devices were modified and deployed into the annulus to take several samples of the material. ORP completed analysis of the samples and the results were reviewed by a panel of experts and senior managers who made the determination that the inner shell of tank AY-102 had leaked.

There have been no indications of abnormal events or leaks detected in any of the other double-shell tanks through routine monitoring. ORP monitors liquid level indicators within the primary tank and the annulus of the DSTs and continuously monitors for airborne contamination within the annulus. In addition, DST Integrity Program inspections that already occur will be accelerated and expanded to perform visual inspections on six other tanks that have similar construction as well as operating and process histories. These tanks are located in the AY, AZ, and SY tank farms.

Tank AY-102 was the first double-shell tank constructed at Hanford and has been in operation for more than 40 years. It contains about 850,000 gallons of sludge and liquid waste from the past production of plutonium for the nation's nuclear arsenal.

###

ENVIRONMENTAL OPERATIONAL ACTIVITIES NOTIFICATION

Date: 10/22/12 TOC-ENV-NOT: 2012-0110

Name: J.A. Voogd Revision No.: 0

Regulatory Requirement: RCRA and Air Operating Permits

RE: 241-AY-102 Leak Detemination

Notification Information:

The Department of Energy's Office of River Protection (ORP), working with its Hanford tank operations contractor Washington River Protection Solutions, has determined that there is a slow leak of chemical and radioactive waste into the annulus space in Tank AY-102, the approximately 30-inch area between the inner primary tank and the outer tank that serves as the secondary containment for these types of tanks. The press release associated with the determination is attached.

Distribution of this form shall be completed to the following groups.
Check all applicable distribution lists

- [x] Environmental Records
- [ ] Team Line Management
- [x] Other: WDOE, WDOH, ORP, WRPS Management, T.L. Sams, D.W. Strasser, J.C. Britton

Attach a copy of original notification email and any applicable information when submitting Environmental Notification to Document Control.

Huffman, Lori A

From: Voogd, Jeffry A
Sent: Wednesday, October 24, 2012 5:14 AM
To: Lyon, Jeffery
Cc: Sams, Terry L; Trenchard, Glyn D; Grindstaff, Joanne F; Peloquin, Michael G; Killoy, Steven E; Johnson, Jeremy M; Fletcher, Thomas W; Huffman, Lori A
Subject: RE: TOC-ENV-NOT-2012-0110, Operational Notification 241-AY-102 Leak Determination

Jeff L.,

The Ecology discussions for the path forward on AY-102 are being managed through ORP, Tom Fletcher's office. Due to the significant programmatic impacts of this event I will defer to ORP for discussions on AY-102.

Jeff V.

From: Lyon, Jeffery (ECY) [mailto:JLYO461@ecy.wa.gov]
Sent: Tuesday, October 23, 2012 9:39 AM
To: Voogd, Jeffry A; Johnson, Jeremy M
Cc: Sams, Terry L; Strasser, David W; Britton, John C; Miera, Felix R Jr; Trenchard, Glyn D; Grindstaff, Joanne F; Fox, Randal E; Peloquin, Michael G; Killoy, Steven E; Luke, Jeffrey J
Subject: Re: TOC-ENV-NOT-2012-0110, Operational Notification 241-AY-102 Leak Determination

I have not reviewed the attachment.

Please plan a briefing next week to present your detailed schedule for removing waste from AY-102.

Additionally we have a related request to delay a HIHTL removal until February, due to Retrieval pump replacements and AY-102 response.

We will expect a recovery plan as necessary to ensure USDOE will meet all TPA and CD requirements for tank farm operations.

If you do not have a detail schedule by our briefing next week, we expect a status report and delivery date for the detailed schedule and all impacts to your other obligations..

As I understand you do have requirements to pump tank AY-102. If you are planning any other proposals you can provide those details at our briefing.

Regardless, Ecology expects AY-102 to undergo immediate retrieval. And USDOE must provide the required emergency pumping space to offset this lose.

You can contact Daina Mcfadden to schedule the briefing.

Thanks

From: Voogd, Jeffry A [mailto:Jeffry_A_Voogd@rl.gov]
Sent: Monday, October 22, 2012 04:06 PM
To: DL - WRPS-NOT-ECY <DLWRPSNOTECO@rl.gov>; DL - WRPS-NOT-WDOH <DLWRPSNOTWDOH@rl.gov>; DL -

To: DL - WRPS-NOT-ECY <DLWRPSNOTECO@rl.gov>; DL - WRPS-NOT-WDOH <DLWRPSNOTWDOH@rl.gov>; DL - WRPS-NOT-ORP <DLWRPSNOTORP@rl.gov>; DL - WRPS-NOT-MGMT <DLWRPSNOTMGMT@rl.gov>
Cc: Sams, Terry L <Terry_L_Sams@rl.gov>; Strasser, David W <David_W_Strasser@rl.gov>; Britton, John C <John_C_Britton@rl.gov>; Miera, Felix R Jr <Felix_R_Jr_Miera@rl.gov>
Subject: TOC-ENV-NOT-2012-0110, Operational Notification 241-AY-102 Leak Determination

The Department of Energy's Office of River Protection (ORP), working with its Hanford tank operations contractor Washington River Protection Solutions, has determined that there is a slow leak of chemical and radioactive waste into the annulus space in Tank AY-102, the approximately 30-inch area between the inner primary tank and the outer tank that serves as the secondary containment for these types of tanks. Attached is an Operational Notification and news release associated with the determination.

Should you have questions feel free to call.

Jeff Voogd
373-4101

Huffman, Lori A

From: Miera, Felix R Jr
Sent: Wednesday, October 24, 2012 8:11 AM
To: Huffman, Lori A
Subject: FW: TOC-ENV-NOT-2012-0110, Operational Notification 241-AY-102 Leak Determination

As discussed yesterday afternoon, the note from Jeff.

Felix R. Miera
Manager, Environmental Permitting
Washington River Protection Solutions, One System Org.
Contractor to the United States Department of Energy
(509) 376-7034
(509) 438-9703 -- Cell

From: Lyon, Jeffery (ECY) [mailto:JLYO461@ecy.wa.gov]
Sent: Tuesday, October 23, 2012 9:39 AM
To: Voogd, Jeffry A; Johnson, Jeremy M
Cc: Sams, Terry L; Strasser, David W; Britton, John C; Miera, Felix R Jr; Trenchard, Glyn D; Grindstaff, Joanne F; Fox, Randal E; Peloquin, Michael G; Killoy, Steven E; Luke, Jeffrey J
Subject: Re: TOC-ENV-NOT-2012-0110, Operational Notification 241-AY-102 Leak Determination

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Regardless, Ecology expects AY-102 to undergo immediate retrieval. And USDOE must provide the required emergency pumping space to offset this lose.

You can contact Daina Mcfadden to schedule the briefing.

Thanks

From: Voogd, Jeffry A [mailto:Jeffry_A_Voogd@rl.gov]
Sent: Monday, October 22, 2012 04:06 PM

Huffman, Lori A

From: Miera, Felix R Jr
Sent: Wednesday, October 24, 2012 8:11 AM
To: Huffman, Lori A
Subject: FW: TOC-ENV-NOT-2012-0110, Operational Notification 241-AY-102 Leak Determination
Attachments: Determination on AY-102_Final 102212.docx.docx; TOC-ENV-NOT-2012-0110 AY-102 Leak Determination.pdf

Here is the AY-102 notification that was submitted by WRPS.

Felix R. Miera
Manager, Environmental Permitting
Washington River Protection Solutions, One System Org.
Contractor to the United States Department of Energy
(509) 376-7034
(509) 438-9703 -- Cell

From: Voogd, Jeffry A
Sent: Monday, October 22, 2012 4:07 PM
To: DL - WRPS-NOT-ECY; DL - WRPS-NOT-WDOH; DL - WRPS-NOT-ORP; DL - WRPS-NOT-MGMT
Cc: Sams, Terry L; Strasser, David W; Britton, John C; Miera, Felix R Jr
Subject: TOC-ENV-NOT-2012-0110, Operational Notification 241-AY-102 Leak Determination

The Department of Energy's Office of River Protection (ORP), working with its Hanford tank operations contractor Washington River Protection Solutions, has determined that there is a slow leak of chemical and radioactive waste into the annulus space in Tank AY-102, the approximately 30-inch area between the inner primary tank and the outer tank that serves as the secondary containment for these types of tanks. Attached is an Operational Notification and news release associated with the determination.

Should you have questions feel free to call.

Jeff Voogd
373-4101

U.S. DEPARTMENT OF
ENERGY

MEDIA CONTACTS:
Lori Gamache, ORP, (509) 372-9130
John Britton, WRPS, (509) 376-5561

FOR IMMEDIATE RELEASE:
October 22, 2012

HANFORD DETERMINES DOUBLE-SHELL TANK LEAKED WASTE FROM INNER TANK

Testing found no indication of leaks outside the outer tank

RICHLAND -- The Department of Energy's Office of River Protection (ORP), working with its Hanford tank operations contractor Washington River Protection Solutions, has determined that there is a slow leak of chemical and radioactive waste into the annulus space in Tank AY-102, the approximately 30-inch area between the inner primary tank and the outer tank that serves as the secondary containment for these types of tanks. This is the first time a double-shell tank (DST) leak from the primary tank into the annulus has been identified. There is no indication of waste in the leak detection pit outside the DST, which means that no waste has leaked out of the annulus and into the environment.

Since the material in the annulus was discovered in August, ORP has conducted a video surveillance of more than 95% of the walls and floor of the annulus through 10 risers, or pipes, that extend from within the interior of the tank annulus up through the tank dome to ground level. The surveillance video revealed material in two locations near Riser 90 and one location near Riser 83. In addition to the video surveillance, DOE has taken samples from all locations and performed sample analysis.

Through the sample analysis, DOE has confirmed that one of the areas of material located near Riser 90 is a 2 foot by 2 foot by 8 inch mound of soil, and is not waste. The Department suspects the soil fell into the annulus during construction repairs to the ventilation system. The additional analyses have also allowed DOE to confirm that the material in the remaining two locations in the tank's annulus is waste. The waste is primarily crystalline in form and does not include any pumpable liquid.

ORP is continuing to conduct regular visual inspections of the tank. Based on the most recent inspections located near Riser 83, there is indication that the inner tank is slowly leaking.

"We will continue to perform visual inspections twice a week of the material inside the annulus, using cameras. In addition, liquid levels inside the primary tank and annulus will continue to be monitored. Liquid level monitors, although they cannot detect small changes like those that have

occurred in Tank AY-102, would record any significant changes in the liquid levels of the tank," said Tom Fletcher, Assistant Manager for the Tank Farms Project. "We are working collaboratively with Washington State Department of Ecology to determine the most effective path forward for AY-102 and ensure that we are effectively protecting the public and the environment."

The material was discovered in the tank annulus space during a regularly scheduled DST Integrity Inspection. The area of the annulus floor is approximately 600 square feet. DOE estimates that the waste near Riser 83 covers an area of about three square feet that is less than ½ inch thick. The waste located near Riser 90 covers an estimated 40 square feet and is less than ¼ inch thick.

The underground DSTs include built-in secondary containment, with the outer shell surrounded by steel-reinforced concrete. There is no indication of waste in the leak detection pit outside the DST, which means that no waste has leaked out of the annulus and into the environment.

Since the discovery of material, ORP has kept the Washington State Department of Ecology and other Hanford stakeholders updated on the status of tank AY-102.

Remote-controlled sampling devices were modified and deployed into the annulus to take several samples of the material. ORP completed analysis of the samples and the results were reviewed by a panel of experts and senior managers who made the determination that the inner shell of tank AY-102 had leaked.

There have been no indications of abnormal events or leaks detected in any of the other double-shell tanks through routine monitoring. ORP monitors liquid level indicators within the primary tank and the annulus of the DSTs and continuously monitors for airborne contamination within the annulus. In addition, DST Integrity Program inspections that already occur will be accelerated and expanded to perform visual inspections on six other tanks that have similar construction as well as operating and process histories. These tanks are located in the AY, AZ, and SY tank farms.

Tank AY-102 was the first double-shell tank constructed at Hanford and has been in operation for more than 40 years. It contains about 850,000 gallons of sludge and liquid waste from the past production of plutonium for the nation's nuclear arsenal.

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ENVIRONMENTAL OPERATIONAL ACTIVITIES NOTIFICATION

Date: 10/22/12

TOC-ENV-NOT: 2012-0110

Name: J.A. Voogd

Revision No.: 0

Regulatory Requirement: RCRA and Air Operating Permits

RE: 241-AY-102 Leak Detemination

Notification Information:

The Department of Energy's Office of River Protection (ORP), working with its Hanford tank operations contractor Washington River Protection Solutions, has determined that there is a slow leak of chemical and radioactive waste into the annulus space in Tank AY-102, the approximately 30-inch area between the inner primary tank and the outer tank that serves as the secondary containment for these types of tanks. The press release associated with the determination is attached.

Distribution of this form shall be completed to the following groups.
Check all applicable distribution lists

- [x] Environmental Records
- [ ] Team Line Management
- [x] Other: WDOE, WDOH, ORP, WRPS Management, T.L. Sams, D.W. Strasser, J.C. Britton

Attach a copy of original notification email and any applicable information when submitting Environmental Notification to Document Control.

Huffman, Lori A

From: ^ORP Office of Communications
Sent: Monday, October 22, 2012 3:54 PM
Subject: HANFORD DETERMINES DOUBLE-SHELL TANK LEAKED WASTE FROM INNER TANK

ANNOUNCEMENT

Department of Energy
Office of River Protection
P.O. Box 450
Richland, Washington 99352

ORP No. 12-107

Issued: 10/22/12

To: All ORP Employees
Subject: Updated Release on AY-102

To continue my commitment to share real time information, below is a press release on double-shell tank (DST) AY- 102. This will be issued today.

Please contact me if you have any questions.

Thanks,
Tom Fletcher

HANFORD DETERMINES DOUBLE-SHELL TANK LEAKED WASTE FROM INNER TANK

Testing found no indication of leaks outside the outer tank

RICHLAND -- The Department of Energy's Office of River Protection (ORP), working with its Hanford tank operations contractor Washington River Protection Solutions, has determined that there is a slow leak of chemical and radioactive waste into the annulus space in Tank AY-102, the approximately 30-inch area between the inner primary tank and the outer tank that serves as the secondary containment for these types of tanks. This is the first time a double-shell tank leak from the primary tank into the annulus has been identified. There is no indication of waste in the leak detection pit outside the DST, which means that no waste has leaked out of the annulus and into the environment.

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Through the sample analysis, DOE has confirmed that one of the areas of material located near Riser 90 is a 2 foot by 2 foot by 8 inch mound of soil, and is not waste. The Department suspects the soil fell into the annulus during construction repairs to the ventilation system. The additional analyses have also allowed

DOE to confirm that the material in the remaining two locations in the tank's annulus is waste. The waste is primarily crystalline in form and does not include any pumpable liquid.

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"We will continue to perform visual inspections twice a week of the material inside the annulus, using cameras. In addition, liquid levels inside the primary tank and annulus will continue to be monitored. Liquid level monitors, although they cannot detect small changes like those that have occurred in Tank AY-102, would record any significant changes in the liquid levels of the tank," said Tom Fletcher, Assistant Manager for the Tank Farms Project. "We are working collaboratively with Washington State Department of Ecology to determine the most effective path forward for AY-102 and ensure that we are effectively protecting the public and the environment."

The material was discovered in the tank annulus space during a regularly scheduled DST Integrity Inspection. The area of the annulus floor is approximately 600 square feet. DOE estimates that the waste near Riser 83 covers an area of about three square feet that is less than ½ inch thick. The waste located near Riser 90 covers an estimated 40 square feet and is less than ¼ inch thick.

The underground DSTs include built-in secondary containment, with the outer shell surrounded by steel-reinforced concrete. There is no indication of waste in the leak detection pit outside the DST, which means that no waste has leaked out of the annulus and into the environment.

Since the discovery of material, ORP has kept the Washington State Department of Ecology and other Hanford stakeholders updated on the status of tank AY-102.

Remote-controlled sampling devices were modified and deployed into the annulus to take several samples of the material. ORP completed analysis of the samples and the results were reviewed by a panel of experts and senior managers who made the determination that the inner shell of tank AY-102 had leaked.

There have been no indications of abnormal events or leaks detected in any of the other double-shell tanks through routine monitoring. ORP monitors liquid level indicators within the primary tank and the annulus of the DSTs and continuously monitors for airborne contamination within the annulus. In addition, DST Integrity Program inspections that already occur will be accelerated and expanded to perform visual inspections on six other tanks that have similar construction as well as operating and process histories. These tanks are located in the AY, AZ, and SY tank farms.

Tank AY-102 was the first double-shell tank constructed at Hanford and has been in operation for more than 40 years. It contains about 850,000 gallons of sludge and liquid waste from the past production of plutonium for the nation's nuclear arsenal.

###

Huffman, Lori A

From: Voogd, Jeffry A
Sent: Wednesday, October 17, 2012 9:59 AM
To: DL - WRPS-NOT-MGMT; DL - WRPS-NOT-WDOH; DL - WRPS-NOT-ORP; Hendrickson, Michelle (Washington State Department of Ecology); Lyon, Jeffery; Wold, Kristi (Washington State Department of Ecology); Johnson, Jeremy M; Sams, Terry L
Subject: Operational Notification - AY-102 Annulus CAM Alarm
Attachments: TOC-ENV-NOT-2012-0109 Operational Notification AY-102 Annulus CAM Alarm.pdf

The 102-AY annulus CAM went into alarm following waste sampling activities at riser 90 on day shift 10/16/12. Preliminary CAM readings were 2930 counts per minute (cpm). The alarm set point is 2000 cpm. There were no ENRAF leak detector alarms. The CAM filter paper has been pulled for counting.

Huffman, Lori A

From: ^ORP Office of Communications
Sent: Thursday, October 11, 2012 1:56 PM
Subject: Update on Tank AY-102 Status

ANNOUNCEMENT

Department of Energy
Office of River Protection
P.O. Box 450
Richland, Washington 99352

ORP No. 12-102

Issued: 10/11/12

To: All ORP Employees
Subject: Update on Tank AY-102 Status

Preliminary test results from samples taken from material found within the annulus of double-shell tank AY-102 indicate that the material is largely consistent with the type of material found in that tank. However, the result of our investigation into the material in the annulus of AY-102 will not be complete until sampling and laboratory analysis of the remaining material in the annulus are also completed.

The material was discovered in August during regular video surveillance of the annulus of tank AY-102. Since then video inspections of the annulus through all 10 risers has been completed, with material discovered near two of the risers (Risers 83 and 90). The annulus is the air space between the inner steel wall of the tank and the outer steel shell. The outer shell is covered with steel-reinforced concrete and the tank is buried underground.

It is important to remember that the material within the annulus is stable, no material has been found outside of the annulus, and there is no indication of radioactive contamination in the leak detection pit outside this double-shell tank. We have been performing visual inspections of the material located near Riser 83 twice a week and have seen no changes. We will continue to perform these bi-weekly inspections at AY-102. Monitoring activities at other double-shell tanks continues.

Additional laboratory test results will be evaluated by a Washington River Protection Solutions (WRPS) technical panel. A final decision on the status of this tank could be made as early as the end of next week.

Tank AY-102 is among the oldest of Hanford's double-shell tanks and has been in operation for over 40 years. It contains about 850,000 gallons of waste.

If you have any questions or concerns, please don't hesitate to contact me.

Tom Fletcher

Huffman, Lori A

From: ^ORP Office of Communications
Sent: Tuesday, September 11, 2012 2:39 PM
Subject: Update on Tank AY-102 Material Discovery

ANNOUNCEMENT

Department of Energy
Office of River Protection
P.O. Box 450
Richland, Washington 99352

ORP No. 12-087

Issued: 9-11-2012

To: All ORP Employees
Subject: Update on Tank AY-102 Material Discovery

Work continues at tank AY-102 to understand the source of the material found within the annulus and determine the appropriate next steps. Late last week, I briefed Tom D'Agostino and the Hanford Advisory Board on the status of AY-102. I wanted to share the briefing with you and provide the most current information.

Visual inspections of the annulus through 10 risers are complete and provide video footage for approximately 95 percent of the annulus. As previously shared with you, material had been discovered near two risers. During the final visual inspections, no additional material was found. Crews are preparing to take samples of the material on the floor of the annulus later this month.

In addition, crews are preparing to move the camera for bi-weekly inspections to Riser 83, the location of the annulus where the last discovery of material was found. This work should be complete this week.

Liquid from the tertiary leak detection pit was sampled. Results show radioactivity at background levels, which is consistent with previous samples, indicating there are no leaks in the secondary containment.

Investigation activities will continue through September. I will continue to share information with you as it becomes available. As always, please feel free to contact me if you have any questions.

Tom Fletcher

AY102 Update.pdf

Huffman, Lori A

From: ^ORP Office of Communications
Sent: Friday, August 31, 2012 10:31 AM
Subject: Update of AY-102 Material Discovery

ANNOUNCEMENT

Department of Energy
Office of River Protection
P.O. Box 450
Richland, Washington 99352

ORP No. 12-084

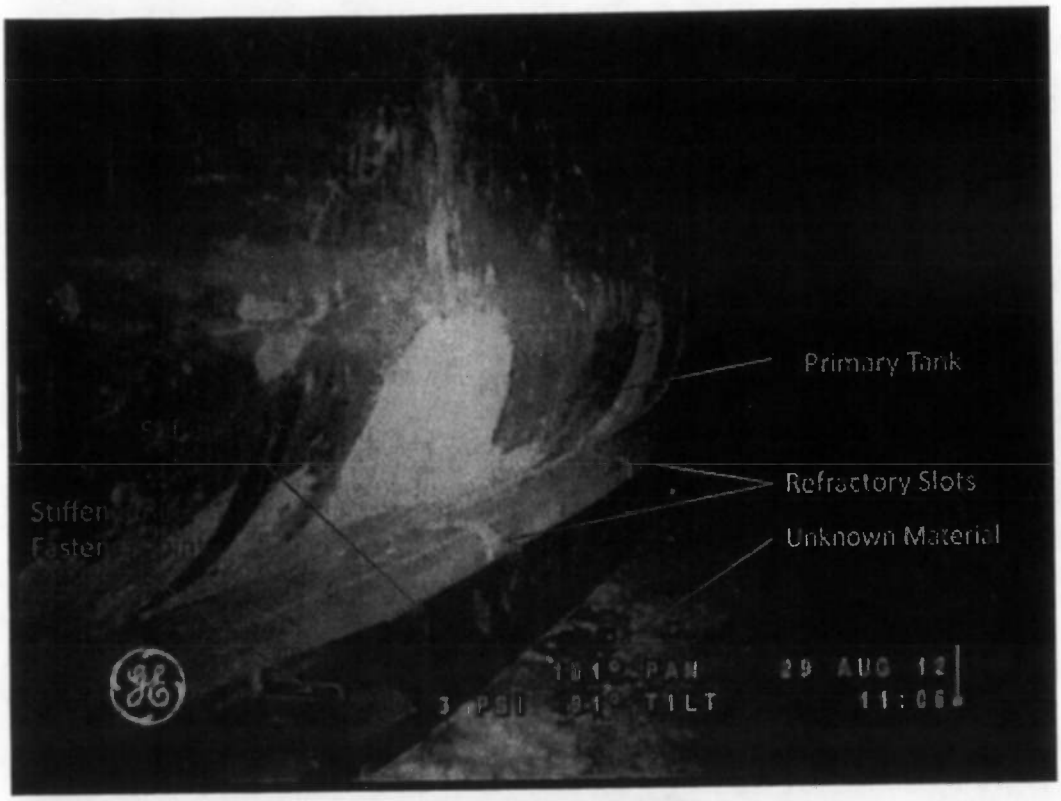
Issued: 8-31-2012

To: All ORP Employees
Subject: Update of AY-102 Material Discovery

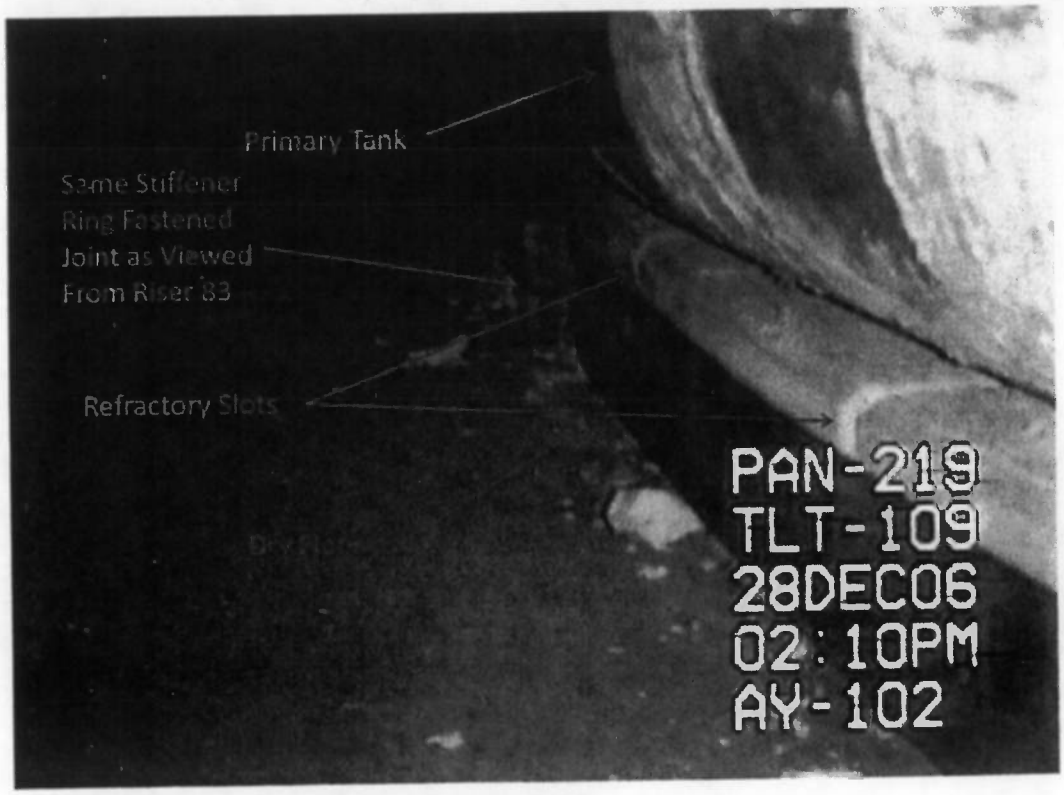
Earlier this month we notified regulators, employees and the public of material found within the annulus of double-shell tank AY-102. We committed to keeping you informed as we proceed with our investigation of this tank. That investigation includes visual inspections through other risers in the tank annulus.

A second riser was visually inspected this week and additional material was identified in the annulus near this second riser. At this time, it is unknown if the material is radioactive. This area of the tank annulus was previously viewed in 2006, providing historical benchmarking data. The 2006 visual inspection did not show any unknown material in this area of the tank annulus. We are continuing our investigation, including gathering additional information from other tank risers. As we learn more, we will keep you informed.

Tom Fletcher



Overview of Region Viewed From Riser, August 29, 2012



Overview of Region Viewed From Riser in 2006

Huffman, Lori A

From: ^ORP Office of Communications
Sent: Wednesday, August 22, 2012 8:21 AM
Subject: Update to Discovery of Material in Double-Shell Tank (DST) AY-102

ANNOUNCEMENT

Department of Energy
Office of River Protection
P.O. Box 450
Richland, Washington 99352

ORP No. 12-081

Issued: 8-22-2012

To: All ORP Employees
Subject: Update to Discovery of Material in Double-Shell Tank (DST) AY-102

In my message sent out last Friday, I committed to providing you with updates on DST AY-102 as they became available. Attached is the presentation I provided to EM Senior Management on Monday which discusses the location and size of the material found in the annulus. It also provides you with some background on AY-102, along with our near term and long term actions. As always, if you have any questions or concerns, please don't hesitate to contact me.

Tom Fletcher

EM-1_AY-102_Status briefing to...

Huffman, Lori A

From: ^ORP Office of Communications
Sent: Friday, August 17, 2012 4:10 PM
To: Abdul, Wahed; Acheson, Clayton S; Adams, James E (Jim); Adler, Jason G; Alexander, Donald H; Al-Wazani, Mazen G; Arm, Cheryl L; Bailey, Pamela K; Ballard, Betsy M; Bang, Ricky; Bechtol, Susan E; Bender, Christy A; Berkey, Edgar; Blanchard, Courtney; Bolanos, Ivan A; Bonser, Lisa A; Bootsma, Amie; Bowser, Dennis W; Braswell, Sharon M; Brazil, Kelly; Brown, Dennis A; Brown, Thomas M; Bruggeman, Jeffrey M; Brunson, Gary E; Bryan, Catherine B; Burandt, Mary E; Burt, Robyn L; Callahan, Victor L; Carier, Patrick P; Carosino, Robert M; Champlain, George F; Charboneau, Stacy L; Chase, Rob - ORP; Cheadle, Jeffry E; Chen, Ko; Christenson, Craig P; Chu, Stephanie C; Ciola, Ronald J; Clendenon, Ronald L; Compton, Karla A; Cooper, Darlene; Cooper-Ford, Max; Cowen, Daniel J; Dale, Heather L; Daniels, Jeffrey J; Dawson, Ronnie L; Deaton, Patricia A; Devere, Betty L.; Diaz, Elaine N; Diediker, Janet A; Domnoske-Rauch, Lisa A; Donato, M L (Peggy); Doolittle, Henry G; Dudley, Dennis J; Eccleston, Bradley R; Erdman, Annette P; Etheridge, Dragana; Evans, Jamie L; Evarts, Michael D; Fetto, Carrie M; Fish, Robert L; Fletcher, Thomas W; Forgione, Elizabeth J; Fox, Joel S; Frink, Ronald L; Fulton, James T; Furlong, Peter T; Gadish, Brandon G; Gallegos, David A; Gamache, Lori M; Garcia, David; Garcia, JoLynn M; Gibson, Robert E (Gene); Gilbert, Robert A (Rob); Grubb, Richard S; Harkins, Brian A; Harp, Benton J (Ben); Harrington, Christopher C; Harrington, Paul G; Harris, John P III; Harrison, Megan J; Harwood, Russell G; Haskell, Robert I; Havens, Jill K; Helgeson, Dart; Hernandez, Paul R; Hewitt, William M; Hidden, Frederick B; Hieb, Nancy L; Higgins, Kathleen L; Hirschman, Paul R; Hoertkorn, Thomas R; Hoffman, Douglas A; Holton, Langdon K; Hu, Tachung A (Albert); Huffman, Lori A; Hunsaker, Ian S; Irby, Dennis H; Irwin, Robert M (Mat); Jacobson, Gordon T; Jansons, Richard S; Johns Cantu, Wendy L; Johnson, Jeremy M; Johnson, Susan C; Johnson, Walter C; Jones, Gregory L (Greg) ORP; Kemp, Christopher J; Kemp, David C; Klein, Keith A; Knight, Daniel P; Knutson, Dale E; Koll, Ronald J; Kraemer, Kurtis J; Kruger, Albert A; Lew, Barclay S; Licht, Sarah D; Liu, Chung-King; Lober, Robert W; Logan, Pamela; Loscoe, Phillip G; Lutz, Karen; Lynch, James J; Mandelenakis, Nicholas E; Mauss, Billie M; May, Jeffrey D; McCormick-Barger, J W; McCormick-Barger, Mary L; Mccusker, Marc T; McNulty, Richard R; Mena, Arturo; Mendoza, Estella (Stella); Mertens, Edward P; Meyer, Carrie C; Meyers, Colleen A; Miller, Phillip C; Moreno, Mario R; Morris, Ashley T; Neath, Gae M; Neff, William J; Nelson, Mckenzie H; Newcomb, Janet L; Nielsen, Randall K; Nipper, Rose M; Nirider, Laurren T; Grindstaff, Joanne F; Nottingham, Connie G; Noyes, Delmar L; Olds, Theodore E (Erik); Olsen, Gary B; Ortega, Santos U; Patel, Dimple H; Patel, Sunil; Patel, Vinit H; Perrine, Pamela J; Peterson, Becky; Pfaff, Stephen H; Poynor, Cathy; Prokhorova, Sofia L; Rambo, Jeffrey J; Ramin, Gil M; Ramsay, Mark L; Rasmussen, Robert W; Reddick, Julie A; Reed, Garth R; Reiten, Jeff B; Renevitz, Joseph A; Riker, William; Robbins, Elver D; Russell, Woody; Ryan, Mary; Salisbury, Shaun M; Samuelson, Scott L; Sandgren, Kevin R; Sands, Jennifer L; Sauceda, Emmy; Schroder, Paul A; Schroeder, Joseph B; Scott, Walter B; Shaw, Olga; Sherwood, John R; Shuen, Jian-Shun; Smith, Dabrisha M; Smoter, Robert L; Snyder, John D; Sommer, Donald; Sondag, Joseph M; Sondall, James D; Sorensen, R C (Chris); Squires, Robert B; Stafford, Harold J Jr; Steiling, Jeri L; Stickney, Brian J; Stracener, James E; Stubblebine, Scott D; Swann, Patrick J; Swarens, Cecil L; Taylor, Hugh N; Taylor, Robert; Teimouri, Alex E; Thomas, Kristopher D; Thompson, Matthew C; Thrasher, David M; Till, Kenneth G; Tobias, Shannon L; Toon, Thomas L; Treadwell, John S; Trenchard, Glyn D; Trent, Jeffrey S; Triplett, Mark B; Urie, Richard L; Vanderpol, Jeffrey J; Vargas, Susan K; Vega, Samuel A; Venkata, Raman M; Vogel, Hans R; Wade, Kenneth G; Wallace, Debra O; Wheeler, Isabelle; Whiteley, Craig T; Wicks, James H; Williams, Bobby L; Williamson, Brandon I; Woody, Kate; Wright, Derek L; Wright, Teresa A; Wrzesinski, Wendell R; Young, Jason D
Subject: Discovery of Material in Double Shell Tank AY-102

ANNOUNCEMENT

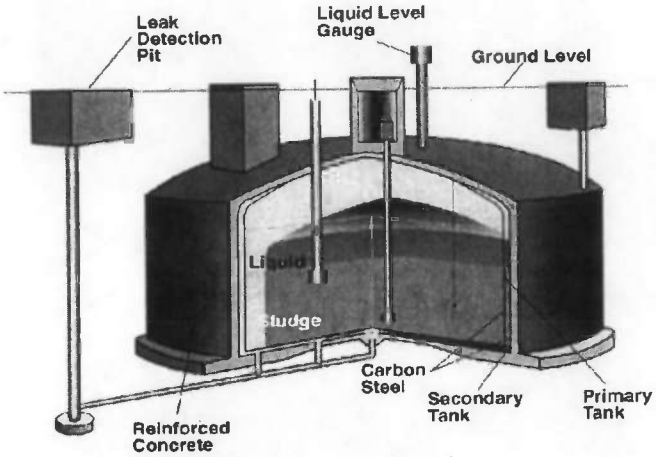
Department of Energy
Office of River Protection
P.O. Box 450
Richland, Washington 99352

ORP No. 12-079

Issued: 8-17-2012

To: All ORP Employees
Subject: Discovery of Material in Double-Shell Tank (DST) AY-102

During a routine inspection of double-shell tank (DST) AY-102, a small amount of dried material was discovered inside the tank annulus. This observation was made by inserting a video camera through a tank riser which had not previously been used for visual examinations. The annulus is the area between the inner and the outer wall of the DST, which serves as an overflow area if the inner steel liner were to leak. There is no evidence of liquid in the annulus from inspections conducted thus far. This material is contained within the outer wall of the tank and poses no current threat to workers, the public or environment.



DOUBLE-SHELL TANK

This is the first time waste has been discovered outside the primary wall of a DST. WRPS maintains a rigorous tank-integrity program to evaluate the conditions of the tanks through regular inspections. No other findings have been identified in any of the other DSTs.

Tank AY 102 was built in 1970 and put into service in 1971. AY Farm was the first DST farm built at Hanford from 1968-1970. The farm contains two DSTs, each capable of holding more than 1 million gallons of waste. This DST currently stores approximately 857,000 gallons of waste. There is approximately 706,000 gallons of liquid waste and 151,000 gallons of waste sludge, the bulk of which came from tank C-106, a single-shell tank in which retrieval activities were declared complete in 2003.

Analysis of samples taken near the material show higher-than-expected contamination levels. Until we learn more about this material and begin to understand the source, we are increasing the monitoring frequency of AY-102. In addition, we are actively working to characterize the material to determine the appropriate next steps, and visually inspecting all accessible areas within the tank to ensure no other material is present.

This is the first tank to show signs of aging. Events such as this reinforce the importance of safely emptying all the Hanford waste storage tanks as quickly as possible and convert the waste into a stable form for safe, long-term storage.

We have been in ongoing discussions with Ecology regarding the inspection of this tank. As more information becomes available I will share it with you. If you have any questions or concerns please don't hesitate to contact me.

Tom Fletcher

Huffman, Lori A

From: Mulkey, Charles H
Sent: Friday, August 17, 2012 5:21 PM
To: Mulkey, Charles H; DL - WRPS-NOT-ORP; DL - WRPS-NOT-AZ; DL - WRPS-NOT-MGMT
Subject: RE: Environmental Notification for AY-102
Attachments: TOC-NOT-2012-0089 AY-102.docx; AY-102 Employee Message.docx

Correction on Subject Line to reflect the tank in AY-102

From: Mulkey, Charles H
Sent: Friday, August 17, 2012 5:18 PM
To: DL - WRPS-NOT-ORP; DL - WRPS-NOT-AZ; DL - WRPS-NOT-MGMT
Subject: Environmental Notification for AT-102

Attached is the notification concerning the discovery of material in the 241-AY-102 annulus. Feel free to contact me if you have any questions.

Chuck Mulkey
373-4077
Environmental Specialist
WRPS
Contractor to US Department of energy, Office of River Protection

ENVIRONMENTAL NOTIFICATION FORM

Date: 8-17-12 Notification No.: TOC-ENV-NOT- 2012-0089

Name: Charles Mulkey Revision No. 0

Section 1. Spills

NA ☐

Chemical Name: _____ MSDS No.: _____

Regulated per 40 CFR 302: Yes ☐ No ☐ EPCRA EHS: Yes ☐ No ☐

CAS No.: _____ Quantity Released: _____ Reportable Quantity (RQ): _____

CAS No.: _____ Quantity Released: _____ Reportable Quantity (RQ): _____

CAS No.: _____ Quantity Released: _____ Reportable Quantity (RQ): _____

Resource Conservation and Recovery Act Contingency Plan Implemented: Yes ☐ No ☐

National Response Center Staff Name: _____

National Response Center Report No.: _____

Tank Waste Release: Yes ☐ No ☐

Section 2. Emission Control Equipment Deviation

NA ☐

Stack ID/Facility: _____

Location: _____

Airborne Release: Yes ☐ No ☐ Personnel Contamination: Yes ☐ No ☐

Work Space Air Sample: _____ DAC

Description of Occurrence:

Date and Time of Discovery: _____

Section 3. RCRA Compliance

NA ☐

Double-Shell Tank Leak Detection System	Yes ☒	No ☐
Single-Shell Tank Leak Assessment Process	Yes ☐	No ☐
Single-Shell Tank Drywell Logging	Yes ☐	No ☐
Double-Shell Tank Inadvertent Waste Transfer	Yes ☐	No ☐

Location: 241-AY-102

Date and Time of Discovery: 8-9-12 1300

Description of Occurrence:
The date and time of discovery reflect when the situation was first discussed with the Washington State Departmetn of Ecology

During a routine inspection of double-shell tank (DST) AY-102, a small amount of dried material was discovered inside the tank annulus. This observation was made by inserting a video camera through a tank riser which had not previously been used for visual examinations. The annulus is the area between the inner and the outer wall of the DST,

ENVIRONMENTAL NOTIFICATION FORM

Date: 8-17-12 Notification No.: TOC-ENV-NOT- 2012-0089

Name: Charles Mulkey Revision No. 0

which serves as an overflow area if the inner steel liner were to leak. There is no evidence of liquid in the annulus from inspections conducted thus far. This material is contained within the outer wall of the tank and poses no current threat to workers, the public or environment.

See attached file for further information.

Section 4. Permit Deviation NA ☐

Air Emission Limit Exceeded: Yes ☐ No ☐

Emission: _____ Limit: _____ Release Amount: _____

ST4511 Permit Non-Compliance (G.11): Yes ☐ No ☐

ST4511 Permit Upset (S.8): Yes ☐ No ☐

RCRA Permit: Yes ☐ No ☐

Location: _____

Date and Time of Discovery: _____

Description of Occurrence:

Distribution of this form shall be completed to the following groups by the originator.

Check all applicable distribution lists:

☐ **Section 1:**

Phone: NRC 1-800-424-8802

E-mail:
- DL-WRPS-NOT-MGMT
- DL-WRPS-NOT-WDOH
- DL-WRPS-NOT-ORP
- DL-WRPS-NOT-ECO
- Team Line Management
- ^WRPS Occurrence Reporting

☐ **Section 2:**

E-mail:
- DL-WRPS-NOT-WDOH
- DL-WRPS-NOT-MGMT
- DL-WRPS-NOT-ORP
- Team Line Management

☒ **Section 3**

Phone:
- Ecology 1-509-575-2490

E-mail:
- DL-WRPS-NOT-ECO
- DL-WRPS-NOT-MGMT
- DL-WRPS-NOT-ORP
- Team Line Management

ENVIRONMENTAL NOTIFICATION FORM

Date: 8-17-12

Notification No.: TOC-ENV-NOT- 2012-0089

Name: Charles Mulkey

Revision No. 0

☐ **Section 4:**

E-mail:
- DL-WRPS-NOT-ECO
- DL-WRPS-NOT-MGMT
- DL-WRPS-NOT-ORP
- Team Line Management

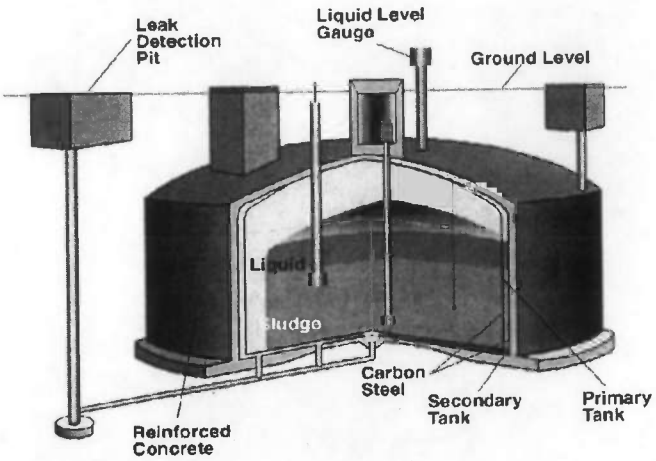
TO: All WRPS Employees
(Please pass this message on to those who did not receive it.)

ISSUED: Aug. 17, 2012

FROM: Dept. of Energy Office of River Protection (DOE-ORP)

SUBJECT: Discovery of material in annulus of double-shell tank AY-102

During a routine inspection of double-shell tank (DST) AY-102, a small amount of dried material was discovered inside the tank annulus. This observation was made by inserting a video camera through a tank riser which had not previously been used for visual examinations. The annulus is the area between the inner and the outer wall of the DST, which serves as an overflow area if the inner steel liner were to leak. There is no evidence of liquid in the annulus from inspections conducted thus far. This material is contained within the outer wall of the tank and poses no current threat to workers, the public or environment.



DOUBLE-SHELL TANK

This is the first time waste has been discovered outside the primary wall of a DST. WRPS maintains a rigorous tank-integrity program to evaluate the conditions of the tanks through regular inspections. No other findings have been identified in any of the other DSTs.

Tank AY-102 was built in 1970 and put into service in 1971. AY Farm was the first DST farm built at Hanford from 1968-1970. The farm contains two DSTs, each capable of holding more than 1 million gallons of waste. This DST currently stores approximately 857,000 gallons of waste. There is approximately 706,000 gallons of liquid waste and 151,000 gallons of waste sludge, the bulk of which came from tank C-106, a single-shell tank in which retrieval activities were declared complete in 2003.

Analysis of samples taken near the material show higher-than-expected contamination levels. Until we learn more about this material and begin to understand the source, we are increasing the monitoring frequency of AY-102. In addition, we are actively working to characterize the material to determine the appropriate next steps, and visually inspecting all accessible areas within the tank to ensure no other material is present.

This is the first tank to show signs of aging. Events such as this reinforce the importance of safely emptying all the Hanford waste storage tanks as quickly as possible and convert the waste into a stable form for safe, long-term storage.

We have been in ongoing discussions with Ecology regarding the inspection of this tank. As more information becomes available I will share it with you. If you have any questions or concerns please don't hesitate to contact me.

Tom Fletcher
DOE-ORP Assistant Manager for Tank Farms Project

Huffman, Lori A

From: Fox, Randal E
Sent: Thursday, October 13, 2011 9:30 AM
To: Conaway, Kathleen (ECY); Nichols, Stacy; Wang, Oliver S; ^Tank Farms Shift Operations; Breshears, Jerralee A; Donnelly, Jack W; Johnson, Gloria J; Miera, Felix R Jr; Patten, Elester; Peloquin, Michael G; Sax, Scott M; Skwarek, Raymond J; Voogd, Jeffry A; Wilkinson, Robert E; Bowser, Dennis W; Huffman, Lori A; Dyekman, Dale L; Smith, Kelly; Strasser, David W; Lutz, Mark T; Ellis, Martin W
Cc: Hamilton, James T; Guberski, John D; Borneman, Lucinda E
Subject: WRPS Environmental Notification TOC-ENV-NOT-2011-0012, AY-102 annulus ENRAF
Attachments: TOC-ENV-NOT-2011-0012_AY-102 annulus ENRAF.docx

Attached is the subject notification.

Thank you,

Randal Fox
WRPS Environmental
contractor to United States Department of Energy
509.373.6024

ENVIRONMENTAL NOTIFICATION FORM

Date: 10/13/2011 Notification No.: TOC-ENV-NOT- 2011-0012

Name: Randal Fox Revision No. 0

Section 1. Spills

NA ☒

Chemical Name: _____ MSDS No.: _____

Regulated per 40 CFR 302: Yes ☐ No ☐ EPCRA EHS: Yes ☐ No ☐

CAS No.: _____ Quantity Released: _____ Reportable Quantity (RQ): _____

CAS No.: _____ Quantity Released: _____ Reportable Quantity (RQ): _____

CAS No.: _____ Quantity Released: _____ Reportable Quantity (RQ): _____

Resource Conservation and Recovery Act Contingency Plan Implemented: Yes ☐ No ☐

National Response Center Staff Name: _____

National Response Center Report No.: _____

Tank Waste Release: Yes ☐ No ☐

Section 2. Emission Control Equipment Deviation

NA ☒

Emission Unit: _____

Location: _____

Airborne Release: Yes ☐ No ☐ Personnel Contamination: Yes ☐ No ☐

Work Space Air Sample: _____ DAC

Description of Occurrence:

Date and Time of Discovery: _____

Section 3. RCRA Compliance

NA ☐

Double-Shell Tank Leak Detection System Yes ☒ No ☐

Single-Shell Tank Leak Assessment Process Yes ☐ No ☐

Single-Shell Tank Drywell Logging Yes ☐ No ☐

Double-Shell Tank Inadvertent Waste Transfer Yes ☐ No ☐

Location: AY-102 (AY102-WSTA-LDT-152)

Date and Time of Discovery: 10/12/2011 1320 hrs

ENVIRONMENTAL NOTIFICATION FORM

Date: 10/13/2011 Notification No.: TOC-ENV-NOT- 2011-0012

Name: Randal Fox Revision No. 0

Description of Occurrence:
Double shell tank 241-AY-102 annulus ENRAF 152 was discovered reading above the expected operating range on 10/9/2011. The other two annulus ENRAFs were both within the expected operating range and ENRAF 152 was declared out of service.

During maintenance and troubleshooting work conducted on 10/12/2011, the ENRAF 152 displacer was discovered to be visually wet and weighing more than expected. Rainwater intrusion is thought to be the cause of the wetness. A video will be taken of the annulus space near this ENRAF and additional maintenance work will be planned to restore the ENRAF to normal operations.

Section 4. Permit Deviation NA ☒

Air Emission Limit Exceeded: Yes ☐ No ☐

Emission: _____ Limit: _____ Release Amount: _____

ST4511 Permit Non-Compliance (G.11): Yes ☐ No ☐

ST4511 Permit Upset (S.8): Yes ☐ No ☐

RCRA Permit: Yes ☐ No ☐

Location: _____

Date and Time of Discovery: _____

Description of Occurrence:

Attach a copy of original notification email when submitting Environmental Notification to Document Control

Approval: _____ Date: _____
(Print and Sign Name)

Distribution of this form shall be completed to the following groups by the originator.

Check all applicable distribution lists:

☐ **Section 1:**

Phone: NRC 1-800-424-8802

E-mail:
- DL-WRPS-NOT-MGMT
- DL-WRPS-NOT-WDOH
- DL-WRPS-NOT-ORP
- DL-WRPS-NOT-ECO
- Team Line Management
- ^WRPS Occurrence Reporting
- Heart of America (Tank Waste release only)

ENVIRONMENTAL NOTIFICATION FORM

Date: 10/13/2011

Notification No.: TOC-ENV-NOT- 2011-0012

Name: Randal Fox

Revision No. 0

☐ **Section 2:**

E-mail:
- DL-WRPS-NOT-WDOH
- DL-WRPS-NOT-MGMT
- DL-WRPS-NOT-ORP
- Team Line Management

☒ **Section 3**

Phone:
- Ecology 1-509-575-2490

E-mail:
- DL-WRPS-NOT-ECO
- DL-WRPS-NOT-MGMT
- DL-WRPS-NOT-ORP
- Team Line Management

☐ **Section 4:**

E-mail:
- DL-WRPS-NOT-ECO
- DL-WRPS-NOT-MGMT
- DL-WRPS-NOT-ORP
- Team Line Management

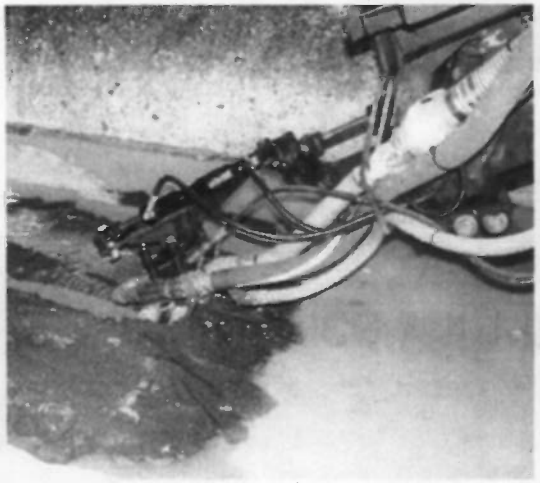
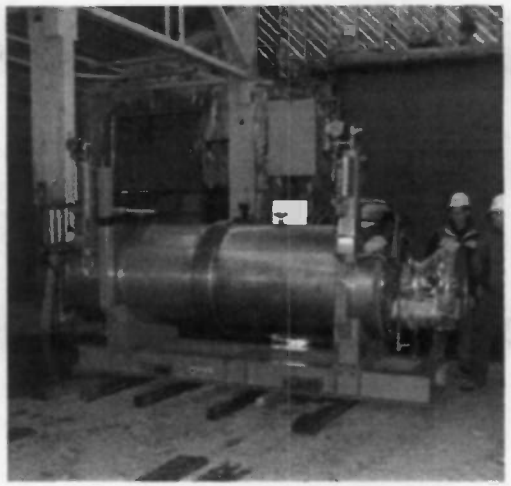
Johnson, Jeremy M

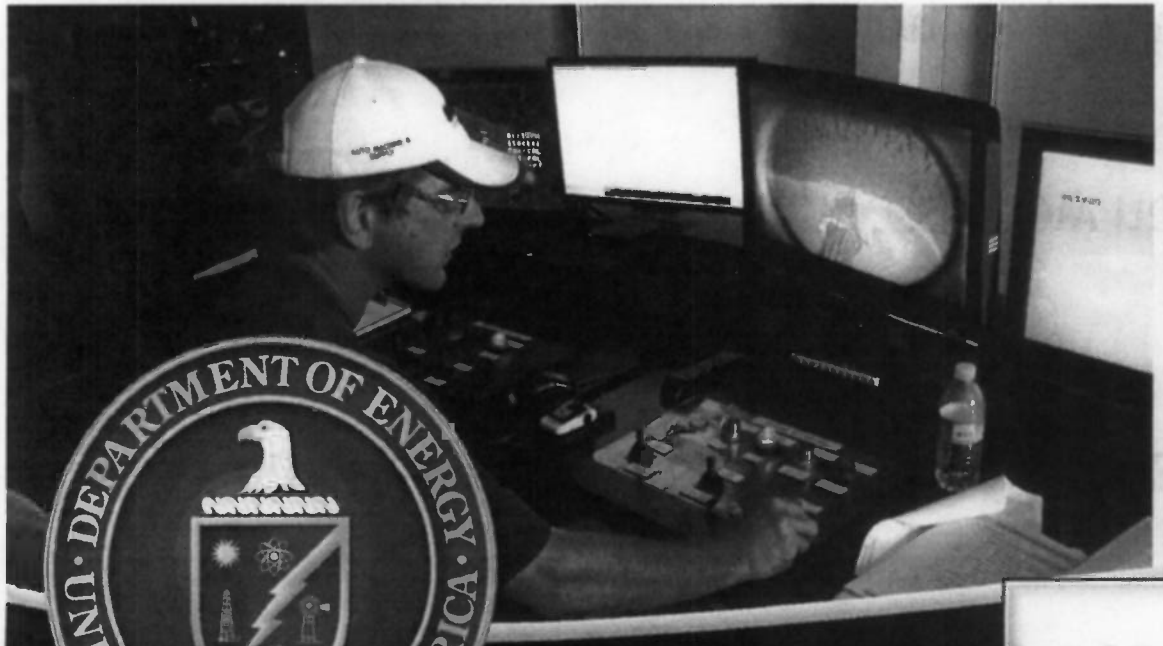
From: Mattlin, Ellen M
Sent: Thursday, January 10, 2013 1:02 PM
To: Poppiti, James
Cc: Johnson, Jeremy M; Fletcher, Thomas W; Charboneau, Stacy L; Smith, Kevin W (ORP)
Subject: AY-102 Update HAB TWC Presentation
Attachments: DST AY102 Update (Jeremy Johnson - 01-09-13) (1).pptx

Jim,

Per our telephone conversation, I am sending you our presentation that was provided to the HAB Tank Waste Committee yesterday. If you need further information for preparing the DNFSB talking points for Dave Huizenga, please let me know. Thanks,

Ellen Mattlin, Division Director
Tank Farms Programs Division
Office of River Protection
Phone: Work 509-376-1900, Cell 509-531-6444
e-mail: ellen.mattlin@rl.doe.gov



DEPARTMENT OF ENERGY

Office of River Protection

HANFORD SITE

Tank Waste Committee
Double-Shell Tank AY-102 Update

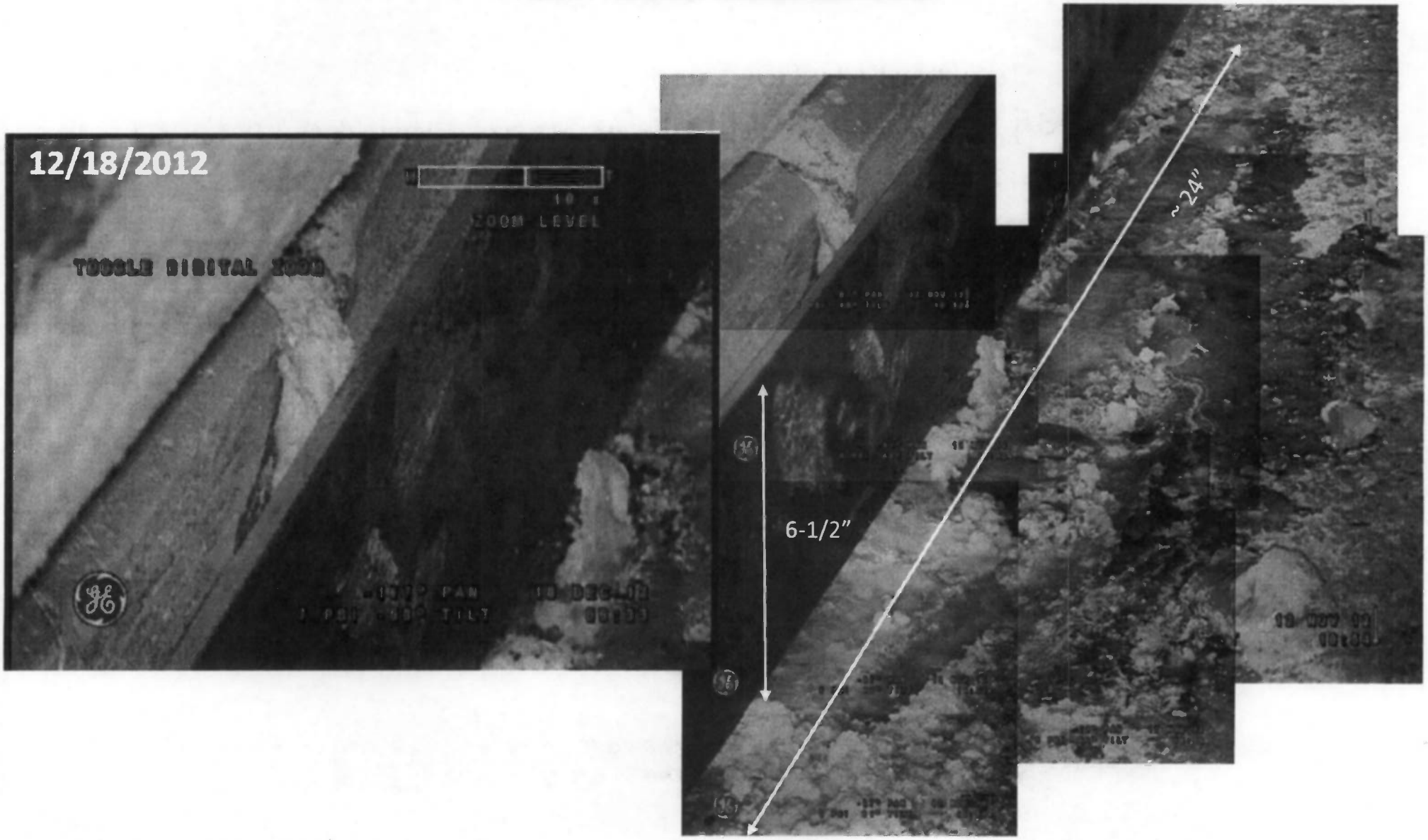
Jeremy Johnson
ORP Tank Integrity Program Manager

January 9, 2013

Double-Shell Tank AY-102 Monitoring

- Riser 83 weekly inspections show some sign of slow changes
- Primary tank liquid level is continuously monitored with no abnormal change
- Annulus liquid level monitors show no indication of liquid
- Annulus Continuous Air Monitor (CAM) shows no sign of change
- Leak Detection Pit sampled twice with no indication of waste outside the secondary liner

AY-102 Riser 83

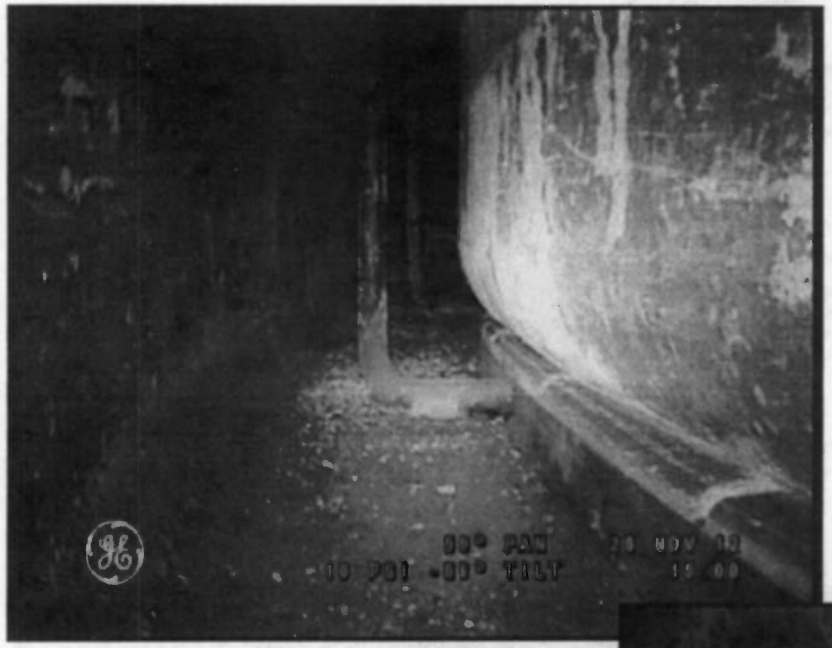


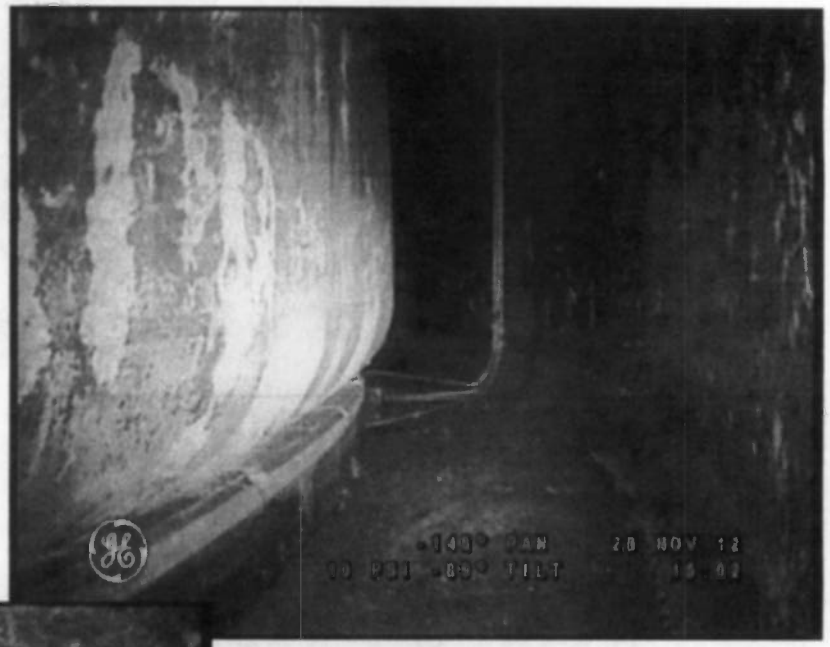
Extent of Condition Evaluations

- 100% visual inspection of six similar Double Shell Tanks (DSTs)
  - Currently evaluating three of six DSTs
    - AY-101 completed with no anomalies seen
  - Expect to complete spring 2013
- Review of archived construction documentation for all DSTs
  - Expect to complete by end of 2013
- For the remaining DSTs, evaluating changes to frequency and methods of the current visual inspection program

AY-101 Annulus Inspection

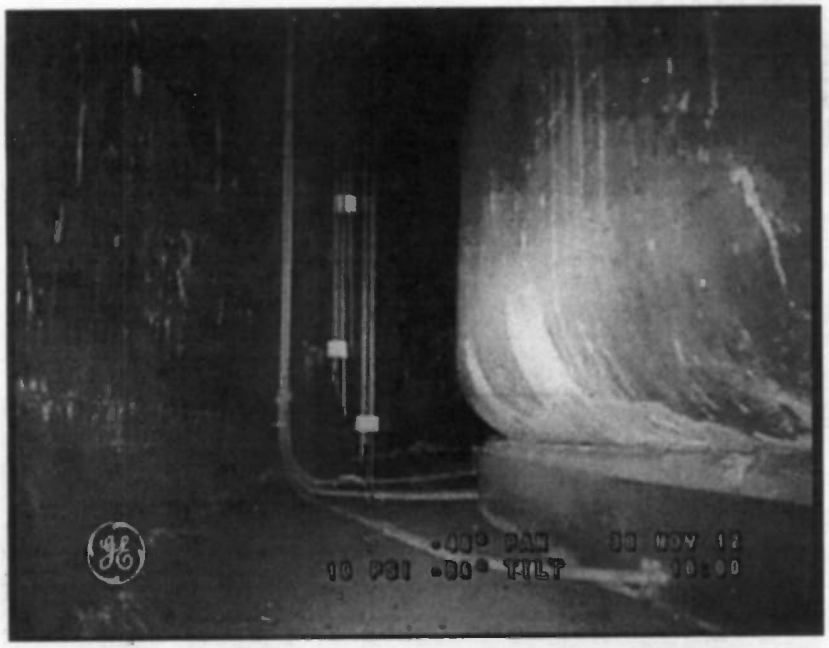
Riser 84 11-28-2012

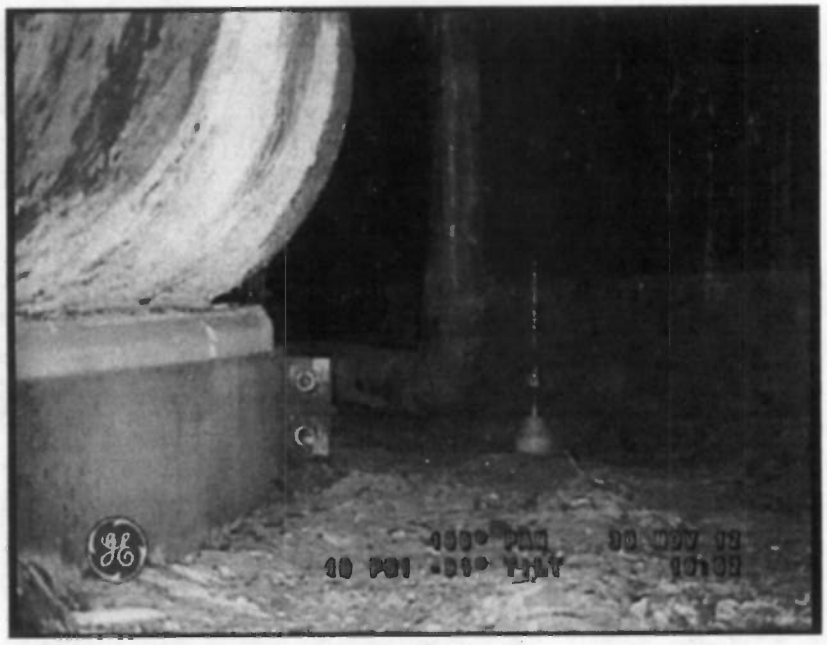


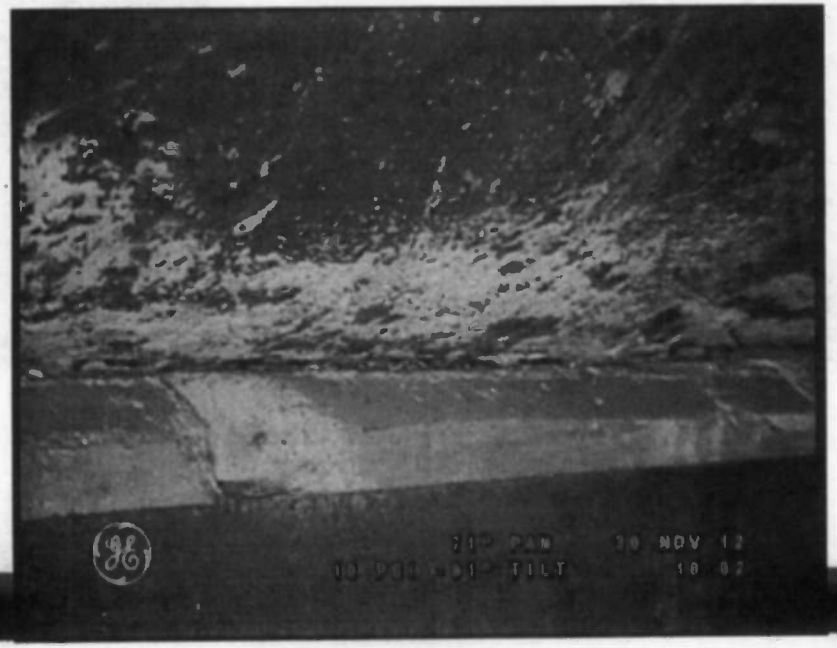


AY-101 Annulus Inspection

Riser 77 11-30-2012

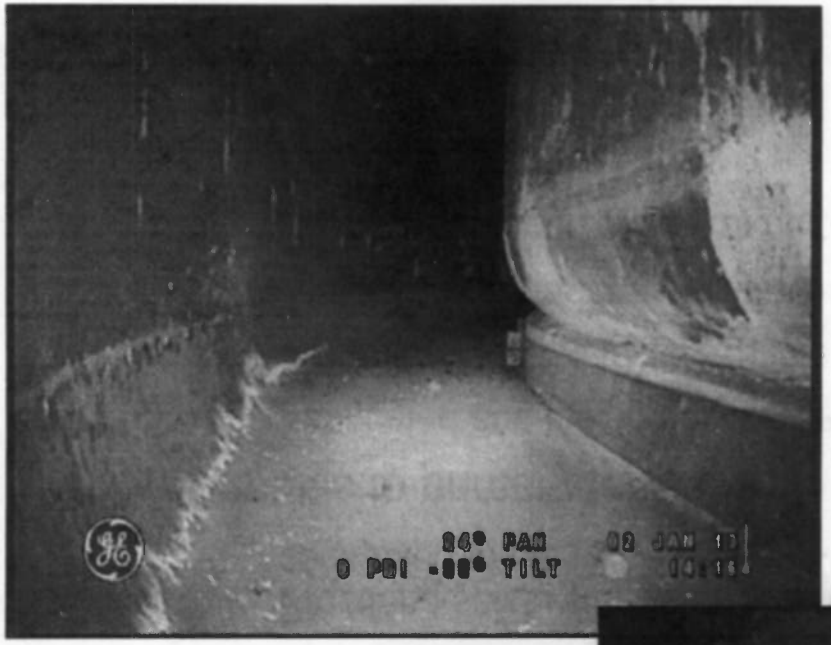






AY-101 Annulus Inspection

Riser 78 1-2-2013



Status of AY-102 Pumping Preparedness

- Liquid Only
- Procedures developed
- Primary tank to alternate double-shell tank
  - Power supplied to AY-02A Pump
  - Procuring safety significant rigid jumpers that will allow operational flexibility and keep AY-101 connected to the DST transfer system
- Annulus to primary tank
  - Fabricated and tested general service jumpers
  - Inspected pits and tested transfer line
  - Tested and performed maintenance on pump
  - Equipment staged onsite for quick deployment

AY-102 Integrated Project Team Update

Initial Recommendations

- Maximize tank space availability by accelerating evaporator campaigns and completing AP Tank Farm level rises
  - Maintain space for retrieval of C-Farm and next 9 tanks as well as AY-102
- Deploy equipment capable of removing sludge/supernatant from AY-102
- Secretary's team evaluating Tank Farm Waste Pre-Treatment Requirements/Facilities should consider additional tank space for emergency response and operational considerations
- Additional recommendations are forthcoming
  - Alternatives for providing emergency pumping space

Enclosure III

Johnson, Jeremy M

From: Niles, Ken <ken.niles@state.or.us>
Sent: Thursday, March 07, 2013 4:20 PM
To: Johnson, Jeremy M
Subject: RE: AY-102 IPT

Thanks

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Thursday, March 07, 2013 4:20 PM
To: 'Niles, Ken'
Subject: RE: AY-102 IPT

Sure

From: Niles, Ken [mailto:ken.niles@state.or.us]
Sent: Thursday, March 07, 2013 3:25 PM
To: Johnson, Jeremy M
Subject: RE: AY-102 IPT

Can I share this with Dirk?

From: Johnson, Jeremy M [mailto:Jeremy_M_Johnson@orp.doe.gov]
Sent: Thursday, March 07, 2013 12:32 PM
To: 'CWHA461@ecy.wa.gov'; Hendrickson, Michelle (Washington State Department of Ecology); Lyon, Jeffery; Martell, John; Schmidt, John; 'Ken.Niles@state.or.us'; Wheeler, Isabelle; Irby, Dennis H; Burandt, Mary E
Subject: AY-102 IPT

Attached please find the extent of condition activities schedule and the latest riser 83 photos.

Jeremy Johnson
DOE-ORP
Programs Division
509-376-1866

Tank AY-102 Status

Tom Fletcher

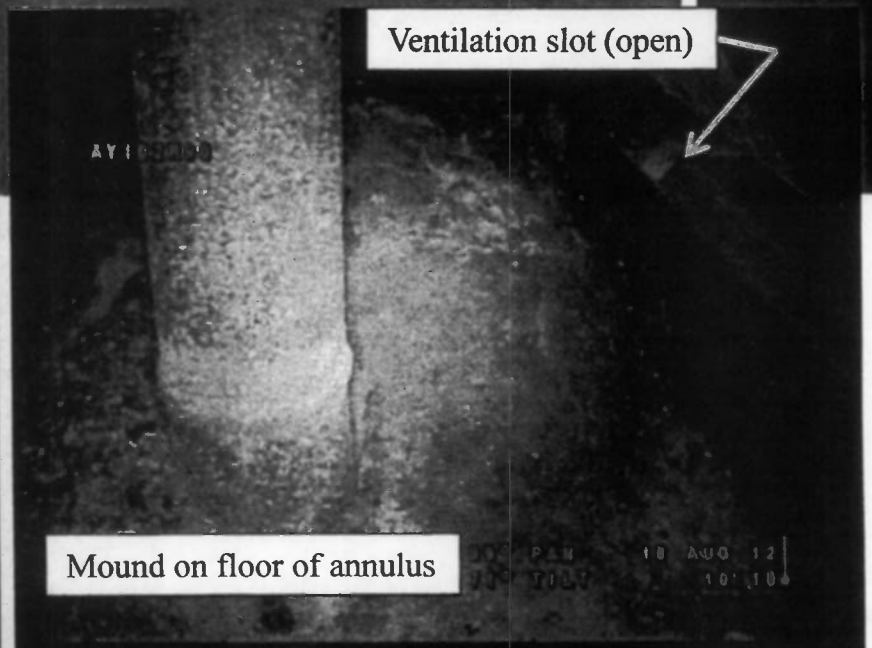
August 20, 2012

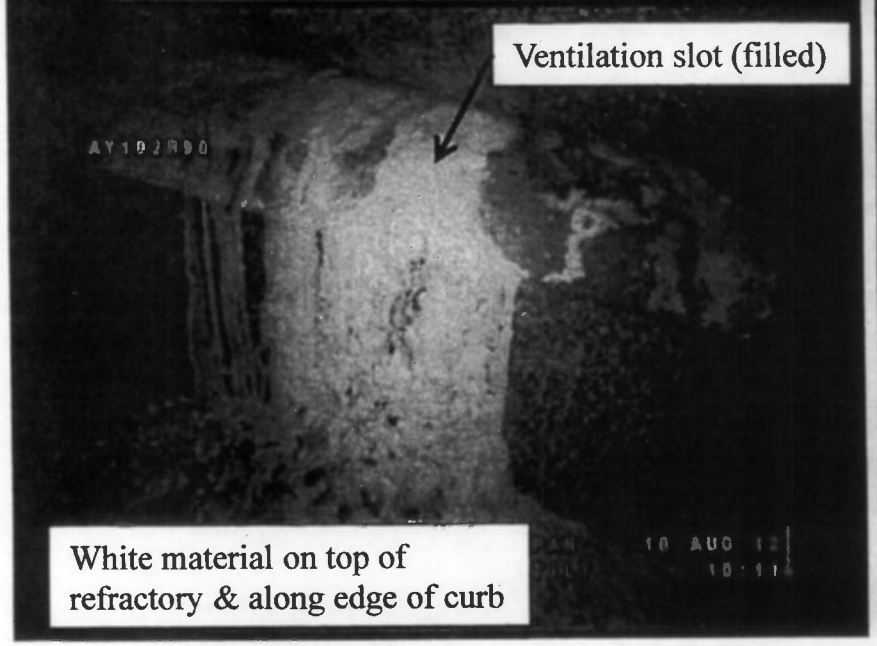
Summary

Routine periodic visual monitoring (via camera) of the AY-102 annulus found material that was never before seen. Inspection of the annulus noted the following;

- Material found in two locations near Riser 90 – source unknown
  - mound approximately (2 ft. x 3 ft. x 8 inches)
  - white material on both the refractory (tank sits on refractory) and annulus floor
- Material is dry (i.e., no standing water or indications of moisture)
- Leak Detection and Constant Air Monitor (CAM) Operable in Annulus (real time monitoring)
- Camera equipment removed from annulus without incident (i.e., no contamination on equipment)
- Contamination present when annulus floor sample was taken

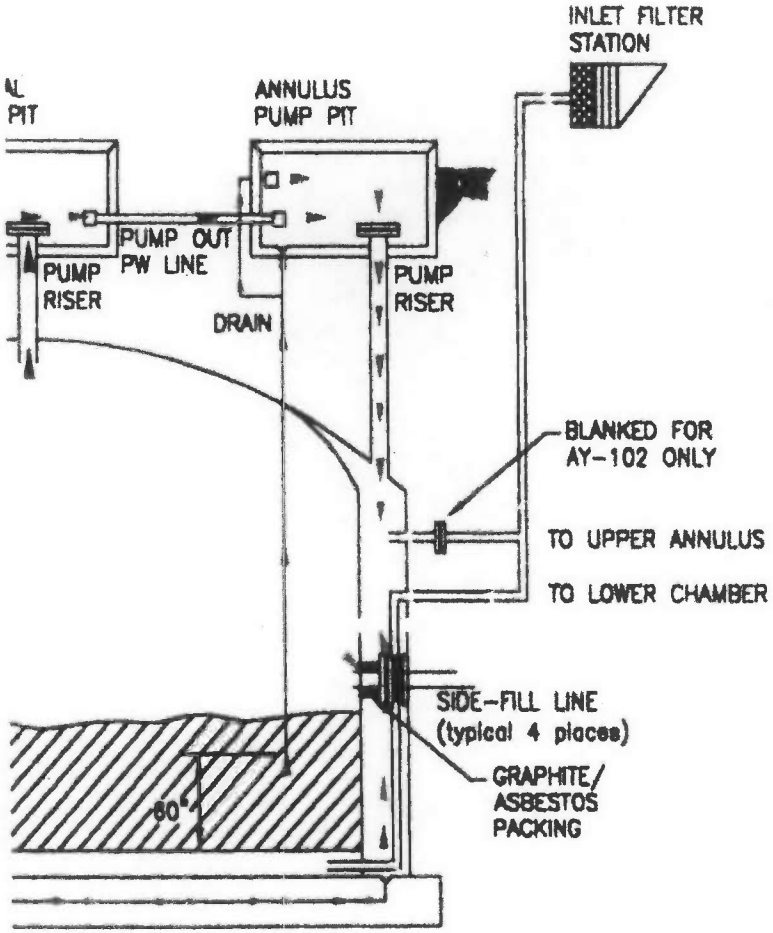
Riser 90 Inspection Photographs





Background

- AY-102 built in 1970 and placed into service in 1971 as aging waste spare and received waste in 1977
- Annulus ventilation used to remove tank residual heat
- Liner provides secondary containment of waste
- Primary waste types are B Plant evaporated waste and Sludge from C-106 Sluicing
- No other Hanford Waste Tank closely approximates this composition of <u>sludge</u>
  - High H_2 Generation
  - Sludge contains solution low in Nitrate, Nitrite, and pH < 12
  - High Heat Generation
- Current volume 857,000 gallons of sludge and supernatant
- No unexplained primary tank level changes



DST Integrity Monitoring

Two elements make-up the Double Shell Tank (DST) Integrity Monitoring Program – Inspections and Tank Waste Chemistry Control

Inspections

- Annulus videos are performed on a nominal 5 year cycle, not to exceed 7 years.
  - AY-102 last perform in 2006
- Ultrasonic wall thickness testing is performed on the primary tank wall from the annulus on an 8 to 10 year cycle.
  - WRPS averages completing 3 to 4 tank UT scans each year
  - AY-102 UT last performed in 2007 (no abnormalities noted)

Tank Waste Chemistry Control

- Corrosion monitoring probes are installed in many DST with removal and analysis of the probe every 3 years
  - AY-102's corrosion probe was installed in 2009
- Tank waste samples are taken on a nominal 5 year cycle for chemistry control, or more frequently when transfers are being made into or out of a tank (e.g., SST retrievals)

Ongoing Investigatory Actions

Action	Status
• Initiate camera installation in Riser 90	COMPLETE
◦ Monitoring twice per week per monitoring plan	
• Increased level monitoring of Annulus	COMPLETE
◦ Monitor each Shift	
• Perform bi-weekly monitoring of CAM	COMPLETE
• Develop tank specific history timeline	COMPLETE
◦ Tank contents, Operational Events & Radiological Events	
• Initiate activities to obtain samples of materials	IN PROGRESS
◦ Data Quality Objective (DQO) and Sample Plan under development	
◦ Obtain annulus samples mid to late September	
• Initiate Tank Assessment Process	IN PROGRESS
◦ Use TFC-ENG-CHEM-D-42, *Tank Leak Assessment Process*	
◦ Complete assessment about 1 week after sample results are reported	
• Document near term and long term actions in Engineering Path Forward	IN PROGRESS

Near Term Actions

- **Initiate tank annulus inspection (accessible areas)**
  - Developed List of Accessible Risers – Complete
  - Developing Work Package and Inspection Criteria – In Progress
  - Annulus inspection planned for week of August 27, 2012
- **Develop Contingency Plan to Transfer AY-102 Contents**
  - Developing transfer procedure – In Progress
  - Developing Work packages to verify transfer system components are operational (motors, valves, piping) – In Progress
  - Task Ready to Transfer – in 6 to 8 weeks (as non-emergency)
- **Sample & pump tertiary leak detection pit**
  (Confirms secondary liner integrity)
  - Review procedure and issue sample request – In Progress
  - Ready to sample and pump contents – by August 30

Long Term Actions

- **Determine Extent of Condition (i.e., applicability to other tanks)**
  - Developing list of tanks for accelerated inspection (up to 7 tanks)
    - Similar Tank Construction and Operating History
    - Similar Process History
- **Initiate planning to inspect Ventilation piping and adjacent ventilation slots to assess cause**
  - Determining feasibility to perform inspection of ventilation piping
  - Developing work package to inspect ventilation slots
    - Evaluating ability to perform concurrent with annulus inspection
- **Explore means for removing material from annulus**
  - Initiated discussions with robotic crawler vendors

Conclusion

- Tank is stable with enhanced monitoring in place
- Investigat on in progress to determine source of dried solids on floor of annulus and material condition of tank components
- Extent of Condition Evaluation initiated
- Actions underway to mitigate hazard should conditions within the annulus change
- Tank Waste Mission essential to mitigate risk associated with aging waste tanks

Huffman, Lori A

From: Voogd, Jeffry A
Sent: Thursday, August 30, 2012 9:15 AM
To: Huffman, Lori A
Cc: Killoy, Steven E; Bowser, Dennis W; Penn, Lucinda L; Dyekman, Dale L
Subject: RE: WDOH Briefing on AY-102 Status

Sampling of Rad material in the annulus is not scheduled for several weeks. On Tuesday at the RTAM we discussed the mechanism for sampling the annulus. WDOH is in agreement to use an ALARACT specific to the annulus. It is in the works.

There is sampling scheduled of water in the leak detection pit LDP for next week. There is no ventilation system on the LDP. The LDP sampling effort will be covered under existing ALARACTS

From: Huffman, Lori A
Sent: Thursday, August 30, 2012 9:06 AM
To: Voogd, Jeffry A; Bowser, Dennis W
Subject: RE: WDOH Briefing on AY-102 Status

I thought inspection and sampling was scheduled for this week – do we already have coverage under the air permitting regs? Thanks, Lori

---

From: Voogd, Jeffry A
Sent: Friday, August 24, 2012 10:29 AM
To: Sams, Terry L; Bowser, Dennis W; Killoy, Steven E; Huffman, Lori A; Little, David B
Cc: Strasser, David W; Dyekman, Dale L; Wilkinson, Robert E
Subject: WDOH Briefing on AY-102 Status

Meeting with WDOH started cautiously but ended well.

WDOH concerns:

Phrases within the public releases regarding radioactive "samples" that were taken from the annulus.
Existing documentation that discusses 0 potential to emit (PTE).
Courteously discussion (rather than formal notification) with them to enable the responses to public enquiries.

Follow up actions:

WDOH is requiring an ALARACT for the investigative activities in the annulus. Action: Dyekman, Penn, Crummel Due: mid September date tbd

WDOH is requesting an update to RPP-29791, "Tank Farm Stack Designation" to address previous statements of 0 PTE from the annulus. Due: tbd

Update the Environmental Notification procedure to address public information inquiry situations: Joint action WRPS Environ – WDOH on process

Jeff Voogd

Huffman, Lori A

From: Voogd, Jeffry A
Sent: Sunday, August 19, 2012 6:26 PM
To: Johnson, Jeremy M
Cc: Huffman, Lori A; Killoy, Steven E
Subject: RE: Feb 2012 PER on AY-102 ENRAF

Jeremy,

I don't think we have a regulatory problem with the PER. WRPS sent a notification to Ecology on this subject on 10/13. See the link below.

http://idmsweb.rl.gov/idms/livelink.exe?func=ll&objId=165542289&objAction=Open&nexturl=%2Fidms%2Flivelink%2Eexe%3Ffunc%3Dll%26objid%3D165529748%26objAction%3Dbrowse%26sort%3Dname%26viewType%3D1

The PER itself alludes to the wet weather .

Jeff

From: Johnson, Jeremy M
Sent: Thursday, August 16, 2012 3:13 PM
To: Voogd, Jeffry A
Subject: FW: Feb 2012 PER on AY-102 ENRAF

Jeff,

Please take a look at this PER and make sure there are not compliance issues before I send to ECY.

Thanks,

Jeremy

<< File: WRPS-PER-2011-2120.htm >>

From: Hendrickson, Michelle (ECY) [mailto:MICH461@ecy.wa.gov]
Sent: Thursday, August 16, 2012 9:52 AM
To: Boomer, Kayle D; Washington Alaskan Malamute Adoption League (wamal@wamal.com); Whalen, Cheryl (ECY); Lyon, Jeffery; Wold, Kristi (Washington State Department of Ecology)
Cc: Johnson, Jeremy M; McFadden, Daina (ECY)
Subject: Feb 2012 PER on AY-102 ENRAF

Gentlemen~

I did an IDMS search and could not locate the February PER for the ENRAF in the annulus in the 241-AY-102 Tank. I then went to the WRPS web site and did not have access to the PER program.

Please if you would send me a copy.

Thanks,
Michelle

Enclosure V

BOX NUMBER	ORG/DEPT	BOX DESCRIPTION	SCHEDULE	DATE RECEIVED	
207374	MSA - 59/07/05	Engineering Change Notices (ECN)	ADM-17.31a1	1/25/2012	BOX

IDMS SQL
AY-102 (Title/Desc/Keyword)

OBJID	DOCNO	DATE	TITLE	PAGES	RHA BOX #	ACC RIGHTS	IDMS CATEGORY
63362910	H-2-93374	15-Oct-87	241-AY-102 ANNULUS EXHAUST STACK MONITOR INSTALLATION	1	RD527K	(null)	Techdata_Mig
63162181	H-2-79276	15-Mar-94	TWRS, AY-102-02B SLUICE PIT AGITATOR PUMP FLEX RCVR BAG ASSY	1	RD527K	(null)	Techdata_Mig
62863288	H-2-131087	24-May-94	PIPING DETAILS MODULE TIE-IN FOR AY-102	1	RD81	(null)	Techdata_Mig
63161963	H-2-79219	28-Jun-94	TWRS - 42" FLEXIBLE RECEIVER ASSEMBLY AY-102-02B SLUICE PIT	1	RD148K	(null)	Techdata_Mig
64873451	WHC-SD-WM-ES-290	24-Aug-94	CHEMICAL COMPATIBILITY OF TANK WASTES IN 241-C-106 - 241-AY-101 AND241-AY-102	112	179729	(null)	Techdata_Mig
64873451	WHC-SD-WM-ES-290	24-Aug-94	CHEMICAL COMPATIBILITY OF TANK WASTES IN 241-C-106 - 241-AY-101 AND241-AY-102	112	179729	(null)	Techdata_Mig
64873451	WHC-SD-WM-ES-290	24-Aug-94	CHEMICAL COMPATIBILITY OF TANK WASTES IN 241-C-106 - 241-AY-101 AND241-AY-102	112	179729	(null)	Techdata_Mig
63162182	H-2-79276	3-Nov-94	TWRS, AY-102-02B SLUICE PIT AGITATOR PUMP FLEX RCVR BAG ASSY	1	RD149E	(null)	Techdata_Mig
63162183	H-2-79276	3-Nov-94	TWRS, AY-102-02B SLUICE PIT AGITATOR PUMP FLEX RCVR BAG ASSY	1	RD149E	(null)	Techdata_Mig
60870321	ECN-618315	13-Feb-95	AY-102 TRANSFER	3	130008	(null)	Techdata_Mig
60873267	ECN-619176	19-Dec-95	AY-102 ANNULUS CAM CONTROL	15	M0019	(null)	Techdata_Mig
64859799	WHC-SD-W320-TI-003	26-Mar-96	AN ANALYSIS OF ENERGY AND TEMPERATURE EFFECTS FOR TANK 241-AY-102	131	179649	(null)	Techdata_Mig
64859799	WHC-SD-W320-TI-003	26-Mar-96	AN ANALYSIS OF ENERGY AND TEMPERATURE EFFECTS FOR TANK 241-AY-102	131	179649	(null)	Techdata_Mig
64859799	WHC-SD-W320-TI-003	26-Mar-96	AN ANALYSIS OF ENERGY AND TEMPERATURE EFFECTS FOR TANK 241-AY-102	131	179649	(null)	Techdata_Mig
63154475	H-2-77323	2-May-96	ABANDONED ANNULUS VENT PIPING TANK 241-AY-102	1	RD90	(null)	Techdata_Mig
63344646	H-2-818560	17-Jun-96	PROJECT W-320 P&ID TK 241-AY-102	1	RD105	(null)	Techdata_Mig
60836015	ECN-609992	15-Jul-96	CHEMICAL & CHEMICALLY RELATED CONSIDERATIONS ASSOCIATED WITH SLUICING TANK C-106 TO TANK AY-102	2	135868	(null)	Techdata_Mig
64858567	WHC-SD-W320-EIP-001	26-Jul-96	TANK 241-AY-102,IMMERSIBLE PUMP P-0621- WINCH ASSEMBLY W-0621, ASSEMBLY AND INSTALLATION INSTRUCTIONS	11	179648	(null)	Techdata_Mig
61011527	ECN-633703	27-Aug-96	AY-102 LEVEL GAUGE	8	M0179	(null)	Techdata_Mig
61012113	ECN-633702	27-Aug-96	AY-102 DENSITOMETER	8	M0179	(null)	Techdata_Mig
63194489	H-2-818560	26-Jan-97	PROJECT W-320 P & ID TANK 241-AY-102	1	RD152C	(null)	Techdata_Mig
63194972	H-2-818560	26-Jan-97	PROJECT W-320 P & ID TK 241-AY-102	1	RD152C	(null)	Techdata_Mig
63195067	H-2-818560	26-Jan-97	PROJECT W-320 P & ID TANK 241-AY-102	1	RD152C	(null)	Techdata_Mig
60873863	ECN-619176	20-Feb-97	AY-102 ANNULUS CAM CONTROL	1	M0300	(null)	Techdata_Mig
63194050	H-2-818568	26-Feb-97	INSTRUMENTATION INSTRUMENTS LOCATION PLAN TANK 241-AY-102	1	RD152C	(null)	Techdata_Mig
63194539	H-2-818540	26-Feb-97	PIPING TANK 241-AY-102 DETAILS	1	RD150K	(null)	Techdata_Mig
63194541	H-2-818540	26-Feb-97	PIPING TANK 241-AY-102 SECTIONS & DETAILS	1	RD150K	(null)	Techdata_Mig
63194490	H-2-818560	26-Feb-97	PROJECT W-320 P & ID TANK 241-AY-102	1	RD152C	(null)	Techdata_Mig
63194538	H-2-818540	26-Feb-97	PIPING TANK 241-AY-102 PLAN	1	RD152B	(null)	Techdata_Mig
63194540	H-2-818540	26-Feb-97	PIPING TANK 241-AY-102 SECTIONS & DETAILS	1	RD150K	(null)	Techdata_Mig
63192289	H-2-818434	26-Feb-97	CIVIL 241-AY-102 TRANSFER SYSTEM PLAN & PROFILE	1	RD152B	(null)	Techdata_Mig
63194410	H-2-818541	26-Feb-97	PIPING TANK 241-AY-102 SECTION & PLAN	1	RD152B	(null)	Techdata_Mig
63196237	H-2-818602	20-Mar-97	INSTRUMENTATION LOOP DIAGRAM TANK 241-AY-102 PRESSURE	1	RD154D	(null)	Techdata_Mig
64685538	HNF-SD-WM-TI-756	4-Apr-97	CHEMICAL AND CHEMICALLY-RELATED CONSIDERATIONS ASSOCIATED WITH SLUICING TANK C-106 WASTE TO TANK AY-102	204	179785	(null)	Techdata_Mig
64685538	HNF-SD-WM-TI-756	4-Apr-97	CHEMICAL AND CHEMICALLY-RELATED CONSIDERATIONS ASSOCIATED WITH SLUICING TANK C-106 WASTE TO TANK AY-102	204	179785	(null)	Techdata_Mig
61510157	ECN-W320-596	17-Apr-97	TANK AY-102 PIT MODIFICATIONS	12	151410	(null)	Techdata_Mig
64674336	HNF-SD-W320-CN-001	25-Apr-97	TANK FARM DEFLAGRATION RATES DUE TO VARIOUS IGNITION SOURCES RELATEDTO SLUICING C-106 TO AY-102	56	179648	(null)	Techdata_Mig
64674336	HNF-SD-W320-CN-001	25-Apr-97	TANK FARM DEFLAGRATION RATES DUE TO VARIOUS IGNITION SOURCES RELATEDTO SLUICING C-106 TO AY-102	56	179648	(null)	Techdata_Mig
61036671	ECN-638510	22-May-97	AY-102 ANNULUS CAM CONTROL	3	151431	(null)	Techdata_Mig

IDMS SQL
AY-102 (Title/Desc/Keyword)

63362650	H-2-93374	30-May-97	241-AY-102 ANNULUS EXHAUST STACK MONITOR FLOW DIA & ELEC	1	RD172C		(null)	Techdata_Mig
64674234	HNF-SD-W320-ABU-003	26-Jun-97	PROJECT W-320, 241-AY-102 02A PIT EQUIPMENT AND MODIFICATIONS DOCUMENTATION REQUIRED FOR ACCEPTANCE OF BENEFICIAL USE	253	179647		(null)	Techdata_Mig
64674234	HNF-SD-W320-ABU-003	26-Jun-97	PROJECT W-320, 241-AY-102 02A PIT EQUIPMENT AND MODIFICATIONS DOCUMENTATION REQUIRED FOR ACCEPTANCE OF BENEFICIAL USE	253	179647		(null)	Techdata_Mig
64673212	HNF-SD-TWR-PE-001	14-Jul-97	COMPUTER SIMULATION OF THE LEACHING AND WASHING OF WASTE IN TANKS C-106 AY-102 AZ-101 AND AZ-102	288	179708		(null)	Techdata_Mig
64673212	HNF-SD-TWR-PE-001	14-Jul-97	COMPUTER SIMULATION OF THE LEACHING AND WASHING OF WASTE IN TANKS C-106 AY-102 AZ-101 AND AZ-102	288	179708		(null)	Techdata_Mig
64673212	HNF-SD-TWR-PE-001	14-Jul-97	COMPUTER SIMULATION OF THE LEACHING AND WASHING OF WASTE IN TANKS C-106 AY-102 AZ-101 AND AZ-102	288	179708		(null)	Techdata_Mig
64676918	HNF-SD-WM-CN-110	5-Aug-97	CONSEQUENCES OF A RADIOACTIVE SURFACE POOL RESULTING FROM WASTE TRANSFER OPERATIONS BETWEEN TANKS 241-C-106 AND 241-AY-102	259	179714		(null)	Techdata_Mig
64676918	HNF-SD-WM-CN-110	5-Aug-97	CONSEQUENCES OF A RADIOACTIVE SURFACE POOL RESULTING FROM WASTE TRANSFER OPERATIONS BETWEEN TANKS 241-C-106 AND 241-AY-102	259	179714		(null)	Techdata_Mig
129265583	H-2-131366	31-Oct-97	ELECTRICAL ELEMENTARY DIAGRAM EVAP TWR AY-102	1	RD214B		(null)	Techdata_Mig
129265369	H-2-131366	31-Oct-97	ELECTRICAL ELEMENTARY DIAGRAM RECIRC BLDG AY-101 & AY-102	1	RD214B		(null)	Techdata_Mig
129271926	H-2-131087	14-Nov-97	PIPING DETAILS MODULE TIE-IN FOR AY-102	1	RD218D		(null)	Techdata_Mig
61510272	ECN-W320-688	19-Nov-97	DELETE INSTALLATION OF 241-AY-102 DOME SPACE HUMIDITY MONITOR	2	151429		(null)	Techdata_Mig
64675046	HNF-SD-WM-ABU-024	18-Dec-97	241-C-106 AND 241-AY-102 SHMS-C ACCEPTANCE FOR BENEFICAL USE ABU	18	179709		(null)	Techdata_Mig
64675046	HNF-SD-WM-ABU-024	18-Dec-97	241-C-106 AND 241-AY-102 SHMS-C ACCEPTANCE FOR BENEFICAL USE ABU	18	179709		(null)	Techdata_Mig
61075367	ECN-645848L	13-Jan-98	SUPPORT AY-102 ANNULUS VENTILATION AIR TEST	5	151410		(null)	Techdata_Mig
61510691	ECN-W320-730	28-Jan-98	SUPPORT AY-102 JUMPER FABRICATION	3	151409		(null)	Techdata_Mig
61068950	ECN-644544	3-Feb-98	ENRAF LEVEL GAUGE UPGRADE / AY-102	17	151409		(null)	Techdata_Mig
61080139	ECN-647017	11-Feb-98	ADD LEAK DETECTOR TO RISER #15-I ON TK-AY-102	3	151439		(null)	Techdata_Mig
63194975	H-2-818560	26-Feb-98	PROJECT W-320 P&ID TANK 241-AY-102	1	RD241		(null)	Techdata_Mig
138586974	H-2-818560	26-Feb-98	PROJECT W-320 P & ID TANK 241-AY-102	1	RD241		(null)	Techdata_Mig
138586877	H-2-818560	26-Feb-98	PROJECT W-320 P & ID TANK 241-AY-102	1	RD241		(null)	Techdata_Mig
138587130	H-2-818560	26-Feb-98	PROJECT W-320 P & ID TANK 241-AY-102	1	RD241		(null)	Techdata_Mig
138587214	H-2-818560	26-Feb-98	PROJECT W-320 P & ID TK 241-AY-102	1	RD241		(null)	Techdata_Mig
64634759	HNF-2317	12-Mar-98	PROJECT W-320 HIGH VACUUM 241-AY-102 ANNULUS VENTILATION SYSTEM OPERABILITY TEST RPORT	259	SD1330		(null)	Techdata_Mig
64635352	HNF-2312	23-Mar-98	ACCEPTANCE TEST REPORT FOR THE AY-102 ENRAF DENSITOMETER	50	SD1351		(null)	Techdata_Mig
64635352	HNF-2312	23-Mar-98	ACCEPTANCE TEST REPORT FOR THE AY-102 ENRAF DENSITOMETER	50	SD1351		(null)	Techdata_Mig
129272134	H-2-131087	7-Apr-98	PIPING DETAILS MODULE TIE-IN FOR AY-102	1	RD246A		(null)	Techdata_Mig
138587105	H-2-818540	8-Apr-98	PIPING TANK 241-AY-102 PLAN	1	RD246B		(null)	Techdata_Mig
138586855	H-2-818541	8-Apr-98	PIPING TANK 241-AY-102 SECTION & PLAN	1	RD246C		(null)	Techdata_Mig
138586662	H-2-818540	9-Apr-98	PIPING TANK 241-AY-102 SECTIONS & DETAILS	1	RD246B		(null)	Techdata_Mig
138586437	H-2-818434	13-Apr-98	CIVIL 241-AY-102 TRANSFER SYSTEM PLAN & PROFILE	1	RD247		(null)	Techdata_Mig
138587919	H-2-820724	13-Apr-98	CIVIL 241-AY-102 ENLARGED SITE PLAN	1	RD247A		(null)	Techdata_Mig
63194552	H-2-818540	24-Apr-98	PIPING TANK 241-AY-102 SECTIONS & DETAILS	1	RD248E		(null)	Techdata_Mig
138586581	H-2-818540	24-Apr-98	PIPING TANK 241-AY-102 DETAILS	1	RD248E		(null)	Techdata_Mig
138586951	H-2-818540	24-Apr-98	PIPING TANK 241-AY-102 SECTIONS & DETAILS	1	RD248E		(null)	Techdata_Mig
138587227	H-2-818568	24-Apr-98	INSTRUMENTATION INSTRUMENTS LOCATION PLAN TANK 241-AY-102	1	RD248D		(null)	Techdata_Mig
63194550	H-2-818540	24-Apr-98	PIPING TANK 241-AY-102 SECTIONS & DETAILS	1	RD248E		(null)	Techdata_Mig
63194551	H-2-818540	24-Apr-98	PIPING TANK 241-AY-102 SECTIONS & DETAILS	1	RD248E		(null)	Techdata_Mig
138586876	H-2-818560	27-Apr-98	PROJECT W-320 P & ID TK 241-AY-102	1	RD248E		(null)	Techdata_Mig

IDMS SQL
AY-102 (Title/Desc/Keyword)

138586683	H-2-818560	27-Apr-98	PROJECT W-320 P&ID TANK 241-AY-102		1	RD248E	(null)	Techdata_Mig
138587213	H-2-818560	27-Apr-98	PROJECT W-320 P & ID TANK 241-AY-102		1	RD248E	(null)	Techdata_Mig
138586973	H-2-818560	27-Apr-98	PROJECT W-320 P & ID TANK 241-AY-102		1	RD248E	(null)	Techdata_Mig
138587132	H-2-818560	27-Apr-98	PROJECT W-320 P & ID TANK 241-AY-102		1	RD248E	(null)	Techdata_Mig
63195500	H-2-818568	28-Apr-98	INSTRUMENTATION TANK 241-AY-102 VC--622 ARRANGEMENT		1	RD250	(null)	Techdata_Mig
63194051	H-2-818568	28-Apr-98	INSTRUMENTATION TANK 241-AY-102 DET & CONN DIAG		1	RD250	(null)	Techdata_Mig
63195371	H-2-818568	28-Apr-98	INSTRUMENTATION TANK 241-AY-102 INSTALLATION DETAILS		1	RD250	(null)	Techdata_Mig
138587255	H-2-818602	28-Apr-98	INSTRUMENTATION LOOP DIAGRAM TANK 241-AY-102 PRESSURE		1	RD250A	(null)	Techdata_Mig
61067211	ECN-644544	6-May-98	ENRAF LEVEL GAUGE UPGRADE / AY-102		18	151440	(null)	Techdata_Mig
125926274	HNF-SD-W320-PROC-001	20-May-98	PROJECT W320 TANK 241-AY-102 PUMP/WINCH MAINTENANCE PROCEDURE		34	179649	(null)	Techdata_Mig
61073234	ECN-645848L	4-Jun-98	SUPPORT AY-102 ANNULUS VENTILATION AIR TEST		1	151430	(null)	Techdata_Mig
165712073	H-2-131366	9-Jun-98	ELECTRICAL ELEMENTARY DIAGRAM EVAP TWR AY-102	(null)	(null)	(null)	(null)	Techdata_Mig
129262260	H-2-131366	9-Jun-98	ELECTRICAL ELEMENTARY DIAGRAM EVAP TWR AY-102		1	RD260D	(null)	Techdata_Mig
129265580	H-2-131366	9-Jun-98	ELECTRICAL ELEMENTARY DIAGRAM RECIRC BLDG AY-101 & AY-102		1	RD261F	(null)	Techdata_Mig
165712073	H-2-131366	9-Jun-98	ELECTRICAL ELEMENTARY DIAGRAM EVAP TWR AY-102	(null)	(null)	(null)	(null)	Techdata_Mig
61086064	ECN-647828	25-Jun-98	SUPPORT REPLACEMENT OF TANK AY-102 ANNULUS AIR FLOW MONITORING INSTRUMENTS		23	151475	(null)	Techdata_Mig
63083540	H-2-64462	24-Jul-98	P&ID TANK 241-AY-102 ANNULUS		1	RD273E	(null)	Techdata_Mig
138587586	H-2-820724	24-Jul-98	CIVIL 241-AY-102 ENLARGED SITE PLAN		1	RD275C	(null)	Techdata_Mig
64640953	HNF-2965	24-Jul-98	OPERATIONAL TEST REPORT FOR THE AY-102 ENRAF DENSITOMETER CONTROL AND ACQUISITION SYSTEM		120	SD1678	(null)	Techdata_Mig
138586681	H-2-818560	26-Jul-98	PROJECT W-320 P & ID TANK 241-AY-102		1	RD275C	(null)	Techdata_Mig
138586975	H-2-818560	26-Jul-98	PROJECT W-320 P&ID TANK 241-AY-102		1	RD275C	(null)	Techdata_Mig
138586682	H-2-818560	26-Jul-98	PROJECT W-320 P & ID TANK 241-AY-102		1	RD275C	(null)	Techdata_Mig
138587131	H-2-818560	26-Jul-98	PROJECT W-320 P & ID TK 241-AY-102		1	RD275C	(null)	Techdata_Mig
138586875	H-2-818560	26-Jul-98	PROJECT W-320 P & ID TANK 241-AY-102		1	RD275C	(null)	Techdata_Mig
138586582	H-2-818540	5-Aug-98	PIPING TANK 241-AY-102 SECTIONS & DETAILS		1	RD276E	(null)	Techdata_Mig
138587108	H-2-818541	5-Aug-98	PIPING TANK 241-AY-102 SECTION & PLAN		1	RD276E	(null)	Techdata_Mig
138586852	H-2-818540	5-Aug-98	PIPING TANK 241-AY-102 PLAN		1	RD276E	(null)	Techdata_Mig
138587107	H-2-818540	5-Aug-98	PIPING TANK 241-AY-102 SECTIONS & DETAILS		1	RD276E	(null)	Techdata_Mig
61083329	ECN-647828	7-Aug-98	SUPPORT REPLACEMENT OF TANK AY-102 ANNULUS AIR FLOW MONITORING INSTRUMENTS		1	151495	(null)	Techdata_Mig
63195503	H-2-818568	11-Aug-98	INSTRUMENTATION TANK 241-AY-102 FLOW XMTR ENCL ASSY		1	RD276H	(null)	Techdata_Mig
63194054	H-2-818568	11-Aug-98	INSTRUMENTATION TANK 241-AY-102 SECTIONS & DETAILS		1	RD276H	(null)	Techdata_Mig
63195376	H-2-818568	11-Aug-98	INSTRUMENTATION TANK 241-AY-102 FLOW XMTR ENCL DETAILS		1	RD276H	(null)	Techdata_Mig
138586991	H-2-818568	11-Aug-98	INSTRUMENTATION TANK 241-AY-102 DET & CONN DIAG		1	RD279C	(null)	Techdata_Mig
138587419	H-2-818602	11-Aug-98	INSTRUMENTATION LOOP DIAGRAM TANK 241-AY-102 PRESSURE		1	RD279D	(null)	Techdata_Mig
138586990	H-2-818568	11-Aug-98	INSTRUMENTATION TANK 241-AY-102 INSTALLATION DETAILS		1	RD279C	(null)	Techdata_Mig
138587106	H-2-818540	11-Aug-98	PIPING TANK 241-AY-102 DETAILS		1	RD279C	(null)	Techdata_Mig
138587502	H-2-818568	11-Aug-98	INSTRUMENTATION TANK 241-AY-102 VC--622 ARRANGEMENT		1	RD279C	(null)	Techdata_Mig
138586952	H-2-818540	11-Aug-98	PIPING TANK 241-AY-102 SECTIONS & DETAILS		1	RD279C	(null)	Techdata_Mig
138587304	H-2-818568	11-Aug-98	INSTRUMENTATION TANK 241-AY-102 INSTRUMENTS LOCATION PLAN		1	RD276H	(null)	Techdata_Mig
64638951	HNF-2637	31-Aug-98	PROJECT W-320 PORTABLE EXHAUSTER EVALUATION FOR TANK 241-AY-102		33	SD1810	(null)	Techdata_Mig
61067202	ECN-644494	28-Sep-98	TANK CHARACTERIZATION REPORT FOR DOUBLE-SHELL TANK 241-AY-102		2	161686	(null)	Techdata_Mig
126300450	WHC-SD-WM-ES-290	28-Sep-98	CHEMICAL COMPATIBILITY OF TANK WASTES IN 241-C-106 - 241-AY-101 AND241-AY-102		5	179729	(null)	Techdata_Mig
61065855	ECN-644154	28-Sep-98	CHEMICAL COMPATIBILITY OF TANK WASTES IN 241-C-106, 241-AY-101 AND 241-AY-102		2	179729	(null)	Techdata_Mig
126300450	WHC-SD-WM-ES-290	28-Sep-98	CHEMICAL COMPATIBILITY OF TANK WASTES IN 241-C-106 - 241-AY-101 AND241-AY-102		5	179729	(null)	Techdata_Mig
126300450	WHC-SD-WM-ES-290	28-Sep-98	CHEMICAL COMPATIBILITY OF TANK WASTES IN 241-C-106 - 241-AY-101 AND241-AY-102		5	179729	(null)	Techdata_Mig
64644705	HNF-3254	8-Oct-98	CONTINGENCY PLAN FOR DEPLOYMENT OF THE VOID FRACTION INSTRUMENT IN TANK 241-AY-102		17	SD1950	(null)	Techdata_Mig

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61073036	ECN-645848L	9-Nov-98	SUPPORT AY-102 ANNULUS VENTILATION AIR TEST		5	144828	(null)	Techdata_Mig
125926604	HNF-SD-WM-CN-099	16-Dec-98	RADIOLOGICAL AND TOXICOLOGICAL ANALYSES OF TANK 241-AY-102 AND TANK 241-C-106 VENTILATION SYSTEMS		57	179714	(null)	Techdata_Mig
125926604	HNF-SD-WM-CN-099	16-Dec-98	RADIOLOGICAL AND TOXICOLOGICAL ANALYSES OF TANK 241-AY-102 AND TANK 241-C-106 VENTILATION SYSTEMS		57	179714	(null)	Techdata_Mig
134639279	H-2-64462	30-Dec-98	P&ID TANK 241-AY-102 ANNULUS		1	RD326	(null)	Techdata_Mig
138586890	H-2-818568	18-Feb-99	INSTRUMENTATION TANK 241-AY-102 INSTALLATION DETAILS		1	RD344G	(null)	Techdata_Mig
153211869	H-2-818434	2-Jun-99	CIVIL 241-AY-102 TRANSFER SYSTEM PLAN & PROFILE	(null)		(null)	(null)	Techdata_Mig
126307279	WHC-SD-WM-ER-454	4-Jun-99	TANK CHARACTERIZATION REPORT FOR DOUBLE-SHELL TANK 241-AY-102		18	161686	(null)	Techdata_Mig
61118359	ECN-653811	4-Jun-99	TANK 241-AY-102 TANK CHARACTERIZATION REPORT PAGE CHANGE		2	161686	(null)	Techdata_Mig
138586891	H-2-818568	17-Jun-99	INSTRUMENTATION TANK 241-AY-102 DET & CONN DIAG		1	RD397B	(null)	Techdata_Mig
64654260	HNF-4818	21-Jul-99	FINAL RESULTS OF DOUBLE-SHELL TANK 241-AY-102 ULTRASONIC INSPECTION		61	ED0369	(null)	Techdata_Mig
64653972	HNF-4798	28-Jul-99	TANK 241-AY-102 ANNULUS CONTINUOUS AIR MONITOR HIGH READINGS		15	SD2457	(null)	Techdata_Mig
138586853	H-2-818540	10-Aug-99	PIPING TANK 241-AY-102 DETAILS		1	811W	(null)	Techdata_Mig
125669466	HNF-2958	18-Aug-99	TANK 241-AY-102 GRAB SAMPLING AND ANALYSIS PLAN FOR WASTE RETRIEVAL SLUICING SYSTEM PROCESS CONTROL		9	ED0407	(null)	Techdata_Mig
64655031	HNF-5391	17-Nov-99	TEST PLAN FOR RETRIEVAL TESTING OF SLUDGE FROM TANKS 241-AZ-101, 241-AZ-102, AND 241-AY-102		14	ED0590	(null)	Techdata_Mig
64655031	HNF-5391	17-Nov-99	TEST PLAN FOR RETRIEVAL TESTING OF SLUDGE FROM TANKS 241-AZ-101, 241-AZ-102, AND 241-AY-102		14	ED0590	(null)	Techdata_Mig
64655031	HNF-5391	17-Nov-99	TEST PLAN FOR RETRIEVAL TESTING OF SLUDGE FROM TANKS 241-AZ-101, 241-AZ-102, AND 241-AY-102		14	ED0590	(null)	Techdata_Mig
64628654	HNF-1682	10-Feb-00	TANK 241-AY-102, GRAB SAMPLES FOR THE WASTE RETRIEVAL SLUICING PROJECT ANALYTICAL RESULTS FOR THE FINAL REPORT		3405	ED0740	(null)	Techdata_Mig
64628654	HNF-1682	10-Feb-00	TANK 241-AY-102, GRAB SAMPLES FOR THE WASTE RETRIEVAL SLUICING PROJECT ANALYTICAL RESULTS FOR THE FINAL REPORT		3405	ED0740	(null)	Techdata_Mig
138623171	H-2-93374	28-Feb-00	241-AY-102 ANNULUS EXHAUST STACK MONITOR FLOW DIA & ELEC		1	0229Y	(null)	Techdata_Mig
134648368	H-2-64462	28-Feb-00	P&ID TANK 241-AY-102 ANNULUS		1	0229Y	(null)	Techdata_Mig
129262258	H-2-131366	20-Mar-00	ELECTRICAL ELEMENTARY DIAGRAM RECIRC BLDG AY-101 & AY-102		1	0321Y	(null)	Techdata_Mig
62701007	H-14-010506	30-Mar-00	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102		1	0404V	(null)	Techdata_Mig
62701010	H-14-010506	30-Mar-00	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102		1	0404V	(null)	Techdata_Mig
126254336	TWR-2103	20-Apr-00	RPP RETRIEVAL LEVEL 1 LOGIC WASTE FEED DELIVERY HLW FEED BATCHES TANK 241-AY-102		6	SD2707	(null)	Techdata_Mig
134648467	H-2-64462	8-May-00	P&ID TANK 241-AY-102 ANNULUS		1	0508Y	(null)	Techdata_Mig
64731641	RPP-6463	9-Aug-00	THERMAL ANALYSES FOR TANKS 241-AY-102 AND 241-C-106		138	ED1084	(null)	Techdata_Mig
64731641	RPP-6463	9-Aug-00	THERMAL ANALYSES FOR TANKS 241-AY-102 AND 241-C-106		138	ED1084	(null)	Techdata_Mig
134638759	H-2-64462	28-Aug-00	P&ID TANK 241-AY-102 ANNULUS		1	RD446R	(null)	Techdata_Mig
64731664	RPP-6646	30-Aug-00	CONTROL DECISION RECORD FOR POST SLUICING CONDITIONS IN TANKS 241-C-106 AND 241-AY-102		53	ED1136	(null)	Techdata_Mig
64731664	RPP-6646	30-Aug-00	CONTROL DECISION RECORD FOR POST SLUICING CONDITIONS IN TANKS 241-C-106 AND 241-AY-102		53	ED1136	(null)	Techdata_Mig
61158860	ECN-660350	31-Aug-00	TANK 241-AY-102 PUSH MODE CORE SAMPLING AND ANALYSIS PLAN		3	ED1143	(null)	Techdata_Mig
125687369	HNF-6047	25-Sep-00	TANK 241-AY-102 CORES 270, 271, 272, AND 273 ANALYTICAL RESULTS FOR THE FINAL REPORT		341	SD2868	(null)	Techdata_Mig
125687369	HNF-6047	25-Sep-00	TANK 241-AY-102 CORES 270, 271, 272, AND 273 ANALYTICAL RESULTS FOR THE FINAL REPORT		341	SD2868	(null)	Techdata_Mig
61137858	ECN-657171	16-Oct-00	PROVIDE REMOTE DATA FROM THE TANK 241-AY-101 AND 241-AY-102 ANNULUS CAMS		26	157635	(null)	Techdata_Mig
164077140	H-2-131366	6-Nov-00	ELECTRICAL ELEMENTARY DIAGRAM RECIRC BLDG AY-101 & AY-102	(null)		(null)	(null)	Techdata_Mig
129263995	H-2-131366	6-Nov-00	ELECTRICAL ELEMENTARY DIAGRAM RECIRC BLDG AY-101 & AY-102		1	RD462I	(null)	Techdata_Mig
164077140	H-2-131366	6-Nov-00	ELECTRICAL ELEMENTARY DIAGRAM RECIRC BLDG AY-101 & AY-102	(null)		(null)	(null)	Techdata_Mig
129158869	H-14-010506	17-Nov-00	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102		1	RD464I	(null)	Techdata_Mig
129157910	H-14-010506	17-Nov-00	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102		1	RD464I	(null)	Techdata_Mig
64678342	HNF-SD-WM-ER-454	3-Jan-01	TANK CHARACTERIZATION REPORT FOR DOUBLE-SHELL TANK 241-AY-102		34	ED1493	(null)	Techdata_Mig
125960949	RPP-5378	31-Jan-01	TANK 241-AY-102 PUSH MODE CORE SAMPLING AND ANALYSIS PLAN		22	ED1542	(null)	Techdata_Mig

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126008941	RPP-7274	31-Jan-01	TANK 241-AY-102 GRAB SAMPLING AND ANALYSIS PLAN	17	ED1542	(null)	Techdata_Mig
64736370	RPP-7772	15-Mar-01	TANK 241-AY-102 GRAB SAMPLING AND ANALYSIS PLAN FOR POST CAUSTIC ADDITION	28	ED1631	(null)	Techdata_Mig
129158128	H-14-010506	20-Jun-01	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102	1	RD495P	(null)	Techdata_Mig
126013936	RPP-8909	27-Sep-01	RESULTS OF RETRIEVAL TESTING OF SLUDGE FROM TANK 241-AY-102	197	RM0437	(null)	Techdata_Mig
64738872	RPP-8474	18-Oct-01	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	119	161822	(null)	Techdata_Mig
64738872	RPP-8474	18-Oct-01	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	119	161822	(null)	Techdata_Mig
126009002	RPP-8474	20-Oct-01	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	9	161822	(null)	Techdata_Mig
126009002	RPP-8474	20-Oct-01	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	9	161822	(null)	Techdata_Mig
64739424	RPP-8851	29-Oct-01	EVALUATION OF ADDITION OF WATER FROM TANK 241-AY-101 AND TANK 241-AY-102 ANNULI PRIMARY TANK CLEANING OPERATIONS TO TANK 241-AY-101	31	ED2126	(null)	Techdata_Mig
126010914	RPP-8474	30-Oct-01	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	43	161822	(null)	Techdata_Mig
64740351	RPP-9125	30-Oct-01	EVALUATION OF SODIUM NITRATE ADDITION WITH TANK 241-AY-102	34	ED2126	(null)	Techdata_Mig
126010914	RPP-8474	30-Oct-01	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	43	161822	(null)	Techdata_Mig
64740351	RPP-9125	30-Oct-01	EVALUATION OF SODIUM NITRATE ADDITION WITH TANK 241-AY-102	34	ED2126	(null)	Techdata_Mig
64739448	RPP-9114	8-Nov-01	CALCULATION OF SODIUM NITRATE VOLUME TO BE ADDED TO TANK 241-AY-102	16	ED2163	(null)	Techdata_Mig
64740254	RPP-9160	12-Nov-01	PRELIMINARY WASTE COMPATIBILITY ASSESSMENT OF 244-AR VAULT TANK 001 WASTE WITH TANK 241-AY-102 WASTE	37	ED2170	(null)	Techdata_Mig
64740254	RPP-9160	12-Nov-01	PRELIMINARY WASTE COMPATIBILITY ASSESSMENT OF 244-AR VAULT TANK 001 WASTE WITH TANK 241-AY-102 WASTE	37	ED2170	(null)	Techdata_Mig
64740254	RPP-9160	12-Nov-01	PRELIMINARY WASTE COMPATIBILITY ASSESSMENT OF 244-AR VAULT TANK 001 WASTE WITH TANK 241-AY-102 WASTE	37	ED2170	(null)	Techdata_Mig
126008488	RPP-8474	12-Nov-01	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	73	161822	(null)	Techdata_Mig
126008488	RPP-8474	12-Nov-01	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	73	161822	(null)	Techdata_Mig
61334226	ECN-666714	13-Nov-01	EXAMINE TANK 241-AY-102	3	ED2175	(null)	Techdata_Mig
126009001	RPP-8474	29-Nov-01	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	13	ED2219	(null)	Techdata_Mig
126009001	RPP-8474	29-Nov-01	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	13	ED2219	(null)	Techdata_Mig
126008573	RPP-8474	29-Nov-01	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	178	ED2214	(null)	Techdata_Mig
126008573	RPP-8474	29-Nov-01	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	178	ED2214	(null)	Techdata_Mig
64740274	RPP-9497	30-Nov-01	YEAR 2001 VISUAL EXAMINATION OF TANK ANNULI AT TANKS 241-AY-102 AND 241-AZ-101	51	169959	(null)	Techdata_Mig
64740274	RPP-9497	30-Nov-01	YEAR 2001 VISUAL EXAMINATION OF TANK ANNULI AT TANKS 241-AY-102 AND 241-AZ-101	51	169959	(null)	Techdata_Mig
126008590	RPP-8994	3-Dec-01	OPERATIONAL ACCEPTANCE CHECKLIST CORROSION MITIGATION PROJECT TANK 241-AY-102 NITRATE ADDITION	31	ED2231	(null)	Techdata_Mig
126008590	RPP-8994	3-Dec-01	OPERATIONAL ACCEPTANCE CHECKLIST CORROSION MITIGATION PROJECT TANK 241-AY-102 NITRATE ADDITION	31	ED2231	(null)	Techdata_Mig
61347326	ECN-670716	28-Dec-01	241-AY-102 VENTILATION SYSTEM FLOW TRANSMITTER REPLACEMENT	6	161819	(null)	Techdata_Mig
61349765	ECN-670716	28-Dec-01	241-AY-102 VENTILATION SYSTEM FLOW TRANSMITTER REPLACEMENT	1	161819	(null)	Techdata_Mig
126010913	RPP-8474	9-Jan-02	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	54	ED2326	(null)	Techdata_Mig
126010913	RPP-8474	9-Jan-02	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	54	ED2326	(null)	Techdata_Mig
126008487	RPP-8474	17-Jan-02	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	11	ED2353	(null)	Techdata_Mig
126008487	RPP-8474	17-Jan-02	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	11	ED2353	(null)	Techdata_Mig
126008572	RPP-8474	23-Jan-02	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	19	ED2370	(null)	Techdata_Mig
126008572	RPP-8474	23-Jan-02	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	19	ED2370	(null)	Techdata_Mig
64741979	RPP-9948	24-Jan-02	TANK 241-AY-102 CORE SAMPLING AND ANALYSIS PLAN	31	ED2378	(null)	Techdata_Mig
126013941	RPP-9114	29-Jan-02	CALCULATION OF SODIUM NITRATE VOLUME TO BE ADDED TO TANK 241-AY-102	7	ED2389	(null)	Techdata_Mig
126013941	RPP-9114	29-Jan-02	CALCULATION OF SODIUM NITRATE VOLUME TO BE ADDED TO TANK 241-AY-102	7	ED2389	(null)	Techdata_Mig
126009000	RPP-8474	4-Feb-02	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	6	ED2415	(null)	Techdata_Mig

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126009000	RPP-8474	4-Feb-02	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	6	ED2415	(null)	Techdata_Mig
126010912	RPP-8474	7-Feb-02	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	6	ED2425	(null)	Techdata_Mig
126010912	RPP-8474	7-Feb-02	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	6	ED2425	(null)	Techdata_Mig
126013934	RPP-8851	14-Feb-02	EVALUATION OF ADDITION OF WATER FROM TANK 241-AY-101 AND TANK 241-AY-102 ANNULI PRIMARY TANK CLEANING OPERATIONS TO TANK 241-AY-101	6	ED2451	(null)	Techdata_Mig
126008486	RPP-8474	19-Feb-02	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	7	ED2451	(null)	Techdata_Mig
126008486	RPP-8474	19-Feb-02	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	7	ED2451	(null)	Techdata_Mig
126008486	RPP-8474	19-Feb-02	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	7	ED2451	(null)	Techdata_Mig
126008557	RPP-8173	28-Feb-02	TECHNICAL BASIS FOR CAUSTIC ADDITIONS TO TANKS 241-AY-101, 241-AY-102 AND 241-AN-102 AND 241-AN-107	96	ED2510	(null)	Techdata_Mig
126008557	RPP-8173	28-Feb-02	TECHNICAL BASIS FOR CAUSTIC ADDITIONS TO TANKS 241-AY-101, 241-AY-102 AND 241-AN-102 AND 241-AN-107	96	ED2510	(null)	Techdata_Mig
126008557	RPP-8173	28-Feb-02	TECHNICAL BASIS FOR CAUSTIC ADDITIONS TO TANKS 241-AY-101, 241-AY-102 AND 241-AN-102 AND 241-AN-107	96	ED2510	(null)	Techdata_Mig
64697057	RPP-10370	8-Jul-02	WASTE COMPATIBILITY ASSESSMENT OF CONDENSATE FROM TANK 241-AZ-151 WITH TANK 241-AY-101 WASTE AND TANK 241-AY-102 WASTE	55	ED2915	(null)	Techdata_Mig
64697057	RPP-10370	8-Jul-02	WASTE COMPATIBILITY ASSESSMENT OF CONDENSATE FROM TANK 241-AZ-151 WITH TANK 241-AY-101 WASTE AND TANK 241-AY-102 WASTE	55	ED2915	(null)	Techdata_Mig
64700098	RPP-11757	25-Sep-02	EVALUATION OF TANK 241-AY-102 WASTE MIXING USING AIRLIFT CIRCULATORS	95	ED3086	(null)	Techdata_Mig
64701567	RPP-12077	25-Sep-02	ELECTROCHEMICAL CORROSION STUDY FOR TANK 241-AY-102 SLUDGE	99	ED3086	(null)	Techdata_Mig
125684044	HNF-6047	25-Sep-02	TANK 241-AY-102 CORES 270, 271, 272, AND 273 ANALYTICAL RESULTS FOR THE FINAL REPORT	1741	ED3091	(null)	Techdata_Mig
64703338	RPP-13321	30-Oct-02	DOUBLE-SHELL TANK 241-AY-102 CHEMISTRY CONTROL SAMPLING AND ANALYSIS PLAN FOR FISCAL YEAR 2003	27	ED3150	(null)	Techdata_Mig
62326846	PER-2002-5135	27-Nov-02	EDL-AY-102 PRIMARY VENT FLOW INDICATOR FI-AY2-K1-2 IS GIVING SPORADIC READINGS	10	184082	(null)	Techdata_Mig
62326846	PER-2002-5135	27-Nov-02	EDL-AY-102 PRIMARY VENT FLOW INDICATOR FI-AY2-K1-2 IS GIVING SPORADIC READINGS	10	184082	(null)	Techdata_Mig
129157909	H-14-010506	6-Jan-03	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102	1	RD557K	(null)	Techdata_Mig
64707335	RPP-14387	24-Feb-03	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-C-106 (SST-02-14) WASTE WITH TANK 241-AY-102 WASTE	51	SD3832	(null)	Techdata_Mig
64707335	RPP-14387	24-Feb-03	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-C-106 (SST-02-14) WASTE WITH TANK 241-AY-102 WASTE	51	SD3832	(null)	Techdata_Mig
64709788	RPP-15622	18-Apr-03	TANK 241-AY-102 PUSH MODE CORE SAMPLING AND ANALYSIS PLAN FOR FISCAL YEAR 2003	26	ED3587	(null)	Techdata_Mig
61402150	ECN-720439-R0	24-Apr-03	C-106 WRS WATER ADDITION HOSE ASSEMBLY AT AY-102 (PHASE 1)	19	170057	(null)	Techdata_Mig
61399114	ECN-720173-R0	14-May-03	241-AY-102 ANNULUS LEAK DETECTION USING THREE ENRAF LEVEL GAUGES	20	178424	(null)	Techdata_Mig
64709894	RPP-15758	3-Jun-03	ANALYSIS OF CORROSION PRODUCT RETRIEVED FROM THE PRIMARY TANK WALL IN THE ANNULUS OF TANK 241-AY-102	8	ED3705	(null)	Techdata_Mig
64711489	RPP-16644	4-Jun-03	WASTE COMPATIBILITY ASSESSMENT OF 244-AR VAULT WASTE WITH 241-AY-102 WASTE	62	ED3713	(null)	Techdata_Mig
64711489	RPP-16644	4-Jun-03	WASTE COMPATIBILITY ASSESSMENT OF 244-AR VAULT WASTE WITH 241-AY-102 WASTE	62	ED3713	(null)	Techdata_Mig
64711976	RPP-16716	1-Jul-03	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AZ-151 WASTE WITH TANK 241-AY-102 AND 241-AY-101 WASTE	51	ED3784	(null)	Techdata_Mig
64711976	RPP-16716	1-Jul-03	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AZ-151 WASTE WITH TANK 241-AY-102 AND 241-AY-101 WASTE	51	ED3784	(null)	Techdata_Mig
64711976	RPP-16716	1-Jul-03	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AZ-151 WASTE WITH TANK 241-AY-102 AND 241-AY-101 WASTE	51	ED3784	(null)	Techdata_Mig
64711976	RPP-16716	1-Jul-03	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AZ-151 WASTE WITH TANK 241-AY-102 AND 241-AY-101 WASTE	51	ED3784	(null)	Techdata_Mig

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64711976	RPP-16716	1-Jul-03	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AZ-151 WASTE WITH TANK 241-AY-102 AND 241-AY-101 WASTE	51	ED3784	(null)	Techdata_Mig
138622474	H-2-93374	15-Jul-03	241-AY-102 ANNULUS EXHAUST STACK MONITOR FLOW DIA & ELEC	1	RD574C	(null)	Techdata_Mig
138586661	H-2-818540	22-Jul-03	PIPING TANK 241-AY-102 DETAILS	1	RD573I	(null)	Techdata_Mig
61403467	ECN-720487-R0	22-Aug-03	241-AY-102 ANNULUS EXHAUST MOTOR BASE (AY102-VTA-M-002)	12	178593	(null)	Techdata_Mig
61399794	ECN-720173-R1	2-Sep-03	241-AY-102 ANNULUS LEAK DETECTION	8	178623	(null)	Techdata_Mig
61399796	ECN-720176-R0	16-Sep-03	241-AY-102 ELECTRICAL INSTALLATION FOR ANNULUS LEAK DETECTORS	43	178623	(null)	Techdata_Mig
61409484	ECN-721013-R0	20-Sep-03	TANK 241-C-106 WASTE RETRIEVAL SYSTEM WATER ADDITION HOSE ASSEMBLY (AY-102) MODIFICATIONS	7	178638	(null)	Techdata_Mig
129160454	H-14-010506	23-Sep-03	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102	1	RD581	(null)	Techdata_Mig
64716782	RPP-18243	9-Oct-03	TANK 241-AY-102 PUSH-MODE CORE SAMPLING AND ANALYSIS PLAN FOR FISCAL YEAR 2004	27	ED4013	(null)	Techdata_Mig
61409866	ECN-720944-R1	9-Oct-03	REMOVE FLOW TRANSMITTER FROM AY-102 RESULTING FROM C-106 INTERIM ISOLATION	9	ED4023	(null)	Techdata_Mig
61401955	ECN-720173-R2	29-Oct-03	241-AY-102 ANNULUS LEAK DETECTION USING THREE ENRAF LEVEL GAUGES	20	178638	(null)	Techdata_Mig
64716298	RPP-18399	30-Oct-03	ELECTROCHEMICAL CORROSION STUDIES CORE 308, SEGMENTS 14R1 AND 14R2, TANK 241-AY-102	66	ED4072	(null)	Techdata_Mig
64715995	RPP-18436	30-Oct-03	CALCULATION OF THE EFFECT OF SLUDGE CAUSTIC DEMAND ON CHEMISTRY CONTROL OF TANK 241-AY-102	34	ED4065	(null)	Techdata_Mig
64717610	RPP-18648	6-Nov-03	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AZ-151 CONDENSATE WITH TANK 241-AY-102 WASTE AND TANK 241-AY-101 WASTE	33	ED4086	(null)	Techdata_Mig
64717918	RPP-18743	6-Nov-03	WASTE GROUP ASSIGNMENT OF DOUBLE-SHELL TANK 241-AY-102 FOR TRANSFER FROM TANK 241-AZ-151	181	ED4086	(null)	Techdata_Mig
64717610	RPP-18648	6-Nov-03	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AZ-151 CONDENSATE WITH TANK 241-AY-102 WASTE AND TANK 241-AY-101 WASTE	33	ED4086	(null)	Techdata_Mig
64717918	RPP-18743	6-Nov-03	WASTE GROUP ASSIGNMENT OF DOUBLE-SHELL TANK 241-AY-102 FOR TRANSFER FROM TANK 241-AZ-151	181	ED4086	(null)	Techdata_Mig
64717918	RPP-18743	6-Nov-03	WASTE GROUP ASSIGNMENT OF DOUBLE-SHELL TANK 241-AY-102 FOR TRANSFER FROM TANK 241-AZ-151	181	ED4086	(null)	Techdata_Mig
64717610	RPP-18648	6-Nov-03	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AZ-151 CONDENSATE WITH TANK 241-AY-102 WASTE AND TANK 241-AY-101 WASTE	33	ED4086	(null)	Techdata_Mig
61400005	ECN-720173-R2	15-Dec-03	241-AY-102 ANNULUS LEAK DETECTION USING THREE ENRAF LEVEL GAUGES	1	178666	(null)	Techdata_Mig
61403561	ECN-720487-R1	14-Jan-04	241-AY-102 ANNULUS EXHAUST MOTOR BASE (AY-102-VTA-M-002)	7	178670	(null)	Techdata_Mig
129158868	H-14-010506	14-Jan-04	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102	1	RD592P	(null)	Techdata_Mig
64717988	RPP-19888	23-Feb-04	TEST PLAN FOR COLD TESTING TANK 241-AY-102 SLUDGE SIMULANT	25	ED4321	(null)	Techdata_Mig
125955704	RPP-20168	6-May-04	TEST PLAN/PROCEDURE FOR ELECTROCHEMICAL CORROSION TESTING OF TANK 241-AN-107 TANK 241-AY-102 AND TANK 241-AZ-102	30	179368	(null)	Techdata_Mig
125955704	RPP-20168	6-May-04	TEST PLAN/PROCEDURE FOR ELECTROCHEMICAL CORROSION TESTING OF TANK 241-AN-107 TANK 241-AY-102 AND TANK 241-AZ-102	30	179368	(null)	Techdata_Mig
125955704	RPP-20168	6-May-04	TEST PLAN/PROCEDURE FOR ELECTROCHEMICAL CORROSION TESTING OF TANK 241-AN-107 TANK 241-AY-102 AND TANK 241-AZ-102	30	179368	(null)	Techdata_Mig
125955704	RPP-20168	6-May-04	TEST PLAN/PROCEDURE FOR ELECTROCHEMICAL CORROSION TESTING OF TANK 241-AN-107 TANK 241-AY-102 AND TANK 241-AZ-102	30	179368	(null)	Techdata_Mig
125956662	RPP-20168	24-May-04	TEST PLAN/PROCEDURE FOR ELECTROCHEMICAL CORROSION TESTING OF TANK 241-AN-107 TANK 241-AY-102 AND TANK 241-AZ-102	32	ED4527	(null)	Techdata_Mig
125956662	RPP-20168	24-May-04	TEST PLAN/PROCEDURE FOR ELECTROCHEMICAL CORROSION TESTING OF TANK 241-AN-107 TANK 241-AY-102 AND TANK 241-AZ-102	32	ED4527	(null)	Techdata_Mig
125956662	RPP-20168	24-May-04	TEST PLAN/PROCEDURE FOR ELECTROCHEMICAL CORROSION TESTING OF TANK 241-AN-107 TANK 241-AY-102 AND TANK 241-AZ-102	32	ED4527	(null)	Techdata_Mig
125956662	RPP-20168	24-May-04	TEST PLAN/PROCEDURE FOR ELECTROCHEMICAL CORROSION TESTING OF TANK 241-AN-107 TANK 241-AY-102 AND TANK 241-AZ-102	32	ED4527	(null)	Techdata_Mig
64721705	RPP-21138	21-Jun-04	TANK BUMP CALCULATION FOR TANK 241-AY-102	24	ED4583	(null)	Techdata_Mig
64721705	RPP-21138	21-Jun-04	TANK BUMP CALCULATION FOR TANK 241-AY-102	24	ED4583	(null)	Techdata_Mig

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129158127	H-14-010506	23-Jun-04	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102		1	RD609W	(null)	Techdata_Mig
64721496	RPP-21071	29-Jun-04	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AZ-151 CONDENSATE WITH TANK 241-AY-102 WASTE AND TANK 241-AY-101 WASTE		35	ED4609	(null)	Techdata_Mig
64721496	RPP-21071	29-Jun-04	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AZ-151 CONDENSATE WITH TANK 241-AY-102 WASTE AND TANK 241-AY-101 WASTE		35	ED4609	(null)	Techdata_Mig
64721496	RPP-21071	29-Jun-04	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AZ-151 CONDENSATE WITH TANK 241-AY-102 WASTE AND TANK 241-AY-101 WASTE		35	ED4609	(null)	Techdata_Mig
64721496	RPP-21071	29-Jun-04	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AZ-151 CONDENSATE WITH TANK 241-AY-102 WASTE AND TANK 241-AY-101 WASTE		35	ED4609	(null)	Techdata_Mig
62737654	W211-AY02-P-004	20-Jul-04	SHIELDING ANALYSIS FOR AY-102 SLUICE PITS		1	RM3083	(null)	Techdata_Mig
64722461	RPP-22124	25-Aug-04	AY-102 SLURRY DISTRIBUTOR LIFT ANALYSIS		20	ED4734	(null)	Techdata_Mig
62737655	W211-AY02-P-006	27-Sep-04	SHIELDING ANALYSIS FOR AY-102A CENTRAL PUMP PIT [PAGE 113-148 [SEC 3 OF 3]		1	RM3083	(null)	Techdata_Mig
62736990	W211-AY02-P-006	27-Sep-04	SHIELDING ANALYSIS FOR AY-102A CENTRAL PUMP PIT [PAGE 60-112] [SEC 2 OF 3]		1	RM3083	(null)	Techdata_Mig
62737380	W211-AY02-P-006	27-Sep-04	SHIELDING ANALYSIS FOR AY-102A CENTRAL PUMP PIT [PAGE 1-59] [SEC 1 OF 3]		1	RM3083	(null)	Techdata_Mig
58879822	RPP-22821	30-Sep-04	SPECIFICATION FOR REFURBISHMENT/DESIGN/MODIFICATION AND TESTING OF A VERTICAL TURBINE TRANSFER PUMP FOR TANK 241-AY-102		11	179766	(null)	Techdata_Mig
62737652	W211-AY02-P-002	1-Dec-04	AY-102 JUMPER STRESS ANALYSIS & VALUE QUALIFICATION [PAGE 49-74] [SEC 3 OF 3]		1	RM3083	(null)	Techdata_Mig
62736987	W211-AY02-P-002	1-Dec-04	AY-102 JUMPER STRESS ANALYSIS & VALUE QUALIFICATION [PAGE 1-48] [SEC 2 OF 3]		1	RM3083	(null)	Techdata_Mig
62737091	W211-AY02-P-002	1-Dec-04	AY-102 JUMPER STRESS ANALYSIS & VALUE QUALIFICATION [SEC 1 OF 3]		1	RM3083	(null)	Techdata_Mig
64723020	RPP-23754	7-Dec-04	ENGINEERING EVALUATION OF SPECIAL TOOLS OR TEST EQUIPMENT AY-102 PUMP INSTALLATION DEPLOYMENT CANNISTER		15	ED4965	(null)	Techdata_Mig
58880210	RPP-22782	13-Dec-04	PROJECT W-211 RETRIEVAL CONTROL SYSTEM SYSTEM REQUIREMENTS SPECIFICATION FOR TANK 241-AY-102		35	ED4980	(null)	Techdata_Mig
64722507	RPP-22783	13-Dec-04	PROJECT W-211 RETRIEVAL CONTROL SYSTEM QUALIFICATION TEST PROCEDURE FOR TANK 241-AY-102		13	ED4980	(null)	Techdata_Mig
62736989	W211-AY02-P-006	20-Dec-04	SHIELDING ANALYSIS FOR AY-102A CENTRAL PUMP PIT [PAGE 113-148 [SEC 3 OF 3]		1	RM3083	(null)	Techdata_Mig
58884110	W-211-AY2-C2	28-Dec-04	CONSTRUCTION SPECIFICATION AY-102 CONSTRUCTION INITIAL TANK RETRIEVAL SYSTEMS PROJECT W-211 TANK 241-AY-102		222	ED5012	(null)	Techdata_Mig
62843104	H-14-106498	28-Dec-04	ELECTRICAL 241-AY-102 DETAILS & SECTIONS		1	RD635J	(null)	Techdata_Mig
62843196	H-14-106497	28-Dec-04	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM		1	RD635I	(null)	Techdata_Mig
62843196	H-14-106497	28-Dec-04	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM		1	RD635I	(null)	Techdata_Mig
62843198	H-14-106497	28-Dec-04	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM & SCHED		1	RD635J	(null)	Techdata_Mig
62843195	H-14-106497	28-Dec-04	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM		1	RD635I	(null)	Techdata_Mig
62843200	H-14-106502	28-Dec-04	ELECTRICAL 241-AY-102 PLAN		1	RD635J	(null)	Techdata_Mig
64794886	W-211-AY2-ATP-003	28-Dec-04	PROJECT W-211, 241-AY-102 NITROGEN SUPPLY & LOSS OF UPS POWER & PLC CABINET TEMP MONITORING		23	ED5012	(null)	Techdata_Mig
64793176	W-211-AY2-ATP-005	28-Dec-04	PROJECT W-211, 241-AY-102 TRANSFER PUMP TEMPERATURE ELEMENT, MANUAL TRANSFER SWITCH, AND ASSOCIATED INSTRUMENTATION		22	ED5012	(null)	Techdata_Mig
164118972	H-14-106497	28-Dec-04	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM	(null)	(null)	(null)	(null)	Techdata_Mig
164118972	H-14-106497	28-Dec-04	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM	(null)	(null)	(null)	(null)	Techdata_Mig
164119463	H-14-106497	28-Dec-04	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM	(null)	(null)	(null)	(null)	Techdata_Mig
62843104	H-14-106498	28-Dec-04	ELECTRICAL 241-AY-102 DETAILS & SECTIONS		1	RD635J	(null)	Techdata_Mig
62843103	H-14-106498	28-Dec-04	ELECTRICAL 241-AY-102 SITE PLAN		1	RD635J	(null)	Techdata_Mig
62843197	H-14-106497	28-Dec-04	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM & SCHED		1	RD635J	(null)	Techdata_Mig
62843198	H-14-106497	28-Dec-04	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM & SCHED		1	RD635J	(null)	Techdata_Mig
58884920	W-211-AY2-C1	28-Dec-04	CONSTRUCTION SPECIFICATION PROCESS WATER LINE (PW-404) INSTALLATION INITIAL TANK RETRIEVAL SYSTEMS PROJECT W-211 TANK 241-AY-102		43	ED5015	(null)	Techdata_Mig
62841537	H-14-106420	28-Dec-04	CIVIL SITE PLAN AY-102 TANK FARM		1	RD635G	(null)	Techdata_Mig

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62843103	H-14-106498	28-Dec-04	ELECTRICAL 241-AY-102 SITE PLAN		1	RD635J	(null)	Techdata_Mig
62843195	H-14-106497	28-Dec-04	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM		1	RD635I	(null)	Techdata_Mig
62843197	H-14-106497	28-Dec-04	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM & SCHED		1	RD635J	(null)	Techdata_Mig
62843201	H-14-106502	28-Dec-04	ELECTRICAL 241-AY-102 ELEVATIONS & DETAILS		1	RD635J	(null)	Techdata_Mig
64793176	W-211-AY2-ATP-005	28-Dec-04	PROJECT W-211, 241-AY-102 TRANSFER PUMP TEMPERATURE ELEMENT, MANUAL TRANSFER SWITCH, AND ASSOCIATED INSTRUMENTATION		22	ED5012	(null)	Techdata_Mig
64794886	W-211-AY2-ATP-003	28-Dec-04	PROJECT W-211, 241-AY-102 NITROGEN SUPPLY & LOSS OF UPS POWER & PLC CABINET TEMP MONITORING		23	ED5012	(null)	Techdata_Mig
64795084	W-211-AY2-ATP-004	28-Dec-04	PROJECT W-211, 241-AY-102 MIXER PUMP MOTORS AND ASSOCIATED EQUIPMENT		29	ED5012	(null)	Techdata_Mig
64795084	W-211-AY2-ATP-004	28-Dec-04	PROJECT W-211, 241-AY-102 MIXER PUMP MOTORS AND ASSOCIATED EQUIPMENT		29	ED5012	(null)	Techdata_Mig
164118972	H-14-106497	28-Dec-04	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM	(null)	(null)	(null)	(null)	Techdata_Mig
164119463	H-14-106497	28-Dec-04	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM	(null)	(null)	(null)	(null)	Techdata_Mig
164119463	H-14-106497	28-Dec-04	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM	(null)	(null)	(null)	(null)	Techdata_Mig
61432651	ECN-722575-R0	3-Feb-05	C-102 WRS EQUIPMENT INSTALL AT AY-102		10	179487	(null)	Techdata_Mig
134639278	H-2-64462	18-Feb-05	P&ID TANK 241-AY-102 ANNULUS		1	RD637Y	(null)	Techdata_Mig
125957997	RPP-23754	8-Mar-05	ENGINEERING EVALUATION OF SPECIAL TOOLS OR TEST EQUIPMENT AY-102 PUMP INSTALLATION DEPLOYMENT CANNISTER		10	ED5172	(null)	Techdata_Mig
125957997	RPP-23754	8-Mar-05	ENGINEERING EVALUATION OF SPECIAL TOOLS OR TEST EQUIPMENT AY-102 PUMP INSTALLATION DEPLOYMENT CANNISTER		10	ED5172	(null)	Techdata_Mig
125957997	RPP-23754	8-Mar-05	ENGINEERING EVALUATION OF SPECIAL TOOLS OR TEST EQUIPMENT AY-102 PUMP INSTALLATION DEPLOYMENT CANNISTER		10	ED5172	(null)	Techdata_Mig
61433252	ECN-722944-R0	21-Mar-05	JUMPER PIPING ASSEMBLY 241-AY-102 PUMP PIT		2	179491	(null)	Techdata_Mig
61497475	ECN-W211-AY2-005-R0	24-Mar-05	PROJECT W-211 TEMPERATURE TREE MODIFICATION (AY-102 RETRIEVAL)		11	179491	(null)	Techdata_Mig
61498157	ECN-W211-AY2-001-R0	24-Mar-05	W211-AY-102 PROJECT NON-FACILITY MODIFICATIONS		15	179491	(null)	Techdata_Mig
61431334	ECN-722523-R0	28-Mar-05	W-211 (AY-102) PROJECT FACILITY MODIFICATIONS		33	179491	(null)	Techdata_Mig
64749188	RPP-RPT-25778	21-Apr-05	ANALYSIS FOR CONTINUING CORE SAMPLING OF TANK 241-AY-102 RISER 058		17	ED5324	(null)	Techdata_Mig
153227321	H-14-107032	4-May-05	ELECTRICAL 241-AY-102 PLAN	(null)	(null)	(null)	(null)	Techdata_Mig
61434707	ECN-723102-R0	12-May-05	UPDATE AY-102 CONFIG DRAWING TO DOCUMENT DROPPED DRILL STRING BELOW RISER 058		2	179543	(null)	Techdata_Mig
64743368	RPP-CALC-25983	12-May-05	CAUSTIC ADDITION VOLUME REQUIRED TO MAINTAIN THE TANK 241-AY-102 DILUTE SURFACE SUPERNATANT LAYER WITHIN AC 5.16 LIMITS		24	ED5374	(null)	Techdata_Mig
64743368	RPP-CALC-25983	12-May-05	CAUSTIC ADDITION VOLUME REQUIRED TO MAINTAIN THE TANK 241-AY-102 DILUTE SURFACE SUPERNATANT LAYER WITHIN AC 5.16 LIMITS		24	ED5374	(null)	Techdata_Mig
61498252	ECN-W211-AY2-007-R0	17-May-05	PROJECT W-211 (AY-102) MODIFY MIXER PUMP SPRAY WASH RISER EXTENSION TO ALLOW FOR CONST WELD		4	179543	(null)	Techdata_Mig
61434644	ECN-723217-R0	19-May-05	CAUSTIC DYNAMIC MIXING ANALYSES FOR TANKS 241-AY-101 241-AY-102 241-AZ-102 241-AN-102 AND 241-AN-107		4	SD4673	(null)	Techdata_Mig
125938062	RPP-12387	19-May-05	CAUSTIC DYNAMIC MIXING ANALYSES FOR TANKS 241- AY-101 241- AY-102 241-AZ-102 241- AN-102 AND 241-AN-107		124	SD4673	(null)	Techdata_Mig
125938062	RPP-12387	19-May-05	CAUSTIC DYNAMIC MIXING ANALYSES FOR TANKS 241- AY-101 241- AY-102 241-AZ-102 241- AN-102 AND 241-AN-107		124	SD4673	(null)	Techdata_Mig
125938062	RPP-12387	19-May-05	CAUSTIC DYNAMIC MIXING ANALYSES FOR TANKS 241- AY-101 241- AY-102 241-AZ-102 241- AN-102 AND 241-AN-107		124	SD4673	(null)	Techdata_Mig
64751431	RPP-RPT-26075	19-May-05	EVALUATION OF CAUSTIC ADDITION TO TANK 241-AY-102 & WASTE COMPATIBILITY ASSESSMENT OF 241-AZ-151 CONDENSATE WITH 241-AY-102 WASTE & 241-AY-101 WASTE		41	ED5399	(null)	Techdata_Mig
125938062	RPP-12387	19-May-05	CAUSTIC DYNAMIC MIXING ANALYSES FOR TANKS 241- AY-101 241- AY-102 241-AZ-102 241- AN-102 AND 241-AN-107		124	SD4673	(null)	Techdata_Mig

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64751431	RPP-RPT-26075	19-May-05	EVALUATION OF CAUSTIC ADDITION TO TANK 241-AY-102 & WASTE COMPATIBILITY ASSESSMENT OF 241-AZ-151 CONDENSATE WITH 241-AY-102 WASTE & 241-AY-101 WASTE	41	ED5399	(null)	Techdata_Mig
125938062	RPP-12387	19-May-05	CAUSTIC DYNAMIC MIXING ANALYSES FOR TANKS 241- AY-101 241- AY-102 241-AZ-102 241- AN-102 AND 241-AN-107	124	SD4673	(null)	Techdata_Mig
61498158	ECN-W211-AY2-008-R0	31-May-05	PROJECT W-211 AY-102 RELOCATE CONSTRUCTION TIE-IN INTERFACE POINT FOR PW-404 PIPE	5	179543	(null)	Techdata_Mig
64751329	RPP-RPT-25975	10-Jun-05	FEED CONTROL LIST CHANGE EVALUATION CONSOLIDATING TANK 241-AP-101 SUPERNATE WITH TANK 241-AY-102 SOLIDS	52	ED5457	(null)	Techdata_Mig
129157908	H-14-010506	10-Jun-05	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102	1	179662	(null)	Techdata_Mig
64751329	RPP-RPT-25975	10-Jun-05	FEED CONTROL LIST CHANGE EVALUATION CONSOLIDATING TANK 241-AP-101 SUPERNATE WITH TANK 241-AY-102 SOLIDS	52	ED5457	(null)	Techdata_Mig
61431748	ECN-722575-R1	23-Jun-05	C-FARM WRS: EQUIPMENT INSTALL AT AY-102	10	179678	(null)	Techdata_Mig
138622473	H-2-93374	24-Jun-05	241-AY-102 ANNULUS EXHAUST STACK MONITOR FLOW DIA & ELEC	1	179671	(null)	Techdata_Mig
64743962	RPP-CALC-26628	30-Jun-05	WASTE GROUP ASSIGNMENT OF DOUBLE-SHELL TANK 241-AY-102 FOR DILUTE CAUSTIC AND WASTE ADDITIONS	105	ED5513	(null)	Techdata_Mig
64749211	RPP-RPT-26478	6-Jul-05	EVALUATION OF CAUSTIC ADDITION TO TANK 241-AY-102	26	ED5519	(null)	Techdata_Mig
120449762	RPP-22821	18-Jul-05	SPECIFICATION FOR REFURBISHMENT, DESIGN, MODIFICATION, AND TESTING OF A VERTICAL TURBINE TRANSFER PUMP FOR TANK 241-AY-102	14	ED5544	(null)	Techdata_Mig
100479166	ECN-723164-R0	4-Aug-05	OPTIONAL SHIELD PLUG INSTALLATION FOR SLUDGE MEASUREMENT PORT ON AY-102	2	192082	(null)	Techdata_Mig
61434622	ECN-723164-R0	4-Aug-05	OPTIONAL SHIELD PLUG INSTALLATION FOR SLUDGE MEASUREMENT PORT ON AY-102	3	179678	(null)	Techdata_Mig
129160453	H-14-010506	6-Sep-05	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102	1	179751	(null)	Techdata_Mig
64723644	RPP-24394	29-Sep-05	PROJECT W-211 QUALIFICATION TEST REPORT FOR THE TANK 241-AY-102 RETRIEVAL CONTROL SYSTEM	907	ED5754	(null)	Techdata_Mig
64794902	W211-AY02-P-007	9-Mar-06	PROJECT W-211 AY-102 3" PW-404 HEAT TRACE SIZING	23	191924	(null)	Techdata_Mig
64795686	W211-AY02-P-003	9-Mar-06	PROJECT W-211 AY-102 IN-TANK RECIRCULATION FLOW CONTROL VALVE SIZING	32	191924	(null)	Techdata_Mig
64795687	W211-AY02-P-015	9-Mar-06	PROJECT W-211 TANK 241-AY-102 MIXER PUMP RISER EXTENSION-LIFTING ATTACHMENT ANALYSIS	23	191924	(null)	Techdata_Mig
64724235	RPP-29464	14-Apr-06	CAUSTIC DYNAMIC MIXING ANALYSES FOR TANK 241-AY-102	71	SD5025	(null)	Techdata_Mig
64795100	W211-AY02-P-011	22-Aug-06	PROJECT W-211 CALCULATION DESIGN OF 241-AY-102 LIFTING ATTACHMENT FOR TRANSFER PUMP RISER ASSEMBLY	24	191924	(null)	Techdata_Mig
64795099	W211-AY02-C-012	22-Aug-06	PROJECT W-211 CALCULATION DOME LOADING TANK 241-AY-102	18	191924	(null)	Techdata_Mig
64795100	W211-AY02-P-011	22-Aug-06	PROJECT W-211 CALCULATION DESIGN OF 241-AY-102 LIFTING ATTACHMENT FOR TRANSFER PUMP RISER ASSEMBLY	24	191924	(null)	Techdata_Mig
64795099	W211-AY02-C-012	22-Aug-06	PROJECT W-211 CALCULATION DOME LOADING TANK 241-AY-102	18	191924	(null)	Techdata_Mig
61439597	ECN-724052-R0	11-Sep-06	REMOVE SUPPLEMENTAL COVERS DESIGNATION FROM AY-101 AND AY-102 P&IDS	4	191928	(null)	Techdata_Mig
64752305	RPP-RPT-31789	21-Nov-06	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AY-102 WASTE WITH TANK 241-AN-106 WASTE	44	ED6738	(null)	Techdata_Mig
64752305	RPP-RPT-31789	21-Nov-06	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AY-102 WASTE WITH TANK 241-AN-106 WASTE	44	ED6738	(null)	Techdata_Mig
64724557	RPP-31976	6-Dec-06	DRAIN PATH EVALUATION FOR WASTE TRANSFER FROM 241-AY-102 TO 241-AN-106	4	ED6768	(null)	Techdata_Mig
64724557	RPP-31976	6-Dec-06	DRAIN PATH EVALUATION FOR WASTE TRANSFER FROM 241-AY-102 TO 241-AN-106	4	ED6768	(null)	Techdata_Mig
64724557	RPP-31976	6-Dec-06	DRAIN PATH EVALUATION FOR WASTE TRANSFER FROM 241-AY-102 TO 241-AN-106	4	ED6768	(null)	Techdata_Mig
64724557	RPP-31976	6-Dec-06	DRAIN PATH EVALUATION FOR WASTE TRANSFER FROM 241-AY-102 TO 241-AN-106	4	ED6768	(null)	Techdata_Mig
61442828	ECN-724357-R0	14-Dec-06	CHANGES TO SEL FOR PROJECT TURNOVER OF LEAK DETECTION EQUIPMENT TO SUPPORT AY-102 TRANSFER	2	192072	(null)	Techdata_Mig
64724258	RPP-32173	14-Dec-06	DRAIN PATH EVALUATION FOR WASTE TRANSFER FROM 241-AY-102 TO 241-AW-102	4	ED6795	(null)	Techdata_Mig
64724258	RPP-32173	14-Dec-06	DRAIN PATH EVALUATION FOR WASTE TRANSFER FROM 241-AY-102 TO 241-AW-102	4	ED6795	(null)	Techdata_Mig
126018401	RPP-PLAN-32016	18-Dec-06	RADIOLOGICAL MONITORING PLAN FOR 241-AY-102 TO 241-AN-106 WASTE TRANSFER	20	ED6807	(null)	Techdata_Mig
126018401	RPP-PLAN-32016	18-Dec-06	RADIOLOGICAL MONITORING PLAN FOR 241-AY-102 TO 241-AN-106 WASTE TRANSFER	20	ED6807	(null)	Techdata_Mig
64751508	RPP-RPT-32169	19-Dec-06	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AY-102 WASTE WITH TANK 241-AW-102 WASTE	45	ED6805	(null)	Techdata_Mig
64746524	RPP-PLAN-32195	20-Dec-06	RADIOLOGICAL MONITORING PLAN FOR 241-AY-102 TO 241-AW-102 WASTE TRANSFER	20	ED6809	(null)	Techdata_Mig

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64746524	RPP-PLAN-32195	20-Dec-06	RADIOLOGICAL MONITORING PLAN FOR 241-AY-102 TO 241-AW-102 WASTE TRANSFER	20	ED6809		(null)	Techdata_Mig
64724259	RPP-32251	3-Jan-07	DRAIN PATH EVALUATION FOR WASTE TRANSFER FROM 241-AP-101 TO 241-AY-102	4	CF		(null)	Techdata_Mig
64724259	RPP-32251	3-Jan-07	DRAIN PATH EVALUATION FOR WASTE TRANSFER FROM 241-AP-101 TO 241-AY-102	4	CF		(null)	Techdata_Mig
64746525	RPP-PLAN-32235	5-Jan-07	RADIOLOGICAL MONITORING PLAN FOR 241-AP-101 TO 241-AY-102 WASTE TRANSFER	21	ED6839		(null)	Techdata_Mig
64746525	RPP-PLAN-32235	5-Jan-07	RADIOLOGICAL MONITORING PLAN FOR 241-AP-101 TO 241-AY-102 WASTE TRANSFER	21	ED6839		(null)	Techdata_Mig
64752711	RPP-RPT-32256	5-Jan-07	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AP-101 WASTE WITH TANK 241-AY-102 WASTE	45	CF		(null)	Techdata_Mig
126036288	RPP-RPT-32256	10-Jan-07	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AP-101 WASTE WITH TANK 241-AY-102 WASTE	13	CF		(null)	Techdata_Mig
129158867	H-14-010506	15-Jan-07	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102	1		191985	(null)	Techdata_Mig
64746386	RPP-PLAN-24601	5-Feb-07	FISCAL YEAR 2007 TEST PLAN FOR EVALUATING THE CORROSIVITY OF 241-AY-102 DOUBLE-SHELL TANK WASTE	19	CF		(null)	Techdata_Mig
64751504	RPP-RPT-31932	5-Apr-07	INTERIM REPORT HANFORD TANKS AY-102 AND AP-101: EFFECT OF CHEMISTRY AND OTHER VARIABLES ON CORROSION AND STRESS CORROSION CRACKING	40	CF		(null)	Techdata_Mig
64751504	RPP-RPT-31932	5-Apr-07	INTERIM REPORT HANFORD TANKS AY-102 AND AP-101: EFFECT OF CHEMISTRY AND OTHER VARIABLES ON CORROSION AND STRESS CORROSION CRACKING	40	CF		(null)	Techdata_Mig
64751999	RPP-RPT-32137	4-Jun-07	ULTRASONIC INSPECTION RESULTS FOR DOUBLE-SHELL TANK 241-AY-102-FY2007	260	CF		(null)	Techdata_Mig
64751999	RPP-RPT-32137	4-Jun-07	ULTRASONIC INSPECTION RESULTS FOR DOUBLE-SHELL TANK 241-AY-102-FY2007	260	CF		(null)	Techdata_Mig
126018476	RPP-RPT-34697	22-Aug-07	ELECTROCHEMICAL CORROSION REPORT FOR TANKS 241-AW-103 - 241-AZ-102 - 241-AN-106 - 241-AN-107 - 241-AY-101 AND 241-AY-102	37	CF		(null)	Techdata_Mig
126018476	RPP-RPT-34697	22-Aug-07	ELECTROCHEMICAL CORROSION REPORT FOR TANKS 241-AW-103 - 241-AZ-102 - 241-AN-106 - 241-AN-107 - 241-AY-101 AND 241-AY-102	37	CF		(null)	Techdata_Mig
126018476	RPP-RPT-34697	22-Aug-07	ELECTROCHEMICAL CORROSION REPORT FOR TANKS 241-AW-103 - 241-AZ-102 - 241-AN-106 - 241-AN-107 - 241-AY-101 AND 241-AY-102	37	CF		(null)	Techdata_Mig
76197759	RPP-SPEC-35429	5-Nov-07	PROCUREMENT SPECIFICATION FOR AY-102 CORROSION PROBE ASSEMBLY	19		192252	(null)	Techdata_Mig
76943157	RPP-ASMT-35619	9-Nov-07	EXPERT PANEL OVERSIGHT COMMITTEE ASSESSMENT OF FY 2007 CORROSION & STRESS CORROSION CRACKING SIMULANT TESTING PROGRAM & THE IMPACT ON DST 241-AY-102	9	ED7790		(null)	Techdata_Mig
76943157	RPP-ASMT-35619	9-Nov-07	EXPERT PANEL OVERSIGHT COMMITTEE ASSESSMENT OF FY 2007 CORROSION & STRESS CORROSION CRACKING SIMULANT TESTING PROGRAM & THE IMPACT ON DST 241-AY-102	9	ED7790		(null)	Techdata_Mig
84090403	RPP-PLAN-35593	3-Dec-07	TANK 241-AY-102A LEAK DETECTION PIT GRAB SAMPLING AND ANALYSIS PLAN	26	ED7842		(null)	Techdata_Mig
87355592	ECN-725219-R0	12-Dec-07	CORRECT AY-101 & AY-102 VTA EQUIPMENT SCHEDULES	8		192082	(null)	Techdata_Mig
94132242	RPP-PLAN-24604	4-Jan-08	TEST PLAN FOR EVALUATING SECONDARY REFERENCE ELECTRODE MATERIALS FOR THE 241-AN-102 AND THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEMS	20	ED7936		(null)	Techdata_Mig
94132242	RPP-PLAN-24604	4-Jan-08	TEST PLAN FOR EVALUATING SECONDARY REFERENCE ELECTRODE MATERIALS FOR THE 241-AN-102 AND THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEMS	20	ED7936		(null)	Techdata_Mig
138586953	H-2-818540	15-Jan-08	PIPING TANK 241-AY-102 SECTIONS & DETAILS	1		200238	(null)	Techdata_Mig
138586950	H-2-818540	15-Jan-08	PIPING TANK 241-AY-102 DETAILS	1		200238	(null)	Techdata_Mig
138586663	H-2-818540	15-Jan-08	PIPING TANK 241-AY-102 SECTIONS & DETAILS	1		200238	(null)	Techdata_Mig
138586854	H-2-818540	15-Jan-08	PIPING TANK 241-AY-102 SECTIONS & DETAILS	1		200238	(null)	Techdata_Mig
98580759	RPP-RPT-36249	18-Jan-08	COMPATIBILITY ASSESSMENT OF 241-AZ-301 CONDENSATE, AY-102A LDP LIQUID AND CHEMICAL ADDITIONS TO TANK 241-AY-101	107	ED7987		(null)	Techdata_Mig
98580759	RPP-RPT-36249	18-Jan-08	COMPATIBILITY ASSESSMENT OF 241-AZ-301 CONDENSATE, AY-102A LDP LIQUID AND CHEMICAL ADDITIONS TO TANK 241-AY-101	107	ED7987		(null)	Techdata_Mig
102272809	RPP-RPT-36150	24-Jan-08	FINAL REPORT FOR THE 241-AY-102A LEAK DETECTION PIT GRAB SAMPLES IN SUPPORT OF THE WASTE COMPATIBILITY PROGRAM	66	ED8013		(null)	Techdata_Mig
145201402	RPP-RPT-36150	24-Jan-08	FINAL REPORT FOR THE 241-AY-102A LEAK DETECTION PIT GRAB SAMPLES IN SUPPORT OF THE WASTE COMPATIBILITY PROGRAM	66	ED8013		(null)	Techdata_Mig
120449785	RPP-SPEC-35429	31-Jan-08	PROCUREMENT SPECIFICATION FOR AY-102 CORROSION PROBE ASSEMBLY	25	ED8031		(null)	Techdata_Mig

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134648367	H-2-64462	4-Feb-08	P&ID TANK 241-AY-102 ANNULUS	1	200243	(null)	Techdata_Mig
106147689	RPP-PLAN-36639	14-Feb-08	RADIOLOGICAL MONITORING PLAN FOR PUMPING 241-AY-102 LEAK DETECTOR PIT TO 241-AY-01A PIT	24	204500	(null)	Techdata_Mig
129158126	H-14-010506	3-Mar-08	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102	1	200248	(null)	Techdata_Mig
115443224	ECN-725442-R0	11-Mar-08	241-AY-102 ANNULUS EXHAUSTER FAN SHAFT DETAIL TO SUPPORT FABRICATION	6	192169	(null)	Techdata_Mig
138107599	H-2-64462	22-May-08	P&ID TANK 241-AY-102 ANNULUS	1	192193	(null)	Techdata_Mig
138196081	RPP-31935	5-Jun-08	TANK 241-AY-101 AND 241-AY-102 CONDENSATE RETURN EVALUATION	73	ED8431	(null)	Techdata_Mig
138196081	RPP-31935	5-Jun-08	TANK 241-AY-101 AND 241-AY-102 CONDENSATE RETURN EVALUATION	73	ED8431	(null)	Techdata_Mig
138196081	RPP-31935	5-Jun-08	TANK 241-AY-101 AND 241-AY-102 CONDENSATE RETURN EVALUATION	73	ED8431	(null)	Techdata_Mig
138196081	RPP-31935	5-Jun-08	TANK 241-AY-101 AND 241-AY-102 CONDENSATE RETURN EVALUATION	73	ED8431	(null)	Techdata_Mig
138358235	RPP-RPT-35924	19-Jun-08	FACTORY ACCEPTANCE TEST PROCEDURE FOR THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM	42	ED8466	(null)	Techdata_Mig
138356949	RPP-RPT-35925	19-Jun-08	REQUIREMENTS VERIFICATION REPORT FOR TANK 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM	15	207383	(null)	Techdata_Mig
138357074	PRHA-00292	19-Jun-08	AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM (MPCMS)	5	ED8467	(null)	Techdata_Mig
138357278	RPP-CALC-35476	19-Jun-08	STRUCTURAL ANALYSIS OF AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM	62	207383	(null)	Techdata_Mig
138356837	RPP-PLAN-35914	19-Jun-08	TEST PLAN FOR 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM	13	ED8466	(null)	Techdata_Mig
138356838	RPP-RPT-37135	19-Jun-08	RECOMMENDATIONS FOR HANDLING AND STORAGE OF THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM(MPCMS)	13	207383	(null)	Techdata_Mig
138357061	RPP-RPT-37131	19-Jun-08	CONSTRUCTION ACCEPTANCE AND PROCESS TEST REQUIREMENTS FOR THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM	36	207383	(null)	Techdata_Mig
138357314	H-14-107562	19-Jun-08	AY102 MPCMS 241-AY-102 MULTI PROBE INSTALLATION	1	192200	(null)	Techdata_Mig
169528902	ECN-725279-R0	25-Jun-08	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM INSTALLATION	(null)	(null)	(null)	Techdata_Mig
169528902	ECN-725279-R0	25-Jun-08	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM INSTALLATION	(null)	(null)	(null)	Techdata_Mig
169528902	ECN-725279-R0	25-Jun-08	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM INSTALLATION	(null)	(null)	(null)	Techdata_Mig
169528902	ECN-725279-R0	25-Jun-08	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM INSTALLATION	(null)	(null)	(null)	Techdata_Mig
169528902	ECN-725279-R0	25-Jun-08	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM INSTALLATION	(null)	(null)	(null)	Techdata_Mig
169528902	ECN-725279-R0	25-Jun-08	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM INSTALLATION	(null)	(null)	(null)	Techdata_Mig
140740818	RPP-RPT-39019	1-Oct-08	PROCESS HAZARD ANALYSIS PERFORMED FOR THE TANK 241-AY-102 CORROSION PROBE INSTALLATION AND OPERATION	161	CF	(null)	Techdata_Mig
140924245	PRHA-00538	16-Oct-08	AY-102 MULTI CORROSION MONITORING SYSTEM (MPCMS)	5	CF	(null)	Techdata_Mig
140936257	H-14-107618	20-Oct-08	AY TANK FARM ROUTE MAP AY-101 & AY-102	1	192216	(null)	Techdata_Mig
140936258	H-14-107618	20-Oct-08	AY TANK FARM ROUTE MAP AY-101 AND AY-102	1	192216	(null)	Techdata_Mig
141092792	PRHA-00557	3-Nov-08	AY-102 MPCMS C-RING COUPONS AND PART MODIFICATIONS	5	CF	(null)	Techdata_Mig
141154582	PRHA-00566	10-Nov-08	AY-102 MPCMS PART MODIFICATIONS	5	CF	(null)	Techdata_Mig
141973489	PRHA-00670	3-Feb-09	241-AY-102 MPCMS FACTORY ACCEPTANCE TEST (FAT) MODIFICATION	5	CF	(null)	Techdata_Mig
141973899	RPP-RPT-35924	3-Feb-09	FACTORY ACCEPTANCE TEST PROCEDURE FOR THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM	14	CF	(null)	Techdata_Mig
141973590	PRHA-00643	3-Feb-09	241-AY-102 ENRAF RELOCATION FOR THE MPCMS INSTALLATION	4	CF	(null)	Techdata_Mig
142095297	RPP-RPT-37131	13-Feb-09	CONSTRUCTION ACCEPTANCE AND PROCESS TEST REQUIREMENTS FOR THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM	40	CF	(null)	Techdata_Mig
142250137	RPP-RPT-37135	2-Mar-09	RECOMMENDATIONS FOR HANDLING AND STORAGE OF THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM(MPCMS)	14	CF	(null)	Techdata_Mig
142468440	PRHA-00736	19-Mar-09	241-AY-102 MPCMS FABRICATION AS-BUILT DRAWING	4	CF	(null)	Techdata_Mig
142529930	H-14-107562	23-Mar-09	AY102 MPCMS 241-AY-102 MULTI PROBE INSTALLATION	1	204354	(null)	Techdata_Mig
142601615	RPP-CALC-35476	25-Mar-09	STRUCTURAL ANALYSIS OF AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM	65	CF	(null)	Techdata_Mig
142689822	RPP-RPT-39538	2-Apr-09	241-AY-102 MPCMS C-RING COUPON PHOTOGRAPHS	299	CF	(null)	Techdata_Mig

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143001754	H-14-010506		21-Apr-09	DONE PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102	1	204359	(null)	Techdata_Mig
143033599	H-14-107618		22-Apr-09	AY TANK FARM ROUTE MAP AY-101 & AY-102	1	204361	(null)	Techdata_Mig
143033715	H-14-107618		22-Apr-09	AY TANK FARM ROUTE MAP AY-101 and AY-102	1	204361	(null)	Techdata_Mig
143050187	PRHA-00770		23-Apr-09	241-AY-102 MPCMS CONTRUCTION ACCEPTANCE AND PROCESS TEST	5	CF	(null)	Techdata_Mig
143228456	H-14-010506		13-May-09	DONE PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102	1	204363	(null)	Techdata_Mig
143308034	PRHA-00822		21-May-09	241-AY-102 MPCMS FACTORY ACCEPTANCE TEST REPORT (FATR)	4	CF	(null)	Techdata_Mig
143308036	RPP-RPT-40633		21-May-09	FACTORY ACCEPTANCE TEST REPORT FOR THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM	170	CF	(null)	Techdata_Mig
143308088	RPP-RPT-40661		22-May-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 2 REPORT	48	204494	(null)	Techdata_Mig
143306671	RPP-RPT-35925		22-May-09	REQUIREMENTS VERIFICATION REPORT FOR TANK 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM	21	CF	(null)	Techdata_Mig
143401034	RPP-RPT-40661		2-Jun-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 4 REPORT	56	204494	(null)	Techdata_Mig
143400148	RPP-RPT-40661		2-Jun-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 6 REPORT	56	204494	(null)	Techdata_Mig
143400920	RPP-RPT-40661		2-Jun-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 3 REPORT	61	204494	(null)	Techdata_Mig
143401033	RPP-RPT-40661		2-Jun-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 5 REPORT	56	204494	(null)	Techdata_Mig
143585380	PRHA-00855		18-Jun-09	241-AY-102 ENRAF SHIELDING WIRE CHANGES	4	CF	(null)	Techdata_Mig
143603270		50597	19-Jun-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM	1552	RM5820	(null)	Techdata_Mig
143949280	RPP-PLAN-36639		20-Jul-09	RADIOLOGICAL MONITORING PLAN FOR PUMPING 241-AY-102 LEAK DETECTOR PIT TO 241-AY-01A PIT	31	204521	(null)	Techdata_Mig
143980912	H-14-010506		21-Jul-09	DONE PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102	1	204378	(null)	Techdata_Mig
144424402	RPP-RPT-40661		18-Aug-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 8 REPORT	62	204494	(null)	Techdata_Mig
144424403	RPP-RPT-40661		18-Aug-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 11 REPORT	59	204494	(null)	Techdata_Mig
144429911	RPP-RPT-40661		18-Aug-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 7 REPORT	56	204494	(null)	Techdata_Mig
144429912	RPP-RPT-40661		18-Aug-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 10 REPORT	63	204494	(null)	Techdata_Mig
144424404	RPP-RPT-40661		18-Aug-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 12 REPORT	59	204494	(null)	Techdata_Mig
144424405	RPP-RPT-40661		18-Aug-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEKS 13 AND 14 REPORT	66	204494	(null)	Techdata_Mig
144430024	RPP-RPT-40661		18-Aug-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 9 REPORT	66	204494	(null)	Techdata_Mig
144730140	RPP-RPT-40661		11-Sep-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEKS 17 AND 18 REPORT	80	204494	(null)	Techdata_Mig
144726923	RPP-RPT-40661		11-Sep-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEKS 15 AND 16 REPORT	69	204494	(null)	Techdata_Mig
145055034	RPP-RPT-42920		5-Oct-09	2009 AUTO-TCR FOR TANK 241-AY-102	260	SD6845	PUBLIC	Techdata_Mig
145115527	RPP-RPT-42920		12-Oct-09	2009 AUTO-TCR FOR TANK 241-AY-102	0	SD6845	(null)	Techdata_Mig
145316802	RPP-RPT-42920		12-Oct-09	2009 AUTO-TCR FOR TANK 241-AY-102	0	SD6845	(null)	Techdata_Mig
145458897	RPP-PLAN-36639		6-Nov-09	RADIOLOGICAL MONITORING PLAN FOR PUMPING 241-AY-102 LEAK DETECTOR PIT TO 241-AY-01A PIT	8	204521	(null)	Techdata_Mig
160801945	H-14-107618		9-Dec-09	AY TANK FARM ROUTE MAP AY-101 & AY-102	(null)	(null)	(null)	Techdata_Mig
160801945	H-14-107618		9-Dec-09	AY TANK FARM ROUTE MAP AY-101 & AY-102	(null)	(null)	(null)	Techdata_Mig
160804233	H-14-107618		9-Dec-09	AY TANK FARM ROUTE MAP AY-101 and AY-102	(null)	(null)	(null)	Techdata_Mig
160804233	H-14-107618		9-Dec-09	AY TANK FARM ROUTE MAP AY-101 and AY-102	(null)	(null)	(null)	Techdata_Mig
146429884	RPP-RPT-40661		18-Dec-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEKS 19 AND 20 REPORT	67	204514	(null)	Techdata_Mig
146764740	RPP-RPT-40661		12-Jan-10	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEKS 21 AND 22 REPORT	63	204514	(null)	Techdata_Mig
146872493	H-2-64462		20-Jan-10	P & I D TANK 241-AY-102 ANNULUS	1	210445	(null)	Techdata_Mig
147110031	RPP-RPT-44630		3-Feb-10	DERIVATION OF BEST-BASIS INVENTORY FOR TANK 241-AY-102	48	204528	(null)	Techdata_Mig
148261519	H-14-010506		16-Mar-10	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102	1	210455	(null)	Techdata_Mig
148261519	H-14-010506		16-Mar-10	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102	1	210455	(null)	Techdata_Mig
148261610	H-14-010506		16-Mar-10	DONE PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102	1	210455	(null)	Techdata_Mig
148261610	H-14-010506		16-Mar-10	DONE PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102	1	210455	(null)	Techdata_Mig
163049454	H-14-010506		16-Mar-10	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102	1	210455	(null)	Techdata_Mig
163049454	H-14-010506		16-Mar-10	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102	1	210455	(null)	Techdata_Mig

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148458537	RPP-RPT-44462	24-Mar-10	MULTI-PROBE CORROSION MONITORING SYSTEM DESIGN DIFFERENCES BETWEEN 241-AW-104 AND 241-AN-107, 241-AY-101, 241-AY-102, AND 241-AN-102	10	204518	(null)	Techdata_Mig
148821468	RPP-44828	13-Apr-10	TANK 241-AY-102 DYNAMIC MIXING ANALYSES	217	CF	(null)	Techdata_Mig
148852546	RPP-44828	15-Apr-10	TANK 241-AY-102 DYNAMIC MIXING BENCHMARK ANALYSES	218	204521	(null)	Techdata_Mig
168341740	ECN-727421-R1	24-May-10	NEW FLOOR DRAIN SEAL ASSEMBLIES FOR 241-AY-102 LEAK DETECTION PIT	(null)	(null)	(null)	Techdata_Mig
168341740	ECN-727421-R1	24-May-10	NEW FLOOR DRAIN SEAL ASSEMBLIES FOR 241-AY-102 LEAK DETECTION PIT	(null)	(null)	(null)	Techdata_Mig
168341740	ECN-727421-R1	24-May-10	NEW FLOOR DRAIN SEAL ASSEMBLIES FOR 241-AY-102 LEAK DETECTION PIT	(null)	(null)	(null)	Techdata_Mig
151069160	SVF-1874	16-Jun-10	AY-102 FLOWSHEET INPUT DATA.XLSX	(null)	(null)	(null)	Techdata_Mig
151096368	PRHA-01469	16-Jun-10	TANK 241-AY-102 WASTE FEED DELIVERY FLOWSHEET	4	SD7556	(null)	Techdata_Mig
151069493	SVF-1873	16-Jun-10	AY-102 FLOWSHEET INVENTORY ESTIMATE.XLSX	(null)	(null)	(null)	Techdata_Mig
151070260	SVF-1875	16-Jun-10	AY-102 FLOWSHEET MATERIAL BALANCE	(null)	(null)	(null)	Techdata_Mig
151205404	PRHA-01533	23-Jun-10	241-AY-101 AND 241-AY-102 MPCMS C-RING COUPON PHOTOGRAPHS	4	ED974A	(null)	Techdata_Mig
151205404	PRHA-01533	23-Jun-10	241-AY-101 AND 241-AY-102 MPCMS C-RING COUPON PHOTOGRAPHS	4	ED974A	(null)	Techdata_Mig
152174083	RPP-RPT-40661	14-Jul-10	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEKS 23 AND 24 REPORT	61	EDA018	(null)	Techdata_Mig
152186763	RPP-RPT-40661	15-Jul-10	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: NOVEMBER 2009 MONTHLY REPORT	69	EDA022	(null)	Techdata_Mig
152186854	RPP-RPT-40661	15-Jul-10	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: DECEMBER 2009 MONTHLY REPORT	72	EDA022	(null)	Techdata_Mig
152187209	RPP-RPT-40661	15-Jul-10	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEKS 25 THROUGH 31 REPORT	76	EDA022	(null)	Techdata_Mig
152501216	RPP-46717	19-Jul-10	TANK 241-AY-102 DYNAMIC MIXING ANALYSES FOLLOWING THE JANUARY 2007 SUPERNATANT REPLACEMENT	69	EDA041	(null)	Techdata_Mig
154798286	ECN-10-001284	28-Sep-10	TANK 241-AY-102 WASTE FEED DELIVERY FLOWSHEET	2	SD8007	(null)	Techdata_Mig
154800154	RPP-RPT-46020	28-Sep-10	TANK 241-AY-102 WASTE FEED DELIVERY FLOWSHEET	12	SD8007	(null)	Techdata_Mig
155626656	H-2-64462	10-Nov-10	P & I D TANK 241-AY-102 ANNULUS	1	RD787A	(null)	Techdata_Mig
155779313	RPP-RPT-40661	19-Nov-10	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: FEBRUARY 2010 MONTHLY REPORT	61	EDA528	(null)	Techdata_Mig
155779313	RPP-RPT-40661	19-Nov-10	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: FEBRUARY 2010 MONTHLY REPORT	61	EDA528	(null)	Techdata_Mig
155796913	RPP-RPT-40661	19-Nov-10	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: JANUARY 2010 MONTHLY REPORT	55	EDA528	(null)	Techdata_Mig
156197030	H-2-64462	17-Dec-10	P & I D TANK 241-AY-102 ANNULUS	1	RD790C	(null)	Techdata_Mig
156197030	H-2-64462	17-Dec-10	P & I D TANK 241-AY-102 ANNULUS	1	RD790C	(null)	Techdata_Mig
157339932	RPP-RPT-44630	15-Feb-11	DERIVATION OF BEST-BASIS INVENTORY FOR TANK 241-AY-102	50	SD8189	(null)	Techdata_Mig
157339932	RPP-RPT-44630	15-Feb-11	DERIVATION OF BEST-BASIS INVENTORY FOR TANK 241-AY-102	50	SD8189	(null)	Techdata_Mig
159904146	H-14-106497	5-Apr-11	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM & SCHED	1	RD794F	(null)	Techdata_Mig
159904545	H-14-106497	5-Apr-11	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM & SCHED	1	RD794F	(null)	Techdata_Mig
159904545	H-14-106497	5-Apr-11	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM & SCHED	1	RD794F	(null)	Techdata_Mig
159904146	H-14-106497	5-Apr-11	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM & SCHED	1	RD794F	(null)	Techdata_Mig
160185566	EDT-824478	18-Apr-11	SAFETY DESIGN STRATEGY FOR THE WASTE FEED DELIVERY INTEGRATED AY-102 UPGRADES PROJECT	1	EDB116	(null)	Techdata_Mig
160186852	RPP-49053	18-Apr-11	SAFETY DESIGN STRATEGY FOR THE WASTE FEED DELIVERY INTEGRATED AY-102 UPGRADES PROJECT	19	EDB116	(null)	Techdata_Mig
160253288	H-2-93374	18-Apr-11	241-AY-102 ANNULUS EXHAUST STACK MONITOR FLOW DIA & ELEC	1	RD794X	(null)	Techdata_Mig
161124406	H-14-107618	18-May-11	AY TANK FARM ROUTE MAP AY-101 and AY-102	1	RD795X	(null)	Techdata_Mig
161124221	H-14-107618	18-May-11	AY TANK FARM ROUTE MAP AY-101 & AY-102	1	RD795X	(null)	Techdata_Mig
161124221	H-14-107618	18-May-11	AY TANK FARM ROUTE MAP AY-101 & AY-102	1	RD795X	(null)	Techdata_Mig
161124406	H-14-107618	18-May-11	AY TANK FARM ROUTE MAP AY-101 and AY-102	1	RD795X	(null)	Techdata_Mig
162875621	RPP-34669	5-Jul-11	EVALUATION OF TANK 241-AY-102 PRIMARY TANK KNUCKLE AND WALL TEMPERATURES DURING LOSS OF VENTILATION EVENTS	81	EDB644	(null)	Techdata_Mig
162875621	RPP-34669	5-Jul-11	EVALUATION OF TANK 241-AY-102 PRIMARY TANK KNUCKLE AND WALL TEMPERATURES DURING LOSS OF VENTILATION EVENTS	81	EDB644	(null)	Techdata_Mig
164104815	H-2-131366	10-Aug-11	ELECTRICAL ELEMENTARY DIAGRAM RECIRC BLDG AY-101 & AY-102	1	RD798U	(null)	Techdata_Mig
164104815	H-2-131366	10-Aug-11	ELECTRICAL ELEMENTARY DIAGRAM RECIRC BLDG AY-101 & AY-102	1	RD798U	(null)	Techdata_Mig

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164145980	H-14-106497	12-Aug-11	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM		1	RD798X	(null)	Techdata_Mig
164145980	H-14-106497	12-Aug-11	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM		1	RD798X	(null)	Techdata_Mig
164146863	H-14-106497	12-Aug-11	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM		1	RD798X	(null)	Techdata_Mig
164145980	H-14-106497	12-Aug-11	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM		1	RD798X	(null)	Techdata_Mig
164146863	H-14-106497	12-Aug-11	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM		1	RD798X	(null)	Techdata_Mig
164146863	H-14-106497	12-Aug-11	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM		1	RD798X	(null)	Techdata_Mig
164818975	RPP-RPT-44630	21-Sep-11	DERIVATION OF BEST-BASIS INVENTORY FOR TANK 241-AY-102 AS OF JULY 1, 2011	(null)	(null)	(null)	(null)	Techdata_Mig
164818975	RPP-RPT-44630	21-Sep-11	DERIVATION OF BEST-BASIS INVENTORY FOR TANK 241-AY-102 AS OF JULY 1, 2011	(null)	(null)	(null)	(null)	Techdata_Mig
165270024	RPP-RPT-40661	13-Oct-11	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: MARCH 2010 MONTHLY REPORT		47	SD9029	(null)	Techdata_Mig
165270024	RPP-RPT-40661	13-Oct-11	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: MARCH 2010 MONTHLY REPORT		47	SD9029	(null)	Techdata_Mig
165316639	RPP-RPT-40661	17-Oct-11	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: APRIL 2010 MONTHLY REPORT		50	SD9043	(null)	Techdata_Mig
165316639	RPP-RPT-40661	17-Oct-11	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: APRIL 2010 MONTHLY REPORT		50	SD9043	(null)	Techdata_Mig
165316800	RPP-RPT-40661	18-Oct-11	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: MAY, JUNE, JULY 2010 QUARTERLY REPORT		63	SD9043	(null)	Techdata_Mig
165316800	RPP-RPT-40661	18-Oct-11	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: MAY, JUNE, JULY 2010 QUARTERLY REPORT		63	SD9043	(null)	Techdata_Mig
165396579	TOC-ENV-NOT-2011-0012	25-Oct-11	ENVIRONMENTAL NOTIFICATION FOR 241-AY-102 ANNULUS ENRAF 152 RAINWATER INTRUSION ON 10-13-11	(null)	(null)	(null)		Techdata_Mig
165396579	TOC-ENV-NOT-2011-0012	25-Oct-11	ENVIRONMENTAL NOTIFICATION FOR 241-AY-102 ANNULUS ENRAF 152 RAINWATER INTRUSION ON 10-13-11	(null)	(null)	(null)		Techdata_Mig
165886629	RPP-50817	9-Nov-11	241-AY-102 Mixer Pump Operation Erosion-Corrosion Scoping Test Program	(null)	(null)	(null)		Techdata_Mig
165886629	RPP-50817	9-Nov-11	241-AY-102 Mixer Pump Operation Erosion-Corrosion Scoping Test Program	(null)	(null)	(null)		Techdata_Mig
166211477	ECN-11-002075	1-Dec-11	AY-102 Annulus Exhauster Filter Update		4	SD8663	(null)	Techdata_Mig
166211477	ECN-11-002075	1-Dec-11	AY-102 Annulus Exhauster Filter Update		4	SD8663	(null)	Techdata_Mig
166211477	ECN-11-002075	1-Dec-11	AY-102 Annulus Exhauster Filter Update		4	SD8663	(null)	Techdata_Mig
166397834	RPP-RPT-40661	14-Dec-11	241-AY-102 Multi-Probe Corrosion Monitoring System: August, September, October 2010 Quarterly Report		54	SD8700	(null)	Techdata_Mig
166397834	RPP-RPT-40661	14-Dec-11	241-AY-102 Multi-Probe Corrosion Monitoring System: August, September, October 2010 Quarterly Report		54	SD8700	(null)	Techdata_Mig
166509099	RPP-RPT-40661	20-Dec-11	241-AY-102 Multi-Probe Corrosion Monitoring System: November & December 2010, January 2011 Quarterly Report		55	SD8711	(null)	Techdata_Mig
166509547	RPP-RPT-40661	20-Dec-11	241-AY-102 Multi-Probe Corrosion Monitoring System: February, March & April 2011 Quarterly Report		44	SD8711	(null)	Techdata_Mig
166509547	RPP-RPT-40661	20-Dec-11	241-AY-102 Multi-Probe Corrosion Monitoring System: February, March & April 2011 Quarterly Report		44	SD8711	(null)	Techdata_Mig
166528210	RPP-RPT-40661	20-Dec-11	241-AY-102 Multi-Probe Corrosion Monitoring System: May, June & July 2011 Quarterly Report		60	SD9099	(null)	Techdata_Mig
166528210	RPP-RPT-40661	20-Dec-11	241-AY-102 Multi-Probe Corrosion Monitoring System: May, June & July 2011 Quarterly Report		60	SD9099	(null)	Techdata_Mig
166528210	RPP-RPT-40661	20-Dec-11	241-AY-102 Multi-Probe Corrosion Monitoring System: May, June & July 2011 Quarterly Report		60	SD9099	(null)	Techdata_Mig
166509099	RPP-RPT-40661	20-Dec-11	241-AY-102 Multi-Probe Corrosion Monitoring System: November & December 2010, January 2011 Quarterly Report		55	SD8711	(null)	Techdata_Mig
166509099	RPP-RPT-40661	20-Dec-11	241-AY-102 Multi-Probe Corrosion Monitoring System: November & December 2010, January 2011 Quarterly Report		55	SD8711	(null)	Techdata_Mig
166509547	RPP-RPT-40661	20-Dec-11	241-AY-102 Multi-Probe Corrosion Monitoring System: February, March & April 2011 Quarterly Report		44	SD8711	(null)	Techdata_Mig
166954869	H-2-64462	25-Jan-12	P & I D TANK 241-AY-102 ANNULUS		1	RD805S	(null)	Techdata_Mig
166954869	H-2-64462	25-Jan-12	P & I D TANK 241-AY-102 ANNULUS		1	RD805S	(null)	Techdata_Mig
167331843	RPP-PLAN-45270	15-Feb-12	Test Plan for Evaluating the Possibility of Erosion-Corrosion During Mixer Pump Operation in 241-AY-102	(null)	(null)	(null)		Techdata_Mig
167331829	RPP-PLAN-45270	15-Feb-12	Test Plan for Evaluating the Possibility of Erosion-Corrosion During Mixer Pump Operation in 241-AY-102	(null)	(null)	(null)		Techdata_Mig
167331829	RPP-PLAN-45270	15-Feb-12	Test Plan for Evaluating the Possibility of Erosion-Corrosion During Mixer Pump Operation in 241-AY-102	(null)	(null)	(null)		Techdata_Mig
167331843	RPP-PLAN-45270	15-Feb-12	Test Plan for Evaluating the Possibility of Erosion-Corrosion During Mixer Pump Operation in 241-AY-102	(null)	(null)	(null)		Techdata_Mig
167394435	RPP-PLAN-45270	21-Feb-12	Test Plan for Evaluating the Possibility of Erosion-Corrosion During Mixer Pump Operation in 241-AY-102	(null)	(null)	(null)		Techdata_Mig

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167394435	RPP-PLAN-45270	21-Feb-12	Test Plan for Evaluating the Possibility of Erosion-Corrosion During Mixer Pump Operation in 241-AY-102	(null)	(null)	(null)	Techdata_Mig
167601509	RPP-CALC-51848	28-Feb-12	Determination of Peak Sludge Temperature used in Tank AY-102 TTLFL Calculation		25	SD8872	(null)	Techdata_Mig
167601509	RPP-CALC-51848	28-Feb-12	Determination of Peak Sludge Temperature used in Tank AY-102 TTLFL Calculation		25	SD8872	(null)	Techdata_Mig
167601509	RPP-CALC-51848	28-Feb-12	Determination of Peak Sludge Temperature used in Tank AY-102 TTLFL Calculation		25	SD8872	(null)	Techdata_Mig
167739445	RPP-CALC-51958	9-Mar-12	Decreased Time to LFL in Tank 241-AY-102 due to Temperature Limit Exceeded	(null)	(null)	(null)	Techdata_Mig
167739445	RPP-CALC-51958	9-Mar-12	Decreased Time to LFL in Tank 241-AY-102 due to Temperature Limit Exceeded	(null)	(null)	(null)	Techdata_Mig
167739445	RPP-CALC-51958	9-Mar-12	Decreased Time to LFL in Tank 241-AY-102 due to Temperature Limit Exceeded	(null)	(null)	(null)	Techdata_Mig
167901180	RPP-OE-52015	14-Mar-12	AY-101 and AY-102 VTA Exhauster Fan Bearing	(null)	(null)	(null)	Techdata_Mig
167901180	RPP-OE-52015	14-Mar-12	AY-101 and AY-102 VTA Exhauster Fan Bearing	(null)	(null)	(null)	Techdata_Mig
167901180	RPP-OE-52015	14-Mar-12	AY-101 and AY-102 VTA Exhauster Fan Bearing	(null)	(null)	(null)	Techdata_Mig
168006021	RPP-RPT-44630	22-Mar-12	Derivation of Best-Basis Inventory for Tank 241-AY-102 as of January 1, 2012	(null)	(null)	(null)	Techdata_Mig
168006021	RPP-RPT-44630	22-Mar-12	Derivation of Best-Basis Inventory for Tank 241-AY-102 as of January 1, 2012	(null)	(null)	(null)	Techdata_Mig
168321723	H-2-64462	12-Apr-12	P & I D TANK 241-AY-102 ANNULUS		1	RD811C	(null)	Techdata_Mig
168321723	H-2-64462	12-Apr-12	P & I D TANK 241-AY-102 ANNULUS		1	RD811C	(null)	Techdata_Mig
168852577	PRHA-01932	18-May-12	AY-102 In-Tank Upgrades/T3W11	(null)	(null)	(null)	Techdata_Mig
168852577	PRHA-01932	18-May-12	AY-102 In-Tank Upgrades/T3W11	(null)	(null)	(null)	Techdata_Mig
168852577	PRHA-01932	18-May-12	AY-102 In-Tank Upgrades/T3W11	(null)	(null)	(null)	Techdata_Mig
170115820	RPP-CALC-49945	20-Jun-12	Structural Evaluation of the AY-102 Multi-Probe Corrosion Monitoring System for Removal	(null)	(null)	(null)	Techdata_Mig
170115820	RPP-CALC-49945	20-Jun-12	Structural Evaluation of the AY-102 Multi-Probe Corrosion Monitoring System for Removal	(null)	(null)	(null)	Techdata_Mig
170115820	RPP-CALC-49945	20-Jun-12	Structural Evaluation of the AY-102 Multi-Probe Corrosion Monitoring System for Removal	(null)	(null)	(null)	Techdata_Mig
170116408	RPP-CALC-49943	20-Jun-12	Structural Evaluation of the AY-102 Sludge Thermocouple for Removal	(null)	(null)	(null)	Techdata_Mig
170116408	RPP-CALC-49943	20-Jun-12	Structural Evaluation of the AY-102 Sludge Thermocouple for Removal	(null)	(null)	(null)	Techdata_Mig
170116408	RPP-CALC-49943	20-Jun-12	Structural Evaluation of the AY-102 Sludge Thermocouple for Removal	(null)	(null)	(null)	Techdata_Mig
170129470	ECN-11-000744	21-Jun-12	Project T3w11: AY-102 Corrosion Monitoring System and Probe Removal from Riser 073/22A	(null)	(null)	(null)	Techdata_Mig
170131299	RPP-CALC-49946	21-Jun-12	Structural Evaluation of the AY-102 MIT for Removal	(null)	(null)	(null)	Techdata_Mig
170136055	RPP-CALC-50035	21-Jun-12	Structural Evaluation of the AY-102 Profile Temperature Probe for Removal	(null)	(null)	(null)	Techdata_Mig
170137173	RPP-CALC-50544	21-Jun-12	AY-102 Agitator Pump Assembly Lifting Evaluation	(null)	(null)	(null)	Techdata_Mig
170146112	RPP-CALC-50972	21-Jun-12	Lifting Analysis of the AY-102 Lubricated Turbine APump	(null)	(null)	(null)	Techdata_Mig
170129470	ECN-11-000744	21-Jun-12	Project T3w11: AY-102 Corrosion Monitoring System and Probe Removal from Riser 073/22A	(null)	(null)	(null)	Techdata_Mig
170131299	RPP-CALC-49946	21-Jun-12	Structural Evaluation of the AY-102 MIT for Removal	(null)	(null)	(null)	Techdata_Mig
170131299	RPP-CALC-49946	21-Jun-12	Structural Evaluation of the AY-102 MIT for Removal	(null)	(null)	(null)	Techdata_Mig
170131325	ECN-11-000743	21-Jun-12	Project T3W11: Removal of Multi-Function Instrument Tree from tank 241-AY-102	(null)	(null)	(null)	Techdata_Mig
170146112	RPP-CALC-50972	21-Jun-12	Lifting Analysis of the AY-102 Lubricated Turbine APump	(null)	(null)	(null)	Techdata_Mig
170129470	ECN-11-000744	21-Jun-12	Project T3w11: AY-102 Corrosion Monitoring System and Probe Removal from Riser 073/22A	(null)	(null)	(null)	Techdata_Mig
170131325	ECN-11-000743	21-Jun-12	Project T3W11: Removal of Multi-Function Instrument Tree from tank 241-AY-102	(null)	(null)	(null)	Techdata_Mig
170136051	RPP-CALC-49323	21-Jun-12	Structural Evaluation of the AY-102 SHMS Vapor Probe for Removal	(null)	(null)	(null)	Techdata_Mig
170137173	RPP-CALC-50544	21-Jun-12	AY-102 Agitator Pump Assembly Lifting Evaluation	(null)	(null)	(null)	Techdata_Mig
170136051	RPP-CALC-49323	21-Jun-12	Structural Evaluation of the AY-102 SHMS Vapor Probe for Removal	(null)	(null)	(null)	Techdata_Mig
170136055	RPP-CALC-50035	21-Jun-12	Structural Evaluation of the AY-102 Profile Temperature Probe for Removal	(null)	(null)	(null)	Techdata_Mig
170131325	ECN-11-000743	21-Jun-12	Project T3W11: Removal of Multi-Function Instrument Tree from tank 241-AY-102	(null)	(null)	(null)	Techdata_Mig
170136051	RPP-CALC-49323	21-Jun-12	Structural Evaluation of the AY-102 SHMS Vapor Probe for Removal	(null)	(null)	(null)	Techdata_Mig
170136055	RPP-CALC-50035	21-Jun-12	Structural Evaluation of the AY-102 Profile Temperature Probe for Removal	(null)	(null)	(null)	Techdata_Mig
170137173	RPP-CALC-50544	21-Jun-12	AY-102 Agitator Pump Assembly Lifting Evaluation	(null)	(null)	(null)	Techdata_Mig
170146112	RPP-CALC-50972	21-Jun-12	Lifting Analysis of the AY-102 Lubricated Turbine APump	(null)	(null)	(null)	Techdata_Mig
170459815	RPP-CALC-51144	27-Jun-12	Structural Analysis of the Air Lift Circulators positioned in AY-102 Tank	(null)	(null)	(null)	Techdata_Mig
170459843	RPP-CALC-50033	27-Jun-12	Structural Analysis of the Steam Coil Assembly positioned in AY-102 Tank	(null)	(null)	(null)	Techdata_Mig

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170459815	RPP-CALC-51144	27-Jun-12	Structural Analysis of the Air Lift Circulators positioned in AY-102 Tank	(null)	(null)	(null)	Techdata_Mig
170459843	RPP-CALC-50033	27-Jun-12	Structural Analysis of the Steam Coil Assembly positioned in AY-102 Tank	(null)	(null)	(null)	Techdata_Mig
170459815	RPP-CALC-51144	27-Jun-12	Structural Analysis of the Air Lift Circulators positioned in AY-102 Tank	(null)	(null)	(null)	Techdata_Mig
170459843	RPP-CALC-50033	27-Jun-12	Structural Analysis of the Steam Coil Assembly positioned in AY-102 Tank	(null)	(null)	(null)	Techdata_Mig
171672441	ECN-11-000745	1-Aug-12	Project T3W11: Removal of AY-102 Sludge Measurement Instrument	(null)	(null)	(null)	Techdata_Mig
171672441	ECN-11-000745	1-Aug-12	Project T3W11: Removal of AY-102 Sludge Measurement Instrument	(null)	(null)	(null)	Techdata_Mig
171672441	ECN-11-000745	1-Aug-12	Project T3W11: Removal of AY-102 Sludge Measurement Instrument	(null)	(null)	(null)	Techdata_Mig
171731622	ECN-11-000741	6-Aug-12	Project T3W11: AY-102 Sludge Thermocouple Removals	(null)	(null)	(null)	Techdata_Mig
171731954	ECN-11-000740	6-Aug-12	Project T3W11: AY-102 Profile Thermocouple Probe Removals	(null)	(null)	(null)	Techdata_Mig
171731622	ECN-11-000741	6-Aug-12	Project T3W11: AY-102 Sludge Thermocouple Removals	(null)	(null)	(null)	Techdata_Mig
171731622	ECN-11-000741	6-Aug-12	Project T3W11: AY-102 Sludge Thermocouple Removals	(null)	(null)	(null)	Techdata_Mig
171731954	ECN-11-000740	6-Aug-12	Project T3W11: AY-102 Profile Thermocouple Probe Removals	(null)	(null)	(null)	Techdata_Mig
171731954	ECN-11-000740	6-Aug-12	Project T3W11: AY-102 Profile Thermocouple Probe Removals	(null)	(null)	(null)	Techdata_Mig
171777291	EDT-825196	8-Aug-12	Strategy and Technical Basis for Managing Flammable Gases During Tank 241-AY-102 Mixer Pump Testing	(null)	(null)	(null)	Techdata_Mig
171781187	RPP-RPT-53044	8-Aug-12	Strategy and Technical Basis for Managing Flammable Gases During Tank 241-AY-102 Mixer Pump Testing	(null)	(null)	(null)	Techdata_Mig
171777291	EDT-825196	8-Aug-12	Strategy and Technical Basis for Managing Flammable Gases During Tank 241-AY-102 Mixer Pump Testing	(null)	(null)	(null)	Techdata_Mig
171781187	RPP-RPT-53044	8-Aug-12	Strategy and Technical Basis for Managing Flammable Gases During Tank 241-AY-102 Mixer Pump Testing	(null)	(null)	(null)	Techdata_Mig
171777291	EDT-825196	8-Aug-12	Strategy and Technical Basis for Managing Flammable Gases During Tank 241-AY-102 Mixer Pump Testing	(null)	(null)	(null)	Techdata_Mig
171781187	RPP-RPT-53044	8-Aug-12	Strategy and Technical Basis for Managing Flammable Gases During Tank 241-AY-102 Mixer Pump Testing	(null)	(null)	(null)	Techdata_Mig
171964288	RPP-53216	22-Aug-12	Pressure Transient and Stability Evaluation for the 241-AY and 241-AZ Tank Farm Primary Ventilation System with the Independent Cooling Module Operation on Tank 241-AY-102	(null)	(null)	(null)	Techdata_Mig
171964288	RPP-53216	22-Aug-12	Pressure Transient and Stability Evaluation for the 241-AY and 241-AZ Tank Farm Primary Ventilation System with the Independent Cooling Module Operation on Tank 241-AY-102	(null)	(null)	(null)	Techdata_Mig
171964288	RPP-53216	22-Aug-12	Pressure Transient and Stability Evaluation for the 241-AY and 241-AZ Tank Farm Primary Ventilation System with the Independent Cooling Module Operation on Tank 241-AY-102	(null)	(null)	(null)	Techdata_Mig
171964288	RPP-53216	22-Aug-12	Pressure Transient and Stability Evaluation for the 241-AY and 241-AZ Tank Farm Primary Ventilation System with the Independent Cooling Module Operation on Tank 241-AY-102	(null)	(null)	(null)	Techdata_Mig
171964288	RPP-53216	22-Aug-12	Pressure Transient and Stability Evaluation for the 241-AY and 241-AZ Tank Farm Primary Ventilation System with the Independent Cooling Module Operation on Tank 241-AY-102	(null)	(null)	(null)	Techdata_Mig
172051405	RPP-PLAN-53364	28-Aug-12	2012 GRAB SAMPLING AND ANALYSIS PLAN FOR THE 241-AY-102A TANK ANNULUS LEAK-DETECTION PIT	(null)	(null)	(null)	Techdata_Mig
172051405	RPP-PLAN-53364	28-Aug-12	2012 GRAB SAMPLING AND ANALYSIS PLAN FOR THE 241-AY-102A TANK ANNULUS LEAK-DETECTION PIT	(null)	(null)	(null)	Techdata_Mig
172051405	RPP-PLAN-53364	28-Aug-12	2012 GRAB SAMPLING AND ANALYSIS PLAN FOR THE 241-AY-102A TANK ANNULUS LEAK-DETECTION PIT	(null)	(null)	(null)	Techdata_Mig
172051405	RPP-PLAN-53364	28-Aug-12	2012 GRAB SAMPLING AND ANALYSIS PLAN FOR THE 241-AY-102A TANK ANNULUS LEAK-DETECTION PIT	(null)	(null)	(null)	Techdata_Mig
172098883	H-2-131366	29-Aug-12	ELECTRICAL ELEMENTARY DIAGRAM EVAP TWR AY-102		1 RD825L	(null)	Techdata_Mig
172098883	H-2-131366	29-Aug-12	ELECTRICAL ELEMENTARY DIAGRAM EVAP TWR AY-102		1 RD825L	(null)	Techdata_Mig
172602067	RPP-PLAN-53352	20-Sep-12	Tank 241-AY-102 Annulus Sampling and Analysis Plan	(null)	(null)	(null)	Techdata_Mig
172602067	RPP-PLAN-53352	20-Sep-12	Tank 241-AY-102 Annulus Sampling and Analysis Plan	(null)	(null)	(null)	Techdata_Mig
172602067	RPP-PLAN-53352	20-Sep-12	Tank 241-AY-102 Annulus Sampling and Analysis Plan	(null)	(null)	(null)	Techdata_Mig
172724137	RPP-53434	27-Sep-12	241-AY-102 Annulus Sampling Data Quality Objectives	(null)	(null)	(null)	Techdata_Mig
172745204	RPP-ENV-53694	27-Sep-12	241-AY-102 In-Tank Upgrades Project Regulatory Analysis Plan	(null)	(null)	(null)	Techdata_Mig
172724137	RPP-53434	27-Sep-12	241-AY-102 Annulus Sampling Data Quality Objectives	(null)	(null)	(null)	Techdata_Mig
172745204	RPP-ENV-53694	27-Sep-12	241-AY-102 In-Tank Upgrades Project Regulatory Analysis Plan	(null)	(null)	(null)	Techdata_Mig
172724137	RPP-53434	27-Sep-12	241-AY-102 Annulus Sampling Data Quality Objectives	(null)	(null)	(null)	Techdata_Mig
172815281	RPP-RPT-44630	1-Oct-12	Derivation of Best-Basis Inventory for Tank 241-AY-102 as of July 1, 2012	(null)	(null)	(null)	Techdata_Mig
172815281	RPP-RPT-44630	1-Oct-12	Derivation of Best-Basis Inventory for Tank 241-AY-102 as of July 1, 2012	(null)	(null)	(null)	Techdata_Mig
172815281	RPP-RPT-44630	1-Oct-12	Derivation of Best-Basis Inventory for Tank 241-AY-102 as of July 1, 2012	(null)	(null)	(null)	Techdata_Mig

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172855092	RPP-PLAN-53393	3-Oct-12	Waste Feed Delivery AY-102 Technology Maturation Mixing/Sampling Demonstration Project Execution Plan	(null)	(null)	(null)	Techdata_Mig
172855092	RPP-PLAN-53393	3-Oct-12	Waste Feed Delivery AY-102 Technology Maturation Mixing/Sampling Demonstration Project Execution Plan	(null)	(null)	(null)	Techdata_Mig
172855092	RPP-PLAN-53393	3-Oct-12	Waste Feed Delivery AY-102 Technology Maturation Mixing/Sampling Demonstration Project Execution Plan	(null)	(null)	(null)	Techdata_Mig
172898126	ECN-12-001023	4-Oct-12	Update Riser Elevations for 241-AY-101 and 241-AY-102	(null)	(null)	(null)	Techdata_Mig
172898126	ECN-12-001023	4-Oct-12	Update Riser Elevations for 241-AY-101 and 241-AY-102	(null)	(null)	(null)	Techdata_Mig
172898126	ECN-12-001023	4-Oct-12	Update Riser Elevations for 241-AY-101 and 241-AY-102	(null)	(null)	(null)	Techdata_Mig
172898126	ECN-12-001023	4-Oct-12	Update Riser Elevations for 241-AY-101 and 241-AY-102	(null)	(null)	(null)	Techdata_Mig
172919158	PRHA-01969	5-Oct-12	Obtain Sample from AY-102 Using Drill Sampling Crawler (DSC)	(null)	(null)	(null)	Techdata_Mig
172919158	PRHA-01969	5-Oct-12	Obtain Sample from AY-102 Using Drill Sampling Crawler (DSC)	(null)	(null)	(null)	Techdata_Mig
172944730	RPP-RPT-53511	8-Oct-12	FINAL REPORT FOR TANK 241-AY-102 ANNULUS SOLID SAMPLE TAKEN IN AUGUST, 2012	(null)	(null)	(null)	Techdata_Mig
172944730	RPP-RPT-53511	8-Oct-12	FINAL REPORT FOR TANK 241-AY-102 ANNULUS SOLID SAMPLE TAKEN IN AUGUST, 2012	(null)	(null)	(null)	Techdata_Mig
172944730	RPP-RPT-53511	8-Oct-12	FINAL REPORT FOR TANK 241-AY-102 ANNULUS SOLID SAMPLE TAKEN IN AUGUST, 2012	(null)	(null)	(null)	Techdata_Mig
173087388	H-2-64462	16-Oct-12	P & I D TANK 241-AY-102 ANNULUS		1 RD829M	(null)	Techdata_Mig
173108869	H-2-64462	16-Oct-12	P & I D TANK 241-AY-102 ANNULUS		1 RD829M	(null)	Techdata_Mig
173087389	H-2-64462	16-Oct-12	P & I D TANK 241-AY-102 ANNULUS		1 RD829M	(null)	Techdata_Mig
173108869	H-2-64462	16-Oct-12	P & I D TANK 241-AY-102 ANNULUS		1 RD829M	(null)	Techdata_Mig
173087388	H-2-64462	16-Oct-12	P & I D TANK 241-AY-102 ANNULUS		1 RD829M	(null)	Techdata_Mig
173087389	H-2-64462	16-Oct-12	P & I D TANK 241-AY-102 ANNULUS		1 RD829M	(null)	Techdata_Mig
173248519	H-14-010506	29-Oct-12	DONE PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD829Y	(null)	Techdata_Mig
173248519	H-14-010506	29-Oct-12	DONE PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD829Y	(null)	Techdata_Mig
173325682	RPP-PLAN-53086	2-Nov-12	Waste Feed Delivery AY-102 Technology Maturation Mixing Sampling Demonstration Risk and Opportunity Management Plan	(null)	(null)	(null)	Techdata_Mig
173325682	RPP-PLAN-53086	2-Nov-12	Waste Feed Delivery AY-102 Technology Maturation Mixing Sampling Demonstration Risk and Opportunity Management Plan	(null)	(null)	(null)	Techdata_Mig
173325682	RPP-PLAN-53086	2-Nov-12	Waste Feed Delivery AY-102 Technology Maturation Mixing Sampling Demonstration Risk and Opportunity Management Plan	(null)	(null)	(null)	Techdata_Mig
173356384	RPP-RPT-53805	5-Nov-12	FINAL REPORT FOR TANK 241-AY-102 ANNULUS LEAK DETECTION PIT 2012 LIQUID GRAB SAMPLES IN SUPPORT OF WASTE COMPATIBILITY	(null)	(null)	(null)	Techdata_Mig
173356384	RPP-RPT-53805	5-Nov-12	FINAL REPORT FOR TANK 241-AY-102 ANNULUS LEAK DETECTION PIT 2012 LIQUID GRAB SAMPLES IN SUPPORT OF WASTE COMPATIBILITY	(null)	(null)	(null)	Techdata_Mig
173356384	RPP-RPT-53805	5-Nov-12	FINAL REPORT FOR TANK 241-AY-102 ANNULUS LEAK DETECTION PIT 2012 LIQUID GRAB SAMPLES IN SUPPORT OF WASTE COMPATIBILITY	(null)	(null)	(null)	Techdata_Mig
173670088	RPP-ASMT-53793	7-Nov-12	Tank 241-AY-102 Leak Assessment Report	(null)	(null)	(null)	Techdata_Mig
173670088	RPP-ASMT-53793	7-Nov-12	Tank 241-AY-102 Leak Assessment Report	(null)	(null)	(null)	Techdata_Mig
173670088	RPP-ASMT-53793	7-Nov-12	Tank 241-AY-102 Leak Assessment Report	(null)	(null)	(null)	Techdata_Mig
173750605	RPP-STE-00043	14-Nov-12	Performance and Functional Requirements Evaluation of a Simulated Trunnion Bar for the AY-102 Annulus Pump Pit	(null)	(null)	(null)	Techdata_Mig
173750605	RPP-STE-00043	14-Nov-12	Performance and Functional Requirements Evaluation of a Simulated Trunnion Bar for the AY-102 Annulus Pump Pit	(null)	(null)	(null)	Techdata_Mig
173750800	EDT-825341	14-Nov-12	Performance and Functional Requirements Evaluation of a Simulated Trunnion Bar for the AY-102 Annulus Pump Pit	(null)	(null)	(null)	Techdata_Mig
173750800	EDT-825341	14-Nov-12	Performance and Functional Requirements Evaluation of a Simulated Trunnion Bar for the AY-102 Annulus Pump Pit	(null)	(null)	(null)	Techdata_Mig

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173750605	RPP-STE-00043	14-Nov-12	Performance and Functional Requirements Evaluation of a Simulated Trunnion Bar for the AY-102 Annulus Pump Pit	(null)	(null)	(null)	Techdata_Mig
173750800	EDT-825341	14-Nov-12	Performance and Functional Requirements Evaluation of a Simulated Trunnion Bar for the AY-102 Annulus Pump Pit	(null)	(null)	(null)	Techdata_Mig
173868107	RPP-PLAN-54083	26-Nov-12	FY2013 GRAB SAMPLING AND ANALYSIS PLAN FOR THE 241 AY-102A TANK ANNULUS LEAK-DETECTION PIT	(null)	(null)	(null)	Techdata_Mig
173868107	RPP-PLAN-54083	26-Nov-12	FY2013 GRAB SAMPLING AND ANALYSIS PLAN FOR THE 241 AY-102A TANK ANNULUS LEAK-DETECTION PIT	(null)	(null)	(null)	Techdata_Mig
173868107	RPP-PLAN-54083	26-Nov-12	FY2013 GRAB SAMPLING AND ANALYSIS PLAN FOR THE 241 AY-102A TANK ANNULUS LEAK-DETECTION PIT	(null)	(null)	(null)	Techdata_Mig
173868107	RPP-PLAN-54083	26-Nov-12	FY2013 GRAB SAMPLING AND ANALYSIS PLAN FOR THE 241 AY-102A TANK ANNULUS LEAK-DETECTION PIT	(null)	(null)	(null)	Techdata_Mig
173882531	RPP-RPT-53901	27-Nov-12	Management of Supernatant Level After Hypothetical Decant of 241-AY-102	(null)	(null)	(null)	Techdata_Mig
173882531	RPP-RPT-53901	27-Nov-12	Management of Supernatant Level After Hypothetical Decant of 241-AY-102	(null)	(null)	(null)	Techdata_Mig
173882531	RPP-RPT-53901	27-Nov-12	Management of Supernatant Level After Hypothetical Decant of 241-AY-102	(null)	(null)	(null)	Techdata_Mig
174019215	TOC-ENV-NOT-2012-0023	5-Dec-12	Environmental Operational Activities Notification for planned maintenance on 241-AY-101, 241-AY-102, 241-AZ-101 & 241-AZ-102	(null)	(null)	(null)	Techdata_Mig
174019215	TOC-ENV-NOT-2012-0023	5-Dec-12	Environmental Operational Activities Notification for planned maintenance on 241-AY-101, 241-AY-102, 241-AZ-101 & 241-AZ-102	(null)	(null)	(null)	Techdata_Mig
174019215	TOC-ENV-NOT-2012-0023	5-Dec-12	Environmental Operational Activities Notification for planned maintenance on 241-AY-101, 241-AY-102, 241-AZ-101 & 241-AZ-102	(null)	(null)	(null)	Techdata_Mig
174019215	TOC-ENV-NOT-2012-0023	5-Dec-12	Environmental Operational Activities Notification for planned maintenance on 241-AY-101, 241-AY-102, 241-AZ-101 & 241-AZ-102	(null)	(null)	(null)	Techdata_Mig
174019215	TOC-ENV-NOT-2012-0023	5-Dec-12	Environmental Operational Activities Notification for planned maintenance on 241-AY-101, 241-AY-102, 241-AZ-101 & 241-AZ-102	(null)	(null)	(null)	Techdata_Mig
174019215	TOC-ENV-NOT-2012-0023	5-Dec-12	Environmental Operational Activities Notification for planned maintenance on 241-AY-101, 241-AY-102, 241-AZ-101 & 241-AZ-102	(null)	(null)	(null)	Techdata_Mig
174019215	TOC-ENV-NOT-2012-0023	5-Dec-12	Environmental Operational Activities Notification for planned maintenance on 241-AY-101, 241-AY-102, 241-AZ-101 & 241-AZ-102	(null)	(null)	(null)	Techdata_Mig
174089464	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig
174091861	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig
174091861	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig
174091862	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig
174091862	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig
174091954	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig
174092157	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig
174092451	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig
174089465	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig
174091954	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig
174092158	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig
174304065	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig
174076739	RPP-RPT-54071	10-Dec-12	FINAL REPORT FOR TANK 241-AY-102 ANNULUS	(null)	(null)	(null)	Techdata_Mig
174084626	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig
174089464	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig
174092451	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig
174092552	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig
174076739	RPP-RPT-54071	10-Dec-12	FINAL REPORT FOR TANK 241-AY-102 ANNULUS	(null)	(null)	(null)	Techdata_Mig
174084626	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig
174089465	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig
174092157	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1 RD836Z	(null)	Techdata_Mig

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174092158	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1	RD836Z	(null)	Techdata_Mig
174092552	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1	RD836Z	(null)	Techdata_Mig
174304065	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1	RD836Z	(null)	Techdata_Mig
174076739	RPP-RPT-54071	10-Dec-12	FINAL REPORT FOR TANK 241-AY-102 ANNULUS	(null)	(null)	(null)	Techdata_Mig
174091955	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1	RD836Z	(null)	Techdata_Mig
174091955	H-14-010506	10-Dec-12	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102		1	RD836Z	(null)	Techdata_Mig
174114457	PRHA-01973	12-Dec-12	AY-102 Emergency Pumping Equipment	(null)	(null)	(null)	Techdata_Mig
174114457	PRHA-01973	12-Dec-12	AY-102 Emergency Pumping Equipment	(null)	(null)	(null)	Techdata_Mig
174188326	RPP-ASMT-53794	18-Dec-12	Tank 241-AY-102 Leak Assessment Supporting Documentation: Miscellaneous Reports, Letters, Memoranda, and Data	(null)	(null)	(null)	Techdata_Mig
174181295	RPP-CALC-54091	18-Dec-12	AY-102 Annulus Pump Hoisting Analysis - Double Pump	(null)	(null)	(null)	Techdata_Mig
174188326	RPP-ASMT-53794	18-Dec-12	Tank 241-AY-102 Leak Assessment Supporting Documentation: Miscellaneous Reports, Letters, Memoranda, and Data	(null)	(null)	(null)	Techdata_Mig
174181295	RPP-CALC-54091	18-Dec-12	AY-102 Annulus Pump Hoisting Analysis - Double Pump	(null)	(null)	(null)	Techdata_Mig
174181295	RPP-CALC-54091	18-Dec-12	AY-102 Annulus Pump Hoisting Analysis - Double Pump	(null)	(null)	(null)	Techdata_Mig
174188326	RPP-ASMT-53794	18-Dec-12	Tank 241-AY-102 Leak Assessment Supporting Documentation: Miscellaneous Reports, Letters, Memoranda, and Data	(null)	(null)	(null)	Techdata_Mig
174197719	RPP-RPT-54099	19-Dec-12	Evaluation of the Corrosion Threat of the Waste in the Tank 241-AY-102 Annulus	(null)	(null)	(null)	Techdata_Mig
174197719	RPP-RPT-54099	19-Dec-12	Evaluation of the Corrosion Threat of the Waste in the Tank 241-AY-102 Annulus	(null)	(null)	(null)	Techdata_Mig
174197719	RPP-RPT-54099	19-Dec-12	Evaluation of the Corrosion Threat of the Waste in the Tank 241-AY-102 Annulus	(null)	(null)	(null)	Techdata_Mig
174221020	RPP-CALC-54015	20-Dec-12	AY-102 Annulus Pump Center of Gravity	(null)	(null)	(null)	Techdata_Mig
174221020	RPP-CALC-54015	20-Dec-12	AY-102 Annulus Pump Center of Gravity	(null)	(null)	(null)	Techdata_Mig
174221020	RPP-CALC-54015	20-Dec-12	AY-102 Annulus Pump Center of Gravity	(null)	(null)	(null)	Techdata_Mig
174303877	RPP-DATR-00034	27-Dec-12	AY-102 Reconfiguration for Annulus Pumping	(null)	(null)	(null)	Techdata_Mig
174303877	RPP-DATR-00034	27-Dec-12	AY-102 Reconfiguration for Annulus Pumping	(null)	(null)	(null)	Techdata_Mig
174725795	ECN-12-001264	25-Jan-13	AY/AZ Vent Upgrades: Recirc/Cooling Module Meter Addition for AY-102	(null)	(null)	(null)	Techdata_Mig
174725795	ECN-12-001264	25-Jan-13	AY/AZ Vent Upgrades: Recirc/Cooling Module Meter Addition for AY-102	(null)	(null)	(null)	Techdata_Mig
174725795	ECN-12-001264	25-Jan-13	AY/AZ Vent Upgrades: Recirc/Cooling Module Meter Addition for AY-102	(null)	(null)	(null)	Techdata_Mig
174725795	ECN-12-001264	25-Jan-13	AY/AZ Vent Upgrades: Recirc/Cooling Module Meter Addition for AY-102	(null)	(null)	(null)	Techdata_Mig
174725795	ECN-12-001264	25-Jan-13	AY/AZ Vent Upgrades: Recirc/Cooling Module Meter Addition for AY-102	(null)	(null)	(null)	Techdata_Mig
174753042	RPP-SPEC-52846	28-Jan-13	Fabrication Specification For Double-Shell Tank 241-AY-102 Independent Cooling Module Skid	(null)	(null)	(null)	Techdata_Mig
174755318	RPP-PLAN-54466	28-Jan-13	INDEPENDENT QUALIFIED REGISTERED PROFESSIONAL ENGINEER INSPECTION PLAN FOR AY-102 EMERGENCY PUMPING EQUIPMENT	(null)	(null)	(null)	Techdata_Mig
174755318	RPP-PLAN-54466	28-Jan-13	INDEPENDENT QUALIFIED REGISTERED PROFESSIONAL ENGINEER INSPECTION PLAN FOR AY-102 EMERGENCY PUMPING EQUIPMENT	(null)	(null)	(null)	Techdata_Mig
174753042	RPP-SPEC-52846	28-Jan-13	Fabrication Specification For Double-Shell Tank 241-AY-102 Independent Cooling Module Skid	(null)	(null)	(null)	Techdata_Mig
174753042	RPP-SPEC-52846	28-Jan-13	Fabrication Specification For Double-Shell Tank 241-AY-102 Independent Cooling Module Skid	(null)	(null)	(null)	Techdata_Mig
174755318	RPP-PLAN-54466	28-Jan-13	INDEPENDENT QUALIFIED REGISTERED PROFESSIONAL ENGINEER INSPECTION PLAN FOR AY-102 EMERGENCY PUMPING EQUIPMENT	(null)	(null)	(null)	Techdata_Mig
174886123	H-14-107618	5-Feb-13	AY TANK FARM ROUTE MAP AY-101 & AY-102		1	RD846T	(null)	Techdata_Mig
174886123	H-14-107618	5-Feb-13	AY TANK FARM ROUTE MAP AY-101 & AY-102		1	RD846T	(null)	Techdata_Mig
174886125	H-14-107618	5-Feb-13	AY TANK FARM ROUTE MAP AY-101 and AY-102		1	RD846T	(null)	Techdata_Mig
174886124	H-14-107618	5-Feb-13	AY TANK FARM ROUTE MAP AY-101 & AY-102		1	RD846T	(null)	Techdata_Mig
174886126	H-14-107618	5-Feb-13	AY TANK FARM ROUTE MAP AY-101 and AY-102		1	RD846T	(null)	Techdata_Mig
174886223	H-14-107618	5-Feb-13	AY TANK FARM ROUTE MAP AY-101 & AY-102		1	RD846T	(null)	Techdata_Mig
174886223	H-14-107618	5-Feb-13	AY TANK FARM ROUTE MAP AY-101 & AY-102		1	RD846T	(null)	Techdata_Mig

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174886421	H-14-107618	5-Feb-13	AY TANK FARM ROUTE MAP AY-101 and AY-102		1	RD846T	(null)	Techdata_Mig
174886124	H-14-107618	5-Feb-13	AY TANK FARM ROUTE MAP AY-101 & AY-102		1	RD846T	(null)	Techdata_Mig
174886126	H-14-107618	5-Feb-13	AY TANK FARM ROUTE MAP AY-101 and AY-102		1	RD846T	(null)	Techdata_Mig
174886125	H-14-107618	5-Feb-13	AY TANK FARM ROUTE MAP AY-101 and AY-102		1	RD846T	(null)	Techdata_Mig
174886421	H-14-107618	5-Feb-13	AY TANK FARM ROUTE MAP AY-101 and AY-102		1	RD846T	(null)	Techdata_Mig
174901262	RPP-RPT-54251	6-Feb-13	Final Report for Tank 241-AY-102A Annulus Leak-Detection Pit Liquid Grab Samples, December 2012	(null)	(null)		(null)	Techdata_Mig
174901262	RPP-RPT-54251	6-Feb-13	Final Report for Tank 241-AY-102A Annulus Leak-Detection Pit Liquid Grab Samples, December 2012	(null)	(null)		(null)	Techdata_Mig
174901262	RPP-RPT-54251	6-Feb-13	Final Report for Tank 241-AY-102A Annulus Leak-Detection Pit Liquid Grab Samples, December 2012	(null)	(null)		(null)	Techdata_Mig
175193244	RPP-ASMT-54634	26-Feb-13	PROPENSITY FOR CORROSION IN THE 241-AY-102 ANNULUS	(null)	(null)		(null)	Techdata_Mig
175239617	RPP-RPT-54322	28-Feb-13	Alternatives Evaluation for Tank 241-AY-102 Waste Retrieval	(null)	(null)		(null)	Techdata_Mig
175239617	RPP-RPT-54322	28-Feb-13	Alternatives Evaluation for Tank 241-AY-102 Waste Retrieval	(null)	(null)		(null)	Techdata_Mig
175325860	RPP-RPT-53425	6-Mar-13	Waste Feed Delivery Projects AY-102 In-Tank Upgrades (T3W11) Project Closeout Report	(null)	(null)		(null)	Techdata_Mig
175325860	RPP-RPT-53425	6-Mar-13	Waste Feed Delivery Projects AY-102 In-Tank Upgrades (T3W11) Project Closeout Report	(null)	(null)		(null)	Techdata_Mig
175325860	RPP-RPT-53425	6-Mar-13	Waste Feed Delivery Projects AY-102 In-Tank Upgrades (T3W11) Project Closeout Report	(null)	(null)		(null)	Techdata_Mig
175471414	OSD-RAP-54802	18-Mar-13	AY-102 Annulus Exhaust Ventilation System Shutdown Recovery Action Plan	(null)	(null)		(null)	Techdata_Mig
175471414	OSD-RAP-54802	18-Mar-13	AY-102 Annulus Exhaust Ventilation System Shutdown Recovery Action Plan	(null)	(null)		(null)	Techdata_Mig
175471414	OSD-RAP-54802	18-Mar-13	AY-102 Annulus Exhaust Ventilation System Shutdown Recovery Action Plan	(null)	(null)		(null)	Techdata_Mig
175640213	RPP-RPT-44630	27-Mar-13	Derivation of Best-Basis Inventory for Tank 241-AY-102 as of January 1, 2013	(null)	(null)		(null)	Techdata_Mig
175619334	RPP-RPT-54701	27-Mar-13	VENTILATION OPTIONS TO INCREASE DRYING/CRUST FORMATION ON AY-102 WASTE LEAK	(null)	(null)		(null)	Techdata_Mig
175619334	RPP-RPT-54701	27-Mar-13	VENTILATION OPTIONS TO INCREASE DRYING/CRUST FORMATION ON AY-102 WASTE LEAK	(null)	(null)		(null)	Techdata_Mig
175640213	RPP-RPT-44630	27-Mar-13	Derivation of Best-Basis Inventory for Tank 241-AY-102 as of January 1, 2013	(null)	(null)		(null)	Techdata_Mig
175619334	RPP-RPT-54701	27-Mar-13	VENTILATION OPTIONS TO INCREASE DRYING/CRUST FORMATION ON AY-102 WASTE LEAK	(null)	(null)		(null)	Techdata_Mig
175765022	RPP-54402	3-Apr-13	Tank AY-102 Emergency Pumping System Fabrication and Test Reports	(null)	(null)		(null)	Techdata_Mig
175765022	RPP-54402	3-Apr-13	Tank AY-102 Emergency Pumping System Fabrication and Test Reports	(null)	(null)		(null)	Techdata_Mig
175765022	RPP-54402	3-Apr-13	Tank AY-102 Emergency Pumping System Fabrication and Test Reports	(null)	(null)		(null)	Techdata_Mig

IDMS SQL
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OBJID	DOCNO	DATE	TITLE	PAGES	RHA BOX #	ACC RIGHTS	IDMS CATEGORY
151143485		27-May-10	COMPLETED PROJECT FILES AND SUBMITTALS FOR: WGI CONTRACT 13272 RELEASE 14 W-211 TK-241-AZ-102"				

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OBJID	DOCNO	DATE	TITLE	PAGES	RHA BOX #	ACC RIGHTS	IDMS CATEGORY
44282822	E221013	27-Feb-96	SUPPORT COVERAGE OUTSIDE 241AY FOR ELECTRICIANS PULLING WIRE THROUGH TREADWAY TO 401-AY-101 & 401-AY-102	2	150189	DOES NOT CONTAIN C(	RSR
44287969	E222775	2-Jul-96	REMOVAL OF LIMITORQUE ACTUATOR FROM VALVE MK-AY-102-K1-2 & PERSONNEL & MATERIAL RELEASE SURVEYS IN SUPPORT OF ICF-KH W-151 & W-320 & W-030 PROJECTS	4	150189	DOES NOT CONTAIN C(	RSR
44373433	E302925	18-Nov-97	COVERAGE FOR REINSTALLATION OF FAN COIL UNIT INTO 241-AY-102-02E PIT	2	150187	DOES NOT CONTAIN C(	RSR
44373449	E302941	19-Nov-97	COVERAGE OF THE W-320 LABORERS EXCAVATING IN TRENCHES SOUTHEAST & SOUTHWEST OF THE 241-AY-102-02A PUMP PIT	2	150187	DOES NOT CONTAIN C(	RSR
44373439	E302931	19-Nov-97	RADIOLOGICAL CONTROL TECHNICIAN COVERAGE OF 241-AY-102-A CONTAINMENT TENT FOR W-320	4	150187	DOES NOT CONTAIN C(	RSR
44373448	E302940	20-Nov-97	REMOVED JUMPER FROM 241-AY-102-02A PIT & INSTALLED VAPOR SEAL ON 4 INCH NOZZLE IN THE DISTRIBUTOR	3	150187	DOES NOT CONTAIN C(	RSR
44373447	E302939	21-Nov-97	PROVIDED COVERAGE FOR FDNW W-320 PROJECT TO REMOVE JUMPERS FROM 241-AY-102-02A PIT	3	150187	DOES NOT CONTAIN C(	RSR
44373457	E302949	21-Nov-97	JOB COVERAGE OF 241-AY-102-02A PIT & JUMPER REMOVAL & VAPOR SEAL INSTALLATION	3	150187	DOES NOT CONTAIN C(	RSR
44374236	E303086	13-Dec-97	REPLACE JUMPER H2-818503 NOZZLE A TO TRANSMITTER VAPOR SEAL IN 241-AY-102-02E PIT	4	150187	DOES NOT CONTAIN C(	RSR
44357732	E303298	10-Jan-98	RADIOLOGICAL CONTROL TECHNICIAN COVERAGE OF JUMPER INSTALLATION IN 241-AY-102A PIT	3	150187	DOES NOT CONTAIN C(	RSR
44379950	E303802	12-Jan-98	W-320 PROJECT TO REPLACE COVER BLOCKS & SHIELD PLUGS & VALVE HANDLES INTO 241-AY-102-02A PIT	3	150187	DOES NOT CONTAIN C(	RSR
44241917	DSTP000562	17-Sep-98	COVERED FDNW PAINTER PERFORMING WORK ON 241-AY-102E & 241-AY-102A PITS	2	150371	DOES NOT CONTAIN C(	RSR
44244044	DSTP001039	18-Mar-99	RECONFIGURE 241-AY-102-02A PIT BY REMOVING AIR MANIFOLD & FLUSH JUMPER & REINSTALLING SHIELD PLUG	4	150376	DOES NOT CONTAIN C(	RSR
44257747	DSTP003861	23-Jan-01	ATTEMPT TO INSTALL COVERBLOCKS AT AY-102-02A PIT	3	163960	DOES NOT CONTAIN C(	RSR
44248165	DSTP004217	26-Apr-01	START OTP ON LEAK DETECTOR EQUIPMENT AT AY-102-02A PIT & PERFORM BACKFILL AROUND ELEC HANDHOLES	2	166466	DOES NOT CONTAIN C(	RSR
44270562	DSTP006326	9-Sep-02	REISTALL FLOOR DRAIN INTO AY-102-02A PIT	2	166624	DOES NOT CONTAIN C(	RSR
44005148	CS005722	1-Nov-02	OBTAIN 1 FIELD BLANK & 3 SUPERNATE SAMPLES FROM AY-102 THROUGH RISER NUMBER 54	4	177297	DOES NOT CONTAIN C(	RSR
44005147	CS005721	1-Nov-02	SHIP SAMPLES FROM AN-107 & AY-102 TO 222S LAB	5	177297	DOES NOT CONTAIN C(	RSR
43995583	CS005731	5-Nov-02	PROVIDED COVERAGE FOR NITRATE GRAB SAMPLES AT AY-102 RISER NUMBER 54 ALSO INCLUDES SHIPMENT OF THE SAMPLES TO THE LAB	4	177297	DOES NOT CONTAIN C(	RSR
130545805	S-252240	13-Jan-03	1) LOADOUT OF T-204 & B-203 & T-203 & AY-102 & T-110 SAMPLES FROM 11A1 & 2) MANIPULATOR NUMBER 7471 SURVEYED ACROSS CA LINE INTO 11A	2	RM4724	PUBLIC	RSR
130551326	S-252346	18-Feb-03	LOADOUT OF AY-102 & C-106 & SHIPMENT MAI (MISSION ACCELERATION INITIATIVE PHASE II)	3	RM4727	PUBLIC	RSR
131155347	S-252526	29-Apr-03	RECEIVED TOW AY-102 TANK SAMPLES	2	RM4724	PUBLIC	RSR
131154699	S-252529	30-Apr-03	RECEIVED (4) AY-102 TANK SAMPLES	2	RM4724	PUBLIC	RSR
130869203	S-252532	1-May-03	LOADIN (4) AY-102 TANK SAMPLES INTO 11A1A PORTAL & LOADOUT (3) AN-102 LINERS FROM 11A1A PORTHOLE & RECEIVED (3) 244-AR SAMPLES & (1) FIELD BLANK	3	RM4724	PUBLIC	RSR
131155351	S-252535	2-May-03	LOADOUT AR-244 & AY-102 SAMPLES & RECEIVE (2) AY-102 CASKS	3	RM4724	PUBLIC	RSR
132485427	S-252580	22-May-03	PERFORMED LOAD-OUTS OF (6) AY-102 CORE 308 LINERS & LOAD IN OF (2) AY-102 CASKS	3	RM4724	PUBLIC	RSR
119482397	S-252792	25-Aug-03	PROVIDED COVERAGE FOR 11A HOTCELLS & LOADED OUT FOUR (4) AY-102 E-COR-3 SAMPLES INTO T-HANDLE CARRIERS & SENT INTO LABS FOR ANALYSIS	2	RM4724	PUBLIC	RSR
119606481	S-252843	10-Sep-03	RECEIPT & BREAKDOWN OF C-204 FINGER TRAP SAMPLES & LOADOUT OF AY-102 SAMPLES	3	RM4724	PUBLIC	RSR
119606514	S-252865	17-Sep-03	LOADOUT OF AP-105 & AY-102 & C-203	3	RM4724	PUBLIC	RSR
162771700	WC-000740	24-Nov-03	COVERAGE FOR THE INSTALLATION OF DRILL STRING INTO AY-102 RISER #64	2	RM7830	DOES NOT CONTAIN C(	RSR
121251872	S-253078	25-Nov-03	PROVIDED COVERAGE FOR 11A HOTCELLS & RECEIVED & LOADED IN AY-102 SAMPLES IN OTC CASKS & LOADED OUT BALANCE CALIBRATION WEIGHTS TO BE SENT TO 1E1 HOTCELL	2	RM4724	PUBLIC	RSR
162771833	WC-000752	26-Nov-03	SUPPORT OPERATIONS WITH CORE SAMPLING AT AY-102 RISER 67	4	RM7830	DOES NOT CONTAIN C(	RSR
162772808	WC-000798	16-Dec-03	SUPPORT OPERATIONS WITH CORE SAMPLING ACTIVITIES AT AY-102 RISER 67	2	RM7830	DOES NOT CONTAIN C(	RSR
162887135	WC-000807	17-Dec-03	HEALTH PHYSICS SUPPORT FOR CORE SAMPLING AY-102	2	RM7830	DOES NOT CONTAIN C(	RSR

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162886878	WC-000809	18-Dec-03	COVERAGE FOR CORE SAMPLING AY-102 RISER #67	4	RM7830	DOES NOT CONTAIN C(	RSR
162900818	WC-000949	25-Jan-04	SUPPORT OPERATIONS WITH REMOVAL OF FOOTCLAMP AND MITIGATION SLEEVE AT AY-102 RISER 67	2	RM7830	DOES NOT CONTAIN C(	RSR
162900515	WC-000935	18-Feb-04	COVERAGE FOR DRILLSTRING PULL AT AY-102 RISER #67 (17 PIECES OF 19" DRILLSTRING REMOVED)	4	RM7830	DOES NOT CONTAIN C(	RSR
162901074	WC-000947	24-Feb-04	COVERED OPERATIONS WITH DRILL STRING PULL AT AY-102 RISER 67	4	RM7830	DOES NOT CONTAIN C(	RSR
138460759	S-254102	9-Nov-04	PROVIDE LAB SUPPORT FOR LAB PERSONNEL AY-102 (ORANGE) BEING WORKED IN RM 4A HOOD 3 & SUPPORT INSTRUMENT TECHS DURING SCALE CAL	2	RM4850	PUBLIC	RSR
95606419	2S-000063	24-Jan-05	SUPPORTED OPERATIONS WITH WALKDOWN OF AZ-101 RISER 53 & AZ-102 RISER 58 & 64 & 63 & AY-102 RISER 58 FOR FUTURE CORE SAMPLING	2	RM4668	PUBLIC	RSR
96413736	2S-000225	13-Mar-05	SET-UP WORK AREA AT AY-102 RISER NUMBER 58 & NO INTRUSIVE WORK PERFORMED	2	RM4668	PUBLIC	RSR
96413739	2S-000231	15-Mar-05	COVERAGE OF ATS SAMPLING OPERATION IN PERFORMING SET UP ACTIVITIES FOR CORE SAMPLE OF 241-AY-102 & ALSO PERFORMED SHIPMENT SURVEYS OF 10 OTC & 2 OTC STANDS FROM 2102-HV TO 241-AY-FARM	2	RM4668	PUBLIC	RSR
96413747	2S-000247	21-Mar-05	SUPPORT FOR RISER EQUIPMENT INSTALLATION AT AY-102 RISER 058	2	RM4668	PUBLIC	RSR
97693470	2S-000259	24-Mar-05	REMOVAL OF SHIELD PLUG WITH SLUDGE WEIGHT & SUPPORT FOR RISER EQUIPMENT INSTALLATION AT AY-102 RISER 058	2	RM4668	DOES NOT CONTAIN C(	RSR
97694460	2S-000261	25-Mar-05	COVERAGE OF ATS SAMPLING OPERATIONS IN PERFORMING SET-UP WORK ACTIVITIES OF THE PMCST NUMBER 1 TRUCK ON TANK 241-AY-102 RISER NUMBER 058	5	RM4668	DOES NOT CONTAIN C(	RSR
97694464	2S-000285	5-Apr-05	SURVEY OF ITEMS FOR FARM AFTER (AM) SAMPLE TAKEN & (PM) HOUSE KEEPING PERFORMED FOR TANK AY-102	2	RM4668	DOES NOT CONTAIN C(	RSR
97693474	2S-000283	5-Apr-05	COVERAGE OF ATS SAMPLING OPERATIONS PERFORM CORE SAMPLING OF TANK 241-AY-102 RISER NUMBER 058	7	RM4668	DOES NOT CONTAIN C(	RSR
138678286	S-254505	14-Apr-05	11A COVERAGE RECEIVE & UNLOAD AY-102/OTC	2	RM5335	PUBLIC	RSR
138677990	S-254511	15-Apr-05	SURVEYED 219S GRATE ALSO RECEIVED AY-102 CORE SEGMENT AT DOOR 10	2	RM5335	PUBLIC	RSR
138848489	S-254596	13-May-05	COVER LOAD OUT IN OF TWO AY-102 OTC	2	RM5335	DOES NOT CONTAIN C(	RSR
138849928	S-254599	13-May-05	SUPPORT LOAD OUT OF AY-102 CORE 315 SEG 17 & 16 SAMPLES	4	RM5335	DOES NOT CONTAIN C(	RSR
138850006	S-254626	24-May-05	PROVIDED COVERAGE FOR 11A HOTCELLS & LOADED OUT 1 B-3617 SAMPLE & 6 AY-102 SAMPLES & SENT THEM INTO LABS FOR ANALYSIS & RECEIVED 2 C-203 FINGER TRAP SAMPLES & LOADED 4 C-203 SAMPLES INTO 11A HOTCELL TODAYS PLUS MORE	2	RM5335	DOES NOT CONTAIN C(	RSR
138788295	S-254676	9-Jun-05	JOB COVERAGE IN LAB ROOM 1J HOOD 2 TO SUPPORT ANALYTICAL WORK WITH ORANGE LABELED AY-102 SAMPLES	2	RM5335	DOES NOT CONTAIN C(	RSR
96413637	2S-000611	4-Aug-05	PMCST NUMBER 1 (PUSH MODE CORE SAMPLE TRUCK) AT AY-102 RISER 069 & REMOVE SAMPLER FROM DRILL STRING	2	RM4668	PUBLIC	RSR
138872015	S-254894	8-Aug-05	LOAD OUT AY-102 SAMPLES & BLANK	2	RM5335	DOES NOT CONTAIN C(	RSR
138874176	S-254922	18-Aug-05	LAB WORK 4K HOOD 4 IC ON AY-102 & 4K HOOD 3 STANDARDS & 4K HOOD 1 TRIDIUMS & 1J ICP & 1K/4H MERCURY & 4B HOOD 9 PU & 1D XRD PIPE SAMPLE HOODS 4 & 5 & 4S & 4P HOUSE CLEANING	2	RM5335	DOES NOT CONTAIN C(	RSR
138876036	S-254925	19-Aug-05	LAB WORK 4K HOOD4 & IC ON AY-102 & IJ ICP & 4B HOODS 7 & 9 PU & 4B HOODS 3 & 4 SRY & 1K HOOD 1 MERCURY & 1D XRD PIPE SAMLE HOODS 4 & 5 & 1L HOOD 1 STANDARS & 4L HOOD 2 PU & NP & 4A HOOD 1 & 2 PHS & OHS & 4B BENCH TOP DECON PLANCHETTS	2	RM5335	DOES NOT CONTAIN C(	RSR
138876154	S-254926	19-Aug-05	LOAD OUT & PREP AY-102 SAMPLES	3	RM5335	DOES NOT CONTAIN C(	RSR
138876157	S-254937	24-Aug-05	LOAD OUT AY-102 CENTRIFUGE CONES	2	RM5335	DOES NOT CONTAIN C(	RSR
138876043	S-254953	25-Aug-05	AY-102 ORANGE LABEL WORKED IN ROOM 1B FOR ACID DIGEST ANALYSIS	2	RM5335	DOES NOT CONTAIN C(	RSR
138874063	S-254958	29-Aug-05	COVER WORK INSIDE LABS INCLUDING ORANGE LABEL AY-102 DIGESTS IN 1B	2	RM5335	DOES NOT CONTAIN C(	RSR
138894058	S-254962	30-Aug-05	COVER WORK INSIDE LABS INCLUDING ORANGE LABEL AY-102 DIGESTS IN 1B	2	RM5335	DOES NOT CONTAIN C(	RSR
138893951	S-254977	1-Sep-05	AY-102 SAMPLES WORKED IN 1B ORANGE LABEL	2	RM5335	DOES NOT CONTAIN C(	RSR
138894064	S-254986	2-Sep-05	LOAD OUT & PREP AY-102 LIQUID SAMPLES	2	RM5335	DOES NOT CONTAIN C(	RSR
138893844	S-254985	2-Sep-05	MISC COVERAGE INSIDE LABS & COVERAGE OF FUSSION ORANGE SAMPLES AY-102 CC6 IN 1B	2	RM5335	DOES NOT CONTAIN C(	RSR

IDMS SQL
AY-102 (Title/Desc/Keyword)

138894174	S-254993	6-Sep-05	LAB SUPPORT TIC TOV AY-102 RED/ORANGE LABELED SAMPLES	2	RM5335	DOES NOT CONTAIN C(RSR
138893956	S-255000	7-Sep-05	TEMPORARY RECLASSIFICATION OF AY-102 DIGEST SAMPLES FOR ICP ANALYSIS IN ROOM 1J HOOD 2	2	RM5335	DOES NOT CONTAIN C(RSR
138545857	S-255209	2-Nov-05	LOAD IN OTC & LOAD OUT AY-102 SAMPLES & SURVEY HEDGEHOGS OUT OF CA TO STAGE IN RMA/RBA FOR SHIPMENT AT A LATER DATE	3	RM4850	PUBLIC RSR
128219989	S-255895	2-May-06	11A HOTCELL LOADOUT OF (17) AN-106 SAMPLES & (6) AY-102	2	RM4724	PUBLIC RSR
127948732	S-255967	18-May-06	11A HOTCELL LOAD OUT OF (16) AY-102 SAMPLES	2	RM4724	PUBLIC RSR
127948748	S-256015	31-May-06	AY-102 ORANGE LABEL SAMPLES	2	RM4724	PUBLIC RSR
128268484	S-256031	5-Jun-06	LAB WORK INCLUDED 4K AY-102 IC HOOD 4 & 4B ALPHA/BETAS HOOD 12 & 4J PU HOODS 3 & 4 & 5 & 4B WASHING GLASSWARE & 1GA HOOD 3 702-AZ SAMPLES & 4N & 4P CARPENTER WORKING ON CABINETS	2	RM4724	PUBLIC RSR
128268488	S-256039	6-Jun-06	LAB WORK INCLUDED 1L HOUSE KEEPING & 4N HOUSEKEEPING & 4K AY-102 IC HOOD 4 & 4D & 4L & 2H ROOM OWNER INSPECTION & 4J PU & AM HOODS 3 & 4 & 5 & 4A TGA HOOD 4	2	RM4724	PUBLIC RSR
128268718	S-256060	9-Jun-06	LAB WORK INCLUDED 4J TC-99 HOOD 9 & 4A PIPET CALIBRATION & 2D WASTE INSPECTION & 1L ICPMASPEC HOOD 6 & 1K FUSION HOOD 1 & 2B2 MERCURY HOOD 2 & 2B HOOD 2 ALPHA INSPECTION & 1D HOOD 5 AY-102 CAUSTIC DEMAND & 4J HOOOD 12 SPG	2	RM4724	PUBLIC RSR
68055970	WTP-000302	11-Sep-06	BUILD TENT FOR UT WORK & PULL BOLTS FROM RISER FLANGES ON AY-102	2	RM4113	DOES NOT CONTAIN C(RSR
136489487	S-256650	26-Oct-06	LAB WORK INCLUDE 4P HOODS 3 & 4 & 8 WP 141 & 4K HOOD & 3 IC & 4C HOOD 3 SIM AP-101 & AY-102 & 4D HOOD 1 & 2 NI-63 & 4J HOOD 12 Z-9 & 1K HOOD MERCURY VAPOR & 4L HOOD 12 PU & AM & 2B HOODS 1 & 2 & 3 MICRO DIGEST & 1L HOODS 3 & 6 ICPMASPEC & 2D WASTE	2	RM4724	PUBLIC RSR
136484584	S-256759	21-Nov-06	LAB WORK INCLUDE 4N HOUSEKEEPING & 2D WASTE RECEIPT & 4B HOOD 10 SR-90 & 4B PU HOOD 1 & 3 & 4 & 1L HOOD 6 ICPMASSPEC STD & 1J HOOD 2 ICP AY-102 & AP-101 & 1D INVENTORY & 1B HOOD 5 ACID DIGEST Z-9 & 4K IC HOOD P EF1 & 4J HOOD 2 TOTAL ALPHA & BETA	2	RM4724	PUBLIC RSR
84711096	WTO-005406	23-Dec-06	LIQUID WASTE TRANSFER FROM 241-AY-102 TO 241-AW-102	7	RM4317	PUBLIC RSR
84710838	WTO-005441	28-Dec-06	SUPPORT OF CAMERA CREW & ANNULUS VIDEO WORK AT AY-102 RISER NUMBER 82	3	RM4317	PUBLIC RSR
141084245	S-257033	30-Jan-07	SLURP N POUR FOR 39 RED AW-103, AW-105, AW-106 & 42 GREEN LABEL AY-101, AY-102, & 12 ORANGE LABEL AY-102 ALONG WITH 23 BASES & 20 ACIDS &109 ACID DIGS IN HOOD 16A ONLY	2	RM5573	DOES NOT CONTAIN C(RSR
138198334	WTO-008880	25-Oct-07	COVERAGE OF OPERATORS TAKING ZIP CORD READING IN TANK AY-102	2	RM4850	PUBLIC RSR
138633221	2S-001650	30-Oct-07	PERFORMED WALK DOWN SURVEYS OF AW-105 & AY-102 & AY-101 & AN 106	2	RM5335	PUBLIC RSR
141226760	S-258149	5-Dec-07	RECEIPT OF AY-102 GRAB SAMPLES	2	RM5338	DOES NOT CONTAIN C(RSR
141226543	S-258157	6-Dec-07	SUPPORT 11A, INCLUDING LOAD IN OF AY-102 SAMPLES PIGS, DECON OF PNNL MINI-PIGS, LOAD-OUT & BREAKDOWN OF AY-102 SAMPLES	3	RM5338	DOES NOT CONTAIN C(RSR
141226855	S-258174	11-Dec-07	AY-102 SUPPORT TOTAL INORGANIC CARBON, TOTAL ORGANIC CARBON ANALYSIS & LEAK DETECTION PIT ANALYSIS	2	RM5338	DOES NOT CONTAIN C(RSR
138092703	WTO-009376	20-Dec-07	PROVIDE COVERAGE FOR INSTRUMENT TECHS PERFORMING SUMP LEVEL READINGS AT 241-AY/AZ FARMS & AZ-101-121, AZ 101-141 & AZ 102-142, AZ 102-122 & AY 101-121, AY 101-141, AY-102-122 & AY102-142	2	RM4724	PUBLIC RSR
141892956	WTO-009815	13-Feb-08	REMOVAL & REPLACEMENT OF 241-AY-102 ANNULUS EXHAUSTER FAN BEARINGS, RELEASE OF EQUIPMENT	3	RM5635	DOES NOT CONTAIN C(RSR
141893165	WTO-009850	15-Feb-08	DISASSEMBLY OF FAN BEARINGS #3 & 4 FROM AY-102 ANNULUS VENTILATION FAN	2	RM5635	DOES NOT CONTAIN C(RSR
141893761	WTO-009879	19-Feb-08	SUPPORT INSTRUMENT TECHS AT AY-102 WITH ENRAF CALIBRATION & FUNCTIONAL TEST	2	RM5635	DOES NOT CONTAIN C(RSR
141885126	WTO-010137	14-Mar-08	PROVIDE COVERAGE FOR INSTRUMENT TECHS PERFORMING WEIGHT FACTOR TESTS IN AY-101, AY-102, AZ-101, & AZ-102 INSTRUMENT CABINETS	2	RM5635	DOES NOT CONTAIN C(RSR
141884683	WTO-010156	16-Mar-08	SUPPORT OF AY-102 ANNULUS EXHAUSTER SHAFT INSTALLATION & TOOL CRIB CALIBRATION EXCHANGE	3	RM5635	DOES NOT CONTAIN C(RSR
142039667	2S-001773	8-Apr-08	CORE SAMPLING AT 241-AY FARM, TANK AY-102 RISER #66	4	RM5658	DOES NOT CONTAIN C(RSR
142039576	2S-001775	11-Apr-08	CORE SAMPLING AT 241 AY FARM, TANK AY-102 RISER #66	4	RM5658	DOES NOT CONTAIN C(RSR
142042003	2S-001797	1-May-08	CORE SAMPLING AT 241-AY FARM, TANK AY-102 RISER #66	5	RM5658	DOES NOT CONTAIN C(RSR
143917606	WTO-011127	25-Jun-08	SUPPORT OF ANNULUS VIDEO INSPECTION, SOUTH SIDE OF TANK AY-102 3" RISER 082.	2	RM5803	DOES NOT CONTAIN C(RSR

IDMS SQL
AY-102 (Title/Desc/Keyword)

142900790	WTO-012042	1-Oct-08	SURVEY THE PATH ABOVE THE AY-102 TO C-FARM SL-100 TRANSFER LINE URMA. LOCATION NUMBER 21, OF TASK, TFC-A007. POSTING APPEAR APPROPRIATE, ONE OF THE PIPELINE. OPERATIONS PERSONNEL PICKED UP SOIL & DRIED VEGITATION AT THE SIGHT OF THE HOT SPECKS	3	RM5744	DOES NOT CONTAIN C(	RSR
148818733	WTO-012603	2-Dec-08	MILLWRIGHTS REPLACE AY-102 ANNULUS CAM VACUUM PUMP. NOTE: ALL ITEMS SURVEY @ 67% CL AND RELEASED TO PERSONNEL & MILLWRIGHT	2	RM6062	LIMITED	RSR
157094622	WTO-012877	6-Jan-09	SUPPORTED OPS AND MAINT. PERSONNEL IN 241-AN-FARM AND 241-AY-FARM. COMPLETED ENRAFS IN AN-107-WST RISER-004, AN-103-WST RISER-004 AND AY-102-WST RISER-073, FLUSH AND CALIBRATIONS	2	RM7350	DOES NOT CONTAIN C(	RSR
148286450	WTO-013538	13-Mar-09	SURVEY LLW BOX PIN #BOE-08-345-01 FROM AY FARM CA TO RBA (ITEM #1 WORK AREA AY-102 CA)	2	RM6044	LIMITED	RSR
148970028	WTO-013751	3-Apr-09	JOB SUPPORT FOR ELECTRICIANS @ AY-102, FOR CORROSION PROBE. ITEMS #1, 2, 3, & 4 SURVEYED AND RELEASED AT 67% CL TO ELECTRICIANS	2	RM6062	LIMITED	RSR
148970220	WTO-013755	4-Apr-09	MATERIAL EXIT SURVEYS, CREW WORKING ON THE AY-102 CORROSION PROBE DAILY READINGS, INSTRUMENT CREW. ITEMS 2-6 RELEASED TO THE INSTRUMENT PERSONNEL	2	RM6062	LIMITED	RSR
148970038	WTO-013788	7-Apr-09	COVERAGE FOR INSTRUMENT TECHS DOING CORROSION PROBE READINGS AT AY-102. AY-FARM WAS POSTED VAPOR CONTROL ZONE. ITEM 2 INSTRUMENT TECH ALARMED PCM-1B IN MULTIPLE AREAS TWICE. TOOK BLUE COVERALLS AND BAGGED AND TAGGED THEM FOR SUSPECTED RADON EVEN THOUGH FIELD INSTRUMENTS SHOWED NOTHING ABOVE BACKGROUND. 5 HOURS LATER COVERALLS CLEARED PCM-1B	2	RM6062	LIMITED	RSR
148969828	WTO-013797	8-Apr-09	AY-102 PERFORM CORROSION PROBE READINGS. ITEMS SURVEYED AND RELEASED BACK TO INSTR. TECHS	2	RM6062	LIMITED	RSR
146999186	WTO-013876	15-Apr-09	AY-102 PERFORM CORROSION PROBE READINGS. ITEMS SURVEYED AND RELEASED BACK TO INSTRUMENT TECHS	2	RM5969	LIMITED	RSR
146999850	WTO-013889	16-Apr-09	PERFORM CORROSION PROBE READINGS AT AY-102. ALL ITEMS RETURNED TO INSTRUMENT TECHS	2	RM5969	LIMITED	RSR
148448934	WTO-013901	18-Apr-09	MATERIAL EXIT SURVEYS, CREW WORKING ON THE AY-102 CORROSION PROBE DAILY READINGS, INSTRUMENT CREW. ITEMS 2-6 RELEASED TO THE INSTRUMENT PERSONNEL	2	RM6044	LIMITED	RSR
149020346	WTO-014079	4-May-09	AN & AY-102 PERFORMING CORROSION PROBE READING. ITEMS 2, 3, 4 SURVEYED @ 67% CL AND RELEASED TO INSTRUMENT TECH	2	RM6062	LIMITED	RSR
148538160	WTO-014235	19-May-09	PERFORM TEST ON RW-PI-103 IN 801-AZ. PERFORM READINGS FOR CORROSION PROBES FOR AY-101 AND AY-102. DOSE RATE WORK AREAS, SURVEY PI CAP AND INNER CABINETS FOR CORROSION PROBE READINGS. ITEMS 5 THRU 8 RELEASED TO INSTRUMENT TECHS	2	RM6044	LIMITED	RSR
148595104	WTO-014316	26-May-09	PROVIDED HPT JOB COVERAGE FOR INSTRUMENT TECHS WORKING ON THE CORROSION PROBE READINGS AT AY-101, AY-102 AND AN-102. WORK PACKAGES AS FOLLOWS: AY-101= TFC-09-0580, AY-102 = TFC-WO-09-0579 AND AN-102 = WFO-WO-08-1245. ITEMS GIVEN TO INSTRUMENT TECHS AFTER SURVEY COMPLETED	2	RM6044	LIMITED	RSR
148595137	WTO-014389	1-Jun-09	DAILY CORROSION PROBE READINGS FOR AY-101 & AY-102. WEEKLY CORROSION PROBE READINGS FOR AN-102. MATERIAL RELEASED TO INSTRUMENT TECHS	2	RM6044	LIMITED	RSR
149207637	WTO-014411	2-Jun-09	PROVIDED HPT JOB COVERAGE / SUPPORT FOR INSTRUMENT TECHS WORKING ON CORROSION PROBE READINGS. WORK PACKAGE TFC-WO-09-0580 FOR - AY-101 AND TFC-WO-09-0579 FOR - AY-102. *ITEM GIVEN TO INSTRUMENT TECHS AFTER SURVEY COMPLETED	2	RM6077	LIMITED	RSR
149210108	WTO-014466	6-Jun-09	PERFORMED CORROSION PROBE READINGS AT AY-102 AND MATERIAL RELEASE OF IHT AND OPS EQUIPMENT FROM ALL FARMS. ALL ITEMS RELEASED BACK TO OPS, IHT AND INSTRUMENT TECH'S	2	RM6077	LIMITED	RSR
149211513	WTO-014474	7-Jun-09	PERFORMED CORROSION PROBE READINGS AT AY-102 AND MATERIAL RELEASE OF IHT AND OPS EQUIPMENT FROM ALL FARMS. ALL ITEMS RELEASED BACK TO OPS, IHT AND INSTRUMENT TECH'S	2	RM6077	LIMITED	RSR
149210111	WTO-014481	8-Jun-09	PROVIDED HPT JOB COVERAGE / SUPPORT FOR INSTRUMENT TECHS DOING CORROSION PROBE READINGS. WORK PACKAGE TFC-09-0579 FOR AY-102 AND WORK PACKAGE TFC-09-0580 FOR AY-101. *ITEMS SURVEYED FOR INSTRUMENT TECHS	2	RM6077	LIMITED	RSR
148614065	WTO-014701	24-Jun-09	PERFORM CORROSION PROBE READINGS ON AY-101 & AY-102. ALL ITEMS SURVEYED AND RELEASED TO INSTRUMENT TECHS	2	RM6044	LIMITED	RSR
149078987	WTO-014835	6-Jul-09	AY-101 & AY-102 CORROSION PROBE READINGS. ALL ITEMS RELEASED TO INSTRUMENT TECHS	2	RM6062	LIMITED	RSR

IDMS SQL
AY-102 (Title/Desc/Keyword)

149078294	WTO-014898	13-Jul-09	CORROSION PROBE READINGS IN AY-FARM @ AY-101 AND AY-102. SURVEY OF MATERIAL FROM AY-FARM CA FOR RELEASE. ITEMS #5 - #8 RELEASED TO INSTRUMENT TECHS. EXCEPT ITEM #7 TO HPT	2	RM6062	LIMITED	RSR
154744483	WTO-015012	22-Jul-09	INVESTIGATIVE SURVEY FOR AY-102 CORROSION PROBE, TROUBLE SHOOTING. ALL ITEMS RELEASED TO IH TECH AND INSTRUMENT TECHS	2	RM7183	LIMITED	RSR
154744498	WTO-015076	29-Jul-09	AY-102 & AY101 CORROSION PROBE READINGS (INSTR. TECHS)	2	RM7183	LIMITED	RSR
154639455	WTO-015844	15-Oct-09	COVERAGE FOR INSTRUMENT TECHS ON AY-101 AND AY-102 CORROSION PROBE READINGS. ITEM #2 SURVEYED AND RELEASED AT 67% CONFIDENCE LEVEL, BACK TO INSTRUMENT TECH'S	2	RM7149	LIMITED	RSR
172381831	WTP-000046	27-Oct-09	Preformed investigative survey of SHMS cabinet in 241-AY-102 for removal and disposal. HPT instruments were released to lipt's. See RSR# WTP-000044 for more information on this SHMS cabinet.	6	RM8409	DOES NOT CONTAIN C(	RSR
154506781	WTO-016456	14-Dec-09	REPLACE VACUUM PUMP ON AY-102 ANNULUS ITEMS RELEASED TO MAINTENANCE PERSONNEL	2	RM7149	LIMITED	RSR
155175130	WTO-017152	22-Feb-10	PROVIDE COVERAGE FOR INSTRUMENT TECHS PERFORMING WEEKLY TEMP READINGS AY-101, AY-102, AZ-101 & AZ-102 AND WEEKLY LEVEL READINGS AZ-101-WSTA-WFIT-121, 122 & AY-101-WSTA-WFIT 121 & 122. (SURVEY & RELEASE TOOLS & EQUIP, WORK PKG & RADIO BACK TO INST TECHS)	2	RM7183	LIMITED	RSR
158058603	S-262148	12-Mar-10	PROVIDED JOB SUPPORT FOR CONTINUOUS COVERAGE OF ORANGE LABEL (S10R000191) AY-102 SAMPLE FOR WATER DIGEST IN ROOM 1B. OTHER PROJECTS USED IN TWO RED LABELED SAMPLES AND ONE GREEN LABELED SAMPLE WERE FROM SX-101, S-104 AND B-107. FOR THE PURPOSES OF THIS SURVEY ONLY THE ORANGE LABEL SAMPLE NUMBER IS NOTED HERE. ORIGINAL DOSE RATE ON ORANGE SAMPLE WAS 14, 065 MREM/HR AT 11.43 CENTIMETERS. NO SIGNIFICANT INCREASE OR DECREASE IN DOSE RATE WAS NOTICED, SO LABEL WAS NOT CHANGED ON SAMPLE	2	RM7418	DOES NOT CONTAIN C(	RSR
158058785	S-262158	13-Mar-10	CONTINUOUS COVERAGE SUPPORT FOR AY-102 ORANGE LABEL SAMPLE S10R000191 FOR TIC/TOC ANALYSIS IN 4C HOODS 4 & 5 AND SET UP FOR IC RUN IN 4K HOOD 9. SURVEY OF CHECK SOURCE ITEM #6 RELEASED TO RADCON PER 2000-ASP-RSP-01	2	RM7418	DOES NOT CONTAIN C(	RSR
156939221	WTO-018712	27-Jul-10	SURVEY OF ULTRASONIC TESTING CREW, WALL SCRUBBING IN THE AY-102 ANNULUS SPACE. EQUIPMENT RELEASED TO W.R.P.S. OPERATIONS	2	RM7431	DOES NOT CONTAIN C(	RSR
156939225	WTO-018722	28-Jul-10	SURVEY OF ULTRASONIC TESTING CREW, WALL SCRUBBING IN THE AY-102 ANNULUS SPACE. EQUIPMENT RELEASED TO W.R.P.S. OPERATIONS	2	RM7431	DOES NOT CONTAIN C(	RSR
159974976	WTO-019096	9-Sep-10	SUPPORT MAINT. FITTERS AT 241-AY-102. COVERAGE ON EXCHANGE OF 1/4 HP #AY-102-WST-A-FCV-102 VACUUM PUMP. RELEASE OF MISC. TOOLS AND EQUIP BACK TO HPT & FITTER PERSONNEL (RBA) AREA	2	RM7525	DOES NOT CONTAIN C(	RSR
160000732	WTO-019482	14-Oct-10	SUPPORT INSTRUMENT TECHS WITH INSTALLATION OF MASSTRONS FOR AZ-101 & 102 AND AY-102. ITEM #4 - 8 RELEASED TO INSTRUMENT TECHS. ITEM #9 RELEASED TO IH	2	RM7525	DOES NOT CONTAIN C(	RSR
166528740	WTO-020138	27-Dec-10	SET UP SCAFFOLDING FOR AY-102 AEROSOL TEST ITEM 1 RELEASED TO OPERATIONS ITEM 2 RELEASED TO VENT& BALANCE CREW	2	RM8213	DOES NOT CONTAIN C(	RSR
166528018	WTO-020155	28-Dec-10	241-AY-102 FLT-320/321 ANNULUS EXHAUSTER FILTER AEROSOL TEST 241-AY-102 ANNULUS STACK AIR FLOW (296-A-18) ITEMS 5 RELEASED TO OPERATIONS ITEM 4 & 6 & 7 RELEASED TO V & B CREW	2	RM8213	DOES NOT CONTAIN C(	RSR
162706256	WTO-020307	14-Jan-11	SUPPORT INSTRUMENT TECHS FOR CORROSION PROBE READINGS ON AY-101 AND AY-102	2	RM7801	DOES NOT CONTAIN C(	RSR
172565693	WTO-021344	24-May-11	241-AY-102 TS CHECKS	2	RM8403	DOES NOT CONTAIN C(	RSR
168511932	WTO-021439	31-May-11	AY-101 AND AY-102 CORROSION PROBE READINGS, ITEMS 3-5 RELEASED TO INSTUMENT TECHS.	2	RM8213	DOES NOT CONTAIN C(	RSR
166511816	WTO-021528	14-Jun-11	AY-101 & AY-102 CORROSION PROBE READINGS. ITEMS 3-5 RELEASED TO INSTRUMENT TECHS.	2	RM8213	DOES NOT CONTAIN C(	RSR
169354981	WTO-021719	11-Jul-11	AY-101 & AY-102 CORROSION PROBE READINGS. ITEMS 3-5 RELEASED TO INSTRUMENT TECHS.	2	RM8213	DOES NOT CONTAIN C(	RSR

IDMS SQL
AY-102 (Title/Desc/Keyword)

176861113 WTO-021937	9-Aug-11	INSTRUMENT TECHS AND IH TECH DOING WEEKLY READINGS WORK PACKAGE # TFC-10-3182 AY-101 CORROSION PROBE READINGS, TFC-10-3183 AY-102 CORROSION PROBE READINGS, TFC-11-2800 SUMP LEVEL READINGS, TFC-11-3847 241-AY AZ MANUALLY OBTAIN TANK TEMP, TFC-10-4350 244A FLAME GAS READINGS. NOTE: ITEMS 4-10 GIVEN TO IH AND INSTRUMENT TECHS AFTER SURVEYS COMPLETED.	2	RM8604	DOES NOT CONTAIN C(RSR
169608487 WTP-003428	7-Sep-11	TFC-WO-10-1260 Removed valves SV-030, SV-053, SV-091 from AZ-101, riser 71. All 3 valves were removed from one disconnect point. Area was controlled as a local HCA with a drap and ground cover until fittings were capped. TFC-WO-10-3122 Removed valve SV-091 from AY-102 riser 53. Removed valve SV-030 from AY-101 riser 53. Both areas were controlled as a local HCA until connections were capped. Due to short duration at each work site, ran 1 air sample for all 3 locations. Radeco serial no. 9005, expires 11/8/2011. Fitters equipment released to fitters, IH equipment released to IHT, HP equipment released to HPT's.	3	RM8342	DOES NOT CONTAIN C(RSR
166896169 S-266938	5-Oct-11	HPT continuous coverage during during prep of AY-102 sample for X-RAY diffraction analysis Item 3 - Single shell carrier (containing parent sample S10R000191) was opened in hood 1D Dose rate taken - smear taken in carrier lid - Non work area Item 4 - A small amount of parent sample was placed on a glass cover slide - a lockdown was applied - tape was applied to bottom of the slide to limit potential of contaminating x- ray diffraction unit	2	RM8213	DOES NOT CONTAIN C(RSR
175773071 WTO-022526	12-Oct-11	241-AY Annulus Enraf calibration and funtional tests. Speciffically AY-102-152. Dose Rates were taken with the displacer at the sight glass and again at the pipe below the first flange. Area in AY Farm for this evolution is posted RA/CA. Rad instruments were released to Radiological Protection and Instument Tech Instruments were released to the Instrument Technicians.	2	RM8573	DOES NOT CONTAIN C(RSR
175773742 WTO-022533	24-Oct-11	Flush AY-102-WSTA-LTD-152 Annulus. Instrument Tech and Rad Instrumentation release to their respective groups.	2	RM8573	DOES NOT CONTAIN C(RSR
175773269 WTO-022539	25-Oct-11	241-AY-102 REPLACE WTA RECORD SAMPLE LOOP FLOW SWITCH. RECORD SAMPLE LOOP CALIBRATIONS. ALL ITEMS RELEASED TO INSTRUMENT TECHS.	2	RM8573	DOES NOT CONTAIN C(RSR
172613902 WTO-022654	26-Oct-11	Changed out the sample for CAM in alarm at 241-AY-102 annulus . Initial reading on the CAM was 5164 cpm beta. hand held reading and mini scaler readings recorded below. After Sample was changed readings on the CAM were at 135cpm. survey and package samples for shipment, 21 air samples. Samples shipped to WSCF lab. No contamination detected during this survey. Survey performned to OSRSR requirements, no limits exceeded. All smears were counted on the Ludlum 2929 dual mini scaler.	2	RM8403	DOES NOT CONTAIN C(RSR
175773570 WTO-022540	27-Oct-11	AY-102 record sampler loop cal. under TFC-WO-11-4928, TFC-WO-11-4929 performed in a RBA. Vacuum breaker cals on AZ-101, AZ-102 and AY-101 under TFC-WO-11-1468 performed in a CA/RA. Item 2 - 5 released to instrument techs.	2	RM8573	DOES NOT CONTAIN C(RSR
175773744 WTO-022541	27-Oct-11	Annulus ENRAF Calibrations on AY-102-152 and AY-102-151. For thie evolution, AY-102 is posted as CA/RA. Instrument tech And Radiological instruments were surveyed and released to their respective organizations.	2	RM8573	DOES NOT CONTAIN C(RSR
172540473 WTO-023060	13-Jan-12	241-AY-102 ANNULUS EXHAUSTER HEPA FILTER TEST	3	RM8403	DOES NOT CONTAIN C(RSR
176871066 WTO-023203	26-Jan-12	Dose Rate and Contamination survey of the AY-102 ENRAF. Erect frame for temporary enclosure in preparation for drum replacement of ENRAF AY-102. Release of tools to Riggers, and Instruments to Radcon.	2	RM8604	DOES NOT CONTAIN C(RSR
176871621 WTO-023209	7-Feb-12	ENRAF AY-102 replacement and associated activities. This was performed in a CA/RA. Items released to respectful craft personal.	2	RM8604	DOES NOT CONTAIN C(RSR
176864121 WTO-023241	9-Mar-12	Relabel system and components in 241-AY-102 No contamination observed	2	RM8604	DOES NOT CONTAIN C(RSR
176838191 WTO-024072	23-Jul-12	PROVIDED COVERAGE FOR AY-102 ENRAF REPAIR. ITEMS 13-30 RELEASED TO OPERATIONS.	3	RM8604	DOES NOT CONTAIN C(RSR
174769087 TFC-001164	9-Aug-12	SUPPORTED INTRUMENT TECHS IN PREP OF AY-102 ENRAF #152 IN AY FARM.	2	RM8503	DOES NOT CONTAIN C(RSR

176844815 WTO-024081	10-Aug-12	Removal of the AY-102 ENRAF from riser 90. After removal, video inspection of the Annulus bottom and radiological smear of the floor in the Annulus space. Upon removal of the survey apparatus high than expected direct reading of the item where found. Work was stopped and the farm was exited with no comntamination spread detected. Radcon First line and Shift Manager where notified of unexpected levels. Upon re-entry riser 90 was closed and sealed with a blank and the item was packaged into a hardened container and placed in the 801 building. Area was posted as CA/RA.	2	RM8604	DOES NOT CONTAIN C(RSR
174426014 S-270552	11-Aug-12	HPT coverage during the AY-102 sample breakdown and making the sample prep for futre analysis. Note: Any fturther handling of tape presses, thungsten gloves is suggested.	2	RM8485	DOES NOT CONTAIN C(RSR
174426015 S-270559	12-Aug-12	SAMPLE FROM AY-102 WORKING IN ROOM 4J HOODS 1&3 SRY/GEA, PU AND AM 4J HOODS 3,4,&5.	2	RM8485	DOES NOT CONTAIN C(RSR
176845908 WTO-024083	16-Aug-12	REMOVE TEMPORARY COVER AND INSTALL TOPHAT AND VIDEO CAMERA FOR ONGOING VIDEO INSPECTIONS IN RISER 90 OF THE AY102 ANNULUS. AREA AROUND RISER 90 WAS POSTED AS A HCA PRIOR TO INSTALLATION OF THE TOPHAT AND THEN DOWNPOSTED. LINE 2 TECH SMEARS OF AREAS OF CONCERN-NO ALPHA LINE 3 IH AND RAD INSTRUMENTS, PAPERWORK, TOOLS RELEASED PER TFC-ESHQ-RP_MON-C-23 TO THE RESPECTIVE DEPARTMENTS. AY FARM AY-102 IS POSTED CA-RA.	2	RM8604	DOES NOT CONTAIN C(RSR
176845909 WTO-024085	20-Aug-12	Video of AY-102 Annulus Vessel. Camera is left in place for ongoing video inspections. No Alpha was detected during the evolution. Line three associated equipment includes Rad instruments, radios, procedures, paperwork, used cables, DVR player. Equipment released per TFC-ESHQ-RP-Mon-C-23 to their respective departments. AY 102 at riser 90 is posted a CA/RA.	2	RM8604	DOES NOT CONTAIN C(RSR
175030107 WTP-004431	22-Aug-12	Field walk down of the AY-102 leak detection pit in preparation to remove the cover plate and sample. Items on lines 3-5 were unlikely to be contaminated and were released to listed personnel.	2	RM8509	DOES NOT CONTAIN C(RSR
176846007 WTO-024087	23-Aug-12	Video inspection of AY-102 Annulus through riser 90. Area is posted as CA/RA. Items 4-7 released to respective craft.	2	RM8604	DOES NOT CONTAIN C(RSR
176844822 WTO-024088	24-Aug-12	Investigative Radiological Survey of AY-102 Leak Detector Pit. Line one is for dose rates inside the leak detector pit. Line two denotes contamination survey from inside the leak detector pit. Line three includes Rad instruments, IH instruments, tools, paperwork. released to the proper departments per TFC-ESHQ-RP-MON-23. AY 102. Line four includes cap after removal and prior to the work being performed as well as area dose rates. Leak Detector Pit and vicinity is posted as a CA/RA. Inflow of air was noted during cap removal.	2	RM8604	DOES NOT CONTAIN C(RSR
176844824 WTO-024089	27-Aug-12	Video inspection of AY-102 Annulus through riser 90. Area is posted as CA/RA. Items 4-7 released to respective craft.	2	RM8604	DOES NOT CONTAIN C(RSR
174419149 WTO-024160	27-Aug-12	AY-102 Riser #89 remove shield plug, perform video inspection and install ENRAF.	2	RM8485	DOES NOT CONTAIN C(RSR
176846120 WTO-024092	30-Aug-12	Video inspection of AY-102 Annulus through riser 90. Area is posted as CA/RA. Items 4-7 released to respective craft.	2	RM8604	DOES NOT CONTAIN C(RSR
176845912 WTO-024096	4-Sep-12	Video inspection of AY-102 Annulus through riser 90. Area is posted as CA/RA. items 4-7 released to respective craft.	2	RM8604	DOES NOT CONTAIN C(RSR
174459756 S-270900	5-Sep-12	Continues coverage of subsampling of alpha samples in room 4A hood 9. (SY-102, AZ-102, AN-106, AY-102) Gooseneck was run during the job and a staplex was run after the job to verifly <20% DAC. No contamination encountered. All samples were green labeled except for two, extention tools were used when pulling the samples.	6	RM8495	DOES NOT CONTAIN C(RSR
175115936 WTP-004502	6-Sep-12	Coverage of operations shipping FOUR AY-102 Leak Detection Pit (LDP) grab samples from 271-AN temporary RMA-558 to 222-S labs. All samples from the LDP were less <0.5 mR/hr on contact prior to any packaging.	2	RM8509	DOES NOT CONTAIN C(RSR

174459718 S-270975	10-Sep-12	HPT Support for Process Chemistry working with Sy-102 and AY-102 yellow dot Samples Particle Size Analysis. Item 1: Pre, during and post job survey of the general work area in Room 1F. Item 2: Highest during job dose and contamination in Hood 2. Item3: .Post job survey after hood decon. Item 4&5: SY-102; S512R000288, AY-102; S12R000275,Performed survey of exterior of SSC's prior to removing from storage cells. SSC's were bagged, moved to room 1F Hood 2 and deconned after analysis then returned to 2B storage cell 16. Item 6,7& 10: Performed a survey of exterior of SSC prior to removing from storage cell. SSC bagged, taken to room 1F hood 2, deconned after analysis.	2	RM8495	DOES NOT CONTAIN C(RSR
175166097 WTP-004575	20-Sep-12	Investigative survey of riser numbers 83and 91 in 241lAY farm for the AY-102 annulus tank. This survey is facilitate the work preparations for sampling activities in the tank looking for any removable contamination and/or dose rates of work locations. No removable contamination found. Items released to HPT's	2	RM8509	DOES NOT CONTAIN C(RSR
175115656 WTP-004582	23-Sep-12	Provide Radiological support for the Set-up for Sampling the Annulus at 241-AY-102. Survey and inspect 3 Leaded Pigs and 3 Hardigg cases w/ NFT's and steel pigs. Also Surveyed the RCV Camera van 36183 from 241-C to move to 241-A.Y. Leaded Pigs#460.2, #460.22, and 460.28. Hardigg cases#.012,NFT#EF-9, pig# 102,& case#.013, NFT#EF-33, pig#118& case#.020, NFT#EF- 17 and pig#. 120.	2	RM8509	DOES NOT CONTAIN C(RSR
175115558 WTP-004584	24-Sep-12	Remove the liquid level indicator (ENRAF) from the annulus of AY-102 and install an off riser sampling top hat. No contamination was found during the course of this work. Items on lines 6-9 were unlikely to be contaminated and were released to respective personnel.	2	RM8509	DOES NOT CONTAIN C(RSR
175115659 WTP-004593	26-Sep-12	On the elevated work platform: Perform a pre-job survey and certify the glovebag. Obtain a sample of material from the floor of the AY-102 annulus and deposit into the sample carrier. Retrieve the sample carrier assembly into the glovebag. Dose rate and sleeve out the bottle. Place the sample bottle into the Hardigg sample pig and dose rate. Perform a post-job survey of the glove bag and work area. No removable contamination was found during the course of this work. Items on lines 9-12 were unlikely to be contaminated and were released to listed personnel.	2	RM8509	DOES NOT CONTAIN C(RSR
175115952 WTP-004590	26-Sep-12	Radiological support for Shipping 3 Hardigg cases and 3 Leaded (Pb) pigs to 241-AY-102 for Grab sampling the Annulus. Additionally provided RBA support for the setup of the Grab sampling. ORRSR# WRPS-200A-06-EM4P# 19. Transport vehicle #3343G. Item #5 was found to have 10wo/0.5wc dose rate on the laundry bag. Laundry bag was placed in a yellow plastic bag, horse-tailed and tagged. Bag was placed back on the CA side of SOP and Base Op's was notified of the bag, and they determined the resolution of the bag: which LLW, on the following shift.	2	RM8509	DOES NOT CONTAIN C(RSR
175115953 WTP-004595	27-Sep-12	SHIPPED 2 EMPTY HARDIGG CASES AND 3 EMPTY STEEL PIGS FROM AY FARM TO 2 101 HV ON BLUE CARD #tWRPS-200A-06-EMP COPY #119. SHIPPED 1 HARDIGG CASE CONTAINING A SAMPLE FROM AY-102 ANULUS RISER 91 FROM AY FARM TO 22S LABS ON BLUE CARD# WRPS-200A-TPA-RQ COPY #1 SEE LINE#4 LINE#6 SURVEYED AND RETURNED TO OPS POST RADIOLOGICAL SHIPMENT.	2	RM8509	DOES NOT CONTAIN C(RSR
175533252 WTO-024581	27-Sep-12	Survey and package 7 air sample for shipment to 200 east count room, 20 samples to WSCF. No contamination detected no limits RWP or ORRSR exceded. Under direction of Radcon and operations management, responded to an alarming CAM at 241-AY-102 WRPS-200-13-LTDQTY removed the samples and shipped them to the 200 east count room. CAM was in alarm with 2443 cpm displayed on the CAM, CAM alarm set point is 2000cpm, after sample was changed out CAM displayed 10cpm, CAM calibration eff. is 9.63%. Attached on pages 3-4 are copies of the count room receipt. Page 5 is supplied as a listing of the samples taken to WSCF.	5	RM8539	DOES NOT CONTAIN C(RSR

175013644 WTP-004606	2-Oct-12	Inspection of 5 Hedgehog II shipping assemblies. Components include the Hardigg case, NFT can, and 250 ml pig. Both external and internal surveys are performed. The components are and treated as a radioactive material and are opened in a HPT controlled localized Radiological Buffer Area until the absence of removable contamination is verified. Also inspected 5 steel shipping pigs for use at AY-102 and left stored in the 2012-HV warehouse (RMA-480). Line 7 released to Sampling operators and unlikelt to be contaminted	2	RM8510	DOES NOT CONTAIN C(RSR
175790836 WTO-024920	14-Oct-12	Camera preps for AY-102. Ran cables through yellow jackets to Risers 77 & 90. Pulled old cables. Released old cables and yellow jackets to operators.	2	RM8573	DOES NOT CONTAIN C(RSR
175013482 WTP-004666	17-Oct-12	HPT coverage to pull Off Riser Samples from 241-AY-102 annulus tank. Pulled 2 samples both of which read 0.5 mRIhr. All air samples field counted and found to be .2 DAC for both A and BG (and delivered to count lab). Items were released to their respective crafts. No contamination was encountered during job evolution. RO-7 used during job for initial readings and all found 100 mr/hr for both open and closed window.	2	RM8510	DOES NOT CONTAIN C(RSR
174092492 S-271529	17-Oct-12	Supported receipt, load-in, and load-out of AY-102 annulus samples.	2	RM8408	DOES NOT CONTAIN C(RSR
175790718 WTO-024928	21-Oct-12	241-AY-102 Annulus; manipulate camera and video inspection. Air sample to verify engineering controls. Serial # 10479 - cal due date 03/20/2013. Items 4 & 5 released to operators. AY is posted RA/CA.	2	RM8573	DOES NOT CONTAIN C(RSR
175014434 WTP-004689	30-Oct-12	Performed ISR on 241-AY-102 02A and 02F pits for upcoming pit/jumper/pump work. About 1 " of water was observed in pit 02A. No removable contamination encountered during ISR evolution on/in either pit. Air sample taken (AKI's) during opening of pit access ports and field counted (.2DAC for Alpha and B/G) and sent to labs. Sample of 02A pit was wet smear and 02F was a mud smear. Items released to their respective crafts.	2	RM8510	DOES NOT CONTAIN C(RSR
174187661 BOS-12-1644	1-Nov-12	Performed Radiation survey of the 241-AY-102 Annulus Exhauster Filter Bank and installed SIX survey point stickers as requested by RADCON management to be surveyed on weekly basis.	2	RM8456	DOES NOT CONTAIN C(RSR
175732322 WTO-025154	20-Nov-12	Video inspection of AY-102 Annulus through riser 83. Area is posted as CA/RA.	2	RM8539	DOES NOT CONTAIN C(RSR
175791173 WTO-024980	8-Jan-13	241-AY-102 Annulus (riser 83); manipulate camera and weekly video inspection. Air sample to verify engineering controls. Serial # 20604 - cal due date 01/17/2013. Item 4 released to operators. AY is posted RA/CA.	2	RM8573	DOES NOT CONTAIN C(RSR
176668837 BOS-13-0140	29-Jan-13	Routine Survey and Inspection of: Routinely Occupied RA's, Active & Inlet HEPA Filter Systems, AY-102 Annulus Exhauster, Electrical Cabinets, Occupied CA's and 152-AX HRA per Routine Survey Task Descriptions Item 21 and #22 were not surveyed, due to work crews in buildings. Item #30 is a locked cabinet. Item #38 is located in A-Farm. Item 50 was released to HPTs.	6	RM8586	DOES NOT CONTAIN C(RSR
176667667 BOS-13-0224	20-Feb-13	Routine Survey and Inspection of: Routinely Occupied RA's, Active & Inlet HEPA Filter Systems, AY-102 Annulus Exhauster, Electrical Cabinets, Occupied CA's and 152-AX HRA per Routine Survey Task Descriptions Item # 21 is an HCA at the door. Item #30 is a locked cabinet. Item #38 was released to HPT's.	6	RM8586	DOES NOT CONTAIN C(RSR
176667586 BOS-13-0254	26-Feb-13	Routine Survey and Inspection of: Routinely Occupied RA's, Active & Inlet HEPA Filter Systems, AY-102 Annulus Exhauster, Electrical Cabinets, Occupied CA's and 152-AX HRA per Routine Survey Task Descriptions Item # 21 is an HCA at the door. Item #30 is a locked cabinet. Item #38 was released to HPT's.	6	RM8586	DOES NOT CONTAIN C(RSR
176630057 BOS-13-0319	8-Mar-13	Routine Survey and Inspection of: Routinely Occupied RA' s, Active & Inlet HEPA Filter Systems, AY-102 Annulus Exhauster, Electrical Cabinets, Occupied CA's and 152-AX HRA per Routine Survey Task Descriptions Item # 21 is an HCA at the door. Item #30 is broken cabinet. Item #38 was released to HPT's.	6	RM8586	DOES NOT CONTAIN C(RSR
176630076 BOS-13-0352	14-Mar-13	Radiation and Contamination Survey of potentially contaminated systems. AY-102-EW-T-1 Cooling Tower is located South of 702-AZ. AZ-101-EW-T-1 Cooling Tower is located North of 702-AZ.	2	RM8586	DOES NOT CONTAIN C(RSR
176629657 BOS-13-0353	14-Mar-13	Routine Survey and Inspection of: Routinely Occupied RA's, Active & Inlet HEPA Filter Systems, AY-102 Annulus Exhauster, Electrical Cabinets, Occupied CA's and 152-AX HRA per Routine Survey Task Descriptions Item #21 is an HCA at the door. Item #30 is a locked cabinet. Item #38 was released to UPT's. The RBA northeast of AZ farm was surveyed and no contamination was found.	6	RM8586	DOES NOT CONTAIN C(RSR

176630080 BOS-13-0368	20-Mar-13	Routine Survey and Inspection of: Routinely Occupied RA's, Active & Inlet HEPA Filter Systems, AY-102 Annulus Exhauster, Electrical Cabinets, Occupied CA's and 152-AX HRA per Routine Survey Task Descriptions Item # 21 is an HCA at the door. Item #30 is a locked cabinet. Item #38 was released to HPT's. The RBA northeast of AZ farm was surveyed and no contamination was found.	6	RM8586	DOES NOT CONTAIN C(RSR
176629973 BOS-13-0397	26-Mar-13	Routine Survey and Inspection of: Routinely Occupied RA's, Active & Inlet HEPA Filter Systems, AY-102 Annulus Exhauster, Electrical Cabinets, Occupied CA's and 1 52-AX HRA per Routine Survey Task Descriptions Item #50 Surveyed and released to HPT. Could not locate #38.	6	RM8586	DOES NOT CONTAIN C(RSR
176878478 BOS-13-0439	4-Apr-13	Routine Survey and Inspection of: Routinely Occupied RA's, Active & Inlet HEPA Filter Systems, AY-102 Annulus Exhauster, Electrical Cabinets, Occupied CA's and 152-AX HRA per Routine Survey Task Descriptions Item 921 is an HCA at the door. Item #30 is a locked cabinet. Item #38 was released to HPT's.	6	RM8607	DOES NOT CONTAIN C(RSR
176879080 BOS-13-0458	9-Apr-13	Routine Survey and Inspection of: Routinely Occupied RA's, Active & Inlet HEPA Filter Systems, AY-102 Annulus Exhauster, Electrical Cabinets, Occupied CA's and 152-AX HRA per Routine Survey Task Descriptions Item # 21 is an HCA at the door. Item #30 is a locked cabinet. Item #38 was released to HPT's.	6	RM8607	DOES NOT CONTAIN C(RSR
176877986 BOS-13-0491	16-Apr-13	Routine Survey and Inspection of: Routinely Occupied RA's, Active & Inlet HEPA Filter Systems, AY-102 Annulus Exhauster, Electrical Cabinets, Occupied CA's and 152-AX HRA per Routine Survey Task Descriptions Item #38 was released to HPT's. Item #34 is inaccesable due to the handle being broken. Item #28 is inaccesable due to danger tape and sign saying "work in progress"	6	RM8607	DOES NOT CONTAIN C(RSR

IDMS SQL
AY-102 (Title/Desc/Keyword)

OBJID	DOCNO	DATE	TITLE	PAGES	RHA BOX #	ACC RIGHTS	IDMS CATEGORY
45960656	8022-1-PHOTO	25-Oct-68	IAP-614, PUREX TANK FARM EXPANSION, 200-EAST AREA - CONCRETE BASE FOR TANK NO. 241-AY-102 LOOKING NORTH IN DENSE FOG		24780	(null)	PHOTOGRAPHS
45960005	8027-1-PHOTO	22-Nov-68	IAP-614, PUREX TANK FARM EXPANSION, 200-EAST AREA - DRAINAGE SYSTEM IN BASE OF TANK NO. 241-AY-102 LOOKING WEST		24780	(null)	PHOTOGRAPHS
43435363	2AY-02-03	4-Nov-02	AY-102		H	DOES NOT CONTAIN C(	PHOTOGRAPHS
43435364	2AY-02-04	6-Nov-02	AY-102		H	DOES NOT CONTAIN C(	PHOTOGRAPHS
43435365	2AY-02-05	6-Nov-02	AY-102		H	DOES NOT CONTAIN C(	PHOTOGRAPHS
43435366	2AY-02-06	6-Nov-02	AY-102		H	DOES NOT CONTAIN C(	PHOTOGRAPHS
45101839	AY-102 C308 SEG #11	1-May-03	TANK/GRAB AY-102 CORE 308		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45105109	AY-102 C308 SEG #1	1-May-03	TANK/GRAB AY-102 CORE 308		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45102051	AY-102 C308 SEG #14A	1-May-03	TANK/GRAB AY-102 CORE 308		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45102050	AY-102 C308 SEG #13	1-May-03	TANK/GRAB AY-102 CORE 308		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45103821	AY-102 C308 SEG #2	1-May-03	TANK/GRAB AY-102 CORE 308		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45105110	AY-102 C308 SEG #12	1-May-03	TANK/GRAB AY-102 CORE 308		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45103825	AY-102 CORE308SEG14R2	18-Jun-03	AY-102 CORE 308 SEG 14RA		H	DOES NOT CONTAIN C(	PHOTOGRAPHS
45102053	AY-102C-311SEG.5	25-Nov-03	AY-102		H	DOES NOT CONTAIN C(	PHOTOGRAPHS
45103826	AY-102C-311SEG.1	25-Nov-03	AY-102		H	DOES NOT CONTAIN C(	PHOTOGRAPHS
45102052	AY-102C-311SEG.10	25-Nov-03	AY-102		H	DOES NOT CONTAIN C(	PHOTOGRAPHS
45105107	AY-102 C-312 SEG 15	15-Dec-03	AY-102		H	DOES NOT CONTAIN C(	PHOTOGRAPHS
45105106	AY-102 C-312 SEG 14	15-Dec-03	AY-102		H	DOES NOT CONTAIN C(	PHOTOGRAPHS
45105108	AY-102 C-312 SEG 16	15-Dec-03	AY-102		H	DOES NOT CONTAIN C(	PHOTOGRAPHS
45102055	AY-102C-312SEG.UHCENT CON	5-Jan-04	AY-102		H	DOES NOT CONTAIN C(	PHOTOGRAPHS
45102054	AY-102C-312SEG.UHCENT CON	5-Jan-04	AY-102		H	DOES NOT CONTAIN C(	PHOTOGRAPHS
45101232	AY-102	15-Apr-05	2AY-102 C314 SEG1		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45101231	AY-102	19-Apr-05	AY-102 C314 SEG1 LINER SOLIDS		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45105103	AY-102	19-Apr-05	AY-102 C314 SEG 14 CORE 314 SEGMENT 14		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45105105	AY-102	19-Apr-05	AY-102 C314 SEG1A[2] CORE 314 SEGMENT 1A[2]		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45105104	AY-102	19-Apr-05	AY-102 C314 SEG 7 CORE 314 SEGMENT 7		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45105102	AY-102	19-Apr-05	AY-102 C314 S LIQUID JARS CORE 314 SEGMENT ALL		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45105100	AY-102	16-May-05	AY-102 C315 SEG 17 CORE 315 SEGMENT 17		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45105101	AY-102	16-May-05	AY-102 C315 SEG 16 CORE 315 SEGMENT 16		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45099583	AY-102	4-Aug-05	AY-102 C-318 FIELD BLANK		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45099584	AY-102	4-Aug-05	AY-102 C-318 SEG 15		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45101838	AY-102	4-Aug-05	AY-102 C-318 SEG 8		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45100566	AY-102	4-Aug-05	AY-102 C-318 SEG 1		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45102049	AY-102	4-Aug-05	AY-102 C-318 SEG 2		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45103823	AY-102 CORE 319	11-Aug-05	AY-102 C319 SEG#2		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45103822	AY-102 CORE 319	11-Aug-05	AY-102 C319 SEG#3		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS
45103824	AY-102 CORE 319	11-Aug-05	AY-102 C319 SEG#1		CDF	DOES NOT CONTAIN C(	PHOTOGRAPHS

IDMS SQL
AY-102 (Title/Desc/Keyword)

OBJID	DOCNO	DATE	TITLE	PAGES	RHA BOX #	ACC RIGHTS	IDMS CATEGORY
57322408	WHC-SD-WM-DP-150	16-Nov-95	60 DAY WASTE COMPATIBILITY SAFETY ISSUE & FINAL RESULTS FOR TANK 241-AY-102 & GRAB SAMPLES 2AY-95-1 & 2AY-95-2 & 2AY-95-3 & 2AY-95-4	429	144727	(null)	IRAD
57210397	HNF-SD-W320-CN-001	25-Apr-97	TANK FARM DEFLAGRATION RATES DUE TO VARIOUS IGNITION SOURCES RELATED TO SLUICING C-106 TO AY-102	56	(null)	(null)	IRAD
57191294	HNF-2317	12-Mar-98	PROJECT W-320 HIGH VACUUM 241-AY-102 ANNULUS VENTILATION SYSTEM OPERATIONAL TEST REPORT	259	SD1330	(null)	IRAD
57191282	HNF-2312	23-Mar-98	ACCEPTANCE TEST REPORT FOR THE 241-AY-102 ENRAF DENSITOMETER	50	SD1351	(null)	IRAD
57191049	HNF-2254	25-Mar-98	RELIABILITY STUDY OF THE 241-AY-102 ANNULUS VENTILATION SYSTEM	95	SD1357	(null)	IRAD
57194715	HNF-2958	2-Jul-98	TANK 241-AY-102 GRAB SAMPLING & ANALYSIS PLAN FOR WASTE RETRIEVAL SLUICING SYSTEM PROCESS CONTROL	24	SD1607	(null)	IRAD
57194716	HNF-2958	3-Nov-98	TANK 241-AY-102 GRAB SAMPLING & ANALYSIS PLAN FOR WASTE RETRIEVAL SLUICING SYSTEM PROCESS CONTROL	13	SD2017	(null)	IRAD
57194717	HNF-2958	21-Dec-98	TANK 241-AY-102 GRAB SAMPLING & ANALYSIS PLAN FOR WASTE RETRIEVAL SLUICING SYSTEM PROCESS CONTROL	16	SD2135	(null)	IRAD
57194718	HNF-2958	15-Jun-99	TANK 241-AY-102 GRAB SAMPLING & ANALYSIS PLAN FOR WASTE RETRIEVAL SLUICING SYSTEM PROCESS CONTROL	9	SD2407	(null)	IRAD
57194719	HNF-2958	18-Aug-99	TANK 241-AY-102 GRAB SAMPLING & ANALYSIS PLAN FOR WASTE RETRIEVAL SLUICING SYSTEM PROCESS CONTROL	9	ED0407	(null)	IRAD
57198747	HNF-4818	23-Aug-99	Final results of double-shell tank 241-AY-102 ultrasonic inspection	61	(null)	(null)	IRAD
57188551	HNF-1682	10-Feb-00	TANK 241-AY-102 GRAB SAMPLES FOR THE WASTE RETRIEVAL SLUICING PROJECT ANALYTICAL RESULTS FOR THE FINAL REPORT	3405	ED0740	(null)	IRAD
57243329	RPP-6463	9-Aug-00	THERMAL ANALYSES FOR TANKS 241-AY-102 & 241-C-106	138	ED1084	(null)	IRAD
57239517	RPP-5378	14-Sep-00	Tank 241-AY-102 Push Mode Core Sampling & Analysis Plan	15	(null)	(null)	IRAD
57191119	HNF-6047	25-Sep-00	TANK 241-AY-102 CORES 270 & 271 & 272 & 273 ANALYTICAL RESULTS FOR THE FINAL REPORT [SEC 1 THRU 11]	3507	SD2868	(null)	IRAD
57241956	RPP-7274	3-Nov-00	Tank 241-AY-102 Grab Sampling & Analysis Plan	22	(null)	(null)	IRAD
57244369	RPP-7274	8-Nov-00	Tank 241-AY-102 Grab Sampling & Analysis Plan	7	(null)	(null)	IRAD
57241958	RPP-7274	1-Dec-00	Tank 241-AY-102 Grab Sampling & Analysis Plan	9	(null)	(null)	IRAD
57324059	WHC-SD-WM-ER-454	3-Jan-01	Tank characterization report for double shell tank (DST) 241-AY-102	1	(null)	(null)	IRAD
57241957	RPP-7274	31-Jan-01	TANK 241-AY-102 GRAB SAMPLING & ANALYSIS PLAN	17	(null)	(null)	IRAD
105911896	RPP-7772	15-Mar-01	TANK 241-AY-102 GRAB SAMPLING AND ANALYSIS PLAN FOR POST CAUSTIC ADDITION	26	(null)	(null)	IRAD
57245635	RPP-8173	18-Jun-01	Technical Basis for Caustic Additions to Tanks 241-AY-101 & 241-AY-102 & 241-AN-102	72	(null)	(null)	IRAD
57243869	RPP-8909	27-Sep-01	Results of retrieval testing of sludge from tank 241-AY-102	1	(null)	(null)	IRAD
57244028	RPP-8919	10-Oct-01	OPERATIONAL ACCEPTANCE CHECKLIST CORROSION MITIGATION PROJECT TANK 241-AY-102 NITRITE ADDITION	10	(null)	(null)	IRAD
57243878	RPP-8994	11-Oct-01	OPERATIONAL ACCEPTANCE CHECKLIST CORROSION MITIGATION PROJECT TANK 241-AY-102 NITRITE ADDITION	32	169927	(null)	IRAD
57245941	RPP-8474	18-Oct-01	241-AY-101 & 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	119	161822	(null)	IRAD
57246116	RPP-8474	20-Oct-01	241-AY-101 & 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	9	161822	(null)	IRAD
57244015	RPP-8851	29-Oct-01	EVALUATION OF ADDITION OF WATER FROM TANK 241-AY-101 & 241-AY-102 ANNULI PRIMARY TANK CLEANING OPERATIONS TO TANK 241-AY-101	31	ED2126	(null)	IRAD
57245942	RPP-8474	30-Oct-01	241-AY-101 & 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	43	161822	(null)	IRAD
57246653	RPP-9125	30-Oct-01	EVALUATION OF SODIUM NITRITE ADDITION WITH TANK 241-AY-102 WASTE	34	ED2126	(null)	IRAD
57244048	RPP-9114	8-Nov-01	CALCULATION OF SODIUM NITRITE VOLUME TO BE ADDED TO TANK 241-AY-102	16	ED2163	(null)	IRAD
57244053	RPP-9160	12-Nov-01	PRELIMINARY WASTE COMPATIBILITY ASSESSMENT OF 244-AR VAULT TANK 001 WASTE WITH TANK 241-AY-102 WASTE	10	(null)	(null)	IRAD

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57246117	RPP-8474	12-Nov-01	241-AY-101 & 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	73	161822	(null)	IRAD
57245943	RPP-8474	29-Nov-01	241-AY-101 & 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	178	ED2214	(null)	IRAD
57246118	RPP-8474	29-Nov-01	241-AY-101 & 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	13	ED2219	(null)	IRAD
57244036	RPP-8994	3-Dec-01	OPERATIONAL ACCEPTANCE CHECKLIST CORROSION MITIGATION PROJECT TANK 241-AY-102 NITRITE ADDITION	31	ED2231	(null)	IRAD
57245944	RPP-8474	9-Jan-02	241-AY-101 & 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	54	ED2326	(null)	IRAD
57246119	RPP-8474	17-Jan-02	241-AY-101 & 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	11	ED2353	(null)	IRAD
57245945	RPP-8474	23-Jan-02	241-AY-101 & 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	19	ED2370	(null)	IRAD
57247520	RPP-9948	24-Jan-02	TANK 241-AY-102 CORE SAMPLING & ANALYSIS PLAN	31	ED2378	(null)	IRAD
57246652	RPP-9114	29-Jan-02	CALCULATION OF SODIUM NITRITE VOLUME TO BE ADDED TO TANK 241-AY-102	7	ED2389	(null)	IRAD
57246120	RPP-8474	4-Feb-02	241-AY-101 & 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	6	ED2415	(null)	IRAD
57245946	RPP-8474	7-Feb-02	241-AY-101 & 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	6	ED2425	(null)	IRAD
57246121	RPP-8474	13-Feb-02	241-AY-101 & 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN	7	ED2451	(null)	IRAD
57243858	RPP-8851	14-Feb-02	EVALUATION OF ADDITION OF WATER FROM TANK 241-AY-101 & 241-AY-102 ANNULI PRIMARY TANK CLEANING OPERATIONS TO TANK 241-AY-101	6	ED2451	(null)	IRAD
57228696	RPP-10370	8-Jul-02	Waste compatibility assessment of condensate from Tank 241-AZ-151 with Tank 241-AY-101 waste and Tank 241-AY-102 waste	53	(null)	(null)	IRAD
57229711	RPP-11757	24-Sep-02	Evaluation of tank 241-AY-102 waste mixing using airlift circulators	97	(null)	(null)	IRAD
57227411	RPP-12077	24-Sep-02	ELECTROCHEMICAL CORROSION STUDY FOR TANK 241-AY-102 SLUDGE	97	(null)	(null)	IRAD
57191120	HNF-6047	25-Sep-02	TANK 241-AY-102 CORES 270 & 271 & 272 & 273 ANALYTICAL RESULTS FOR THE FINAL REPORT	1750	ED3091	(null)	IRAD
57230555	RPP-13321	30-Oct-02	Double-shell tank 241-AY-102 chemistry control sampling and analysis plan for fiscal year 2003	24	(null)	(null)	IRAD
57230055	RPP-15622	18-Apr-03	Tank 241-AY-102 Push Mode core sampling & analysis plan for FY2003	26	ED3587	(null)	IRAD
57232451	RPP-15512	15-May-03	STRUCTURAL ANALYSIS FOR PROPOSED ENRAF INSTALLATION ON 3 INCH RISERS OF TANKS 241-AY-101 & 241-AY-102	56	ED3661	(null)	IRAD
57232466	RPP-15758	3-Jun-03	ANALYSIS OF CORROSION PRODUCT RETRIEVED FROM THE PRIMARY TANK WALL IN THE ANNULUS OF TANK 241-AY-102	8	ED3705	(null)	IRAD
57232717	RPP-16644	4-Jun-03	Waste compatibility assessment of 244-AR vault waste with 241-AY-102 waste	60	ED3713	(null)	IRAD
57232739	RPP-16716	1-Jul-03	Waste compatibility assessment of Tank 241-AZ-151 waste with Tank 241-AY-102 and 241-AY-101 waste	51	ED3784	(null)	IRAD
57233888	RPP-18243	9-Oct-03	TANK 241-AY-102 PUSH MODE CORE SAMPLING & ANALYSIS PLAN FOR FY2004	27	ED4013	(null)	IRAD
140973332	RPP-18399	30-Oct-03	ELECTROCHEMICAL CORROSION STUDIES CORE 308 SEGMENTS 14R1 & 14R2 TANK 241-AY-102	64	(null)	(null)	IRAD
57234384	RPP-18648	6-Nov-03	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AZ-151 CONDENSATE WITH TANK 241-AY-102 WASTE & TANK 241-AY-101 WASTE	33	ED4086	(null)	IRAD
57237714	RPP-19888	23-Feb-04	TEST PLAN FOR COLD TESTING TANK 241-AY-102 SLUDGE SIMULANT	25	ED4321	(null)	IRAD
57230216	RPP-12387	26-Feb-04	CAUSTIC DYNAMIC MIXING ANALYSES FOR TANKS 241-AY-101 & 241-AY-102 & 241-AZ-102 & 241-AN-102 & 241-AN-107	118	SD4241	(null)	IRAD
57238280	RPP-20168	25-Mar-04	TEST PLAN & PROCEDURE FOR ELECTROCHEMICAL CORROSION TESTING OF TANK 241-AN-107 TANK 241-AY-102 & TANK 241-AZ-102	31	ED4395	(null)	IRAD
57237912	RPP-20168	6-May-04	TEST PLAN & PROCEDURE FOR ELECTROCHEMICAL CORROSION TESTING OF TANK 241-AN-107 TANK 241-AY-102 & TANK 241-AZ-102	30	ED4497	(null)	IRAD
57238281	RPP-20168	24-May-04	TEST PLAN & PROCEDURE FOR ELECTROCHEMICAL CORROSION TESTING OF TANK 241-AN-107 TANK 241-AY-102 & TANK 241-AZ-102	32	ED4527	(null)	IRAD
57238670	RPP-21138	17-Jun-04	TANK BUMP CALCULATION FOR TANK 241-AY-102	24	ED4583	(null)	IRAD
57238665	RPP-21071	29-Jun-04	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AZ-151 CONDENSATE WITH TANK 241-AY-102 WASTE & TANK 241-AY-101 WASTE	35	ED4609	(null)	IRAD
57232269	RPP-22124	25-Aug-04	241-AY-102 SLURRY DISTRIBUTOR LIFT ANALYSIS	20	ED4734	(null)	IRAD

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57239840	RPP-22821	30-Sep-04	SPECIFICATION FOR REFURBISHMENT & DESIGN & MODIFICATION & TESTING OF A VERTICAL TURBINE TRANSFER PUMP FOR TANK 241-AY-102	11	ED4812	(null)	IRAD
57240295	RPP-23754	7-Dec-04	ENGINEERING EVALUATION OF SPECIAL TOOLS OR TEST EQUIPMENT 241-AY-102 PUMP INSTALLATION DEPLOYMENT CANNISTER	15	ED4965	(null)	IRAD
57240086	RPP-22783	13-Dec-04	PROJECT 2-211 RETRIEVAL CONTROL SYSTEM QUALIFICATION TEST PROCEDURE FOR TANK 241-AY-102	13	ED4980	(null)	IRAD
57239837	RPP-22782	13-Dec-04	PROJECT 2-211 RETRIEVAL CONTROL SYSTEM SYSTEM REQUIREMENTS SPECIFICATION FOR TANK 241-AY-102	35	ED4980	(null)	IRAD
57253527	W-211-AY2-ATP-005	28-Dec-04	PROJECT W-211 241-AY-102 TRANSFER PUMP TEMPERATURE ELEMENT & MANUAL TRANSFER SWITCH & ASSOCIATED INSTRUMENTATION	22	ED5012	(null)	IRAD
57258606	W-211-AY2-ATP-004	28-Dec-04	PROJECT W-211 241-AY-102 MIXER PUMP MOTORS & ASSOCIATED EQUIPMENT	29	ED5012	(null)	IRAD
57253526	W-211-AY2-ATP-003	28-Dec-04	PROJECT W-211 241-AY-102 NITROGEN SUPPLY & LOSS OF UPS POWER & PLC CABINET TEMPERATURE MONITORING	23	ED5012	(null)	IRAD
57240121	RPP-23754	8-Mar-05	ENGINEERING EVALUATION OF SPECIAL TOOLS OR TEST EQUIPMENT 241-AY-102 PUMP INSTALLATION DEPLOYMENT CANNISTER	10	ED5172	(null)	IRAD
57250595	RPP-RPT-25778	21-Apr-05	ANALYSIS FOR CONTINUING CORE SAMPLING OF TANK 241-AY-102 RISER 058	17	ED5324	(null)	IRAD
57227804	RPP-12387	19-May-05	CAUSTIC DYNAMIC MIXING ANALYSES FOR TANKS 241-AY-101 & 241-AY-102 & 241-AZ-102 & 241-AN-102 & 241-AN-107	124	SD4673	(null)	IRAD
57250792	RPP-RPT-25975	10-Jun-05	FEED CONTROL LIST CHANGE EVALUATION CONSOLIDATING TANK 241-AP-101 SUPERNATE WITH TANK 241-AY-102 SOLIDS	52	ED5457	(null)	IRAD
57250574	RPP-RPT-25744	27-Jun-05	PROJECT W-314 AY-102-VTA-YYC-200 PROGRAMABLE LOGIC CONTROLLER (PLC) INSTRUMENTATION ACCEPTANCE TEST REPORT	68	ED5501	(null)	IRAD
57248487	RPP-CALC-26628	30-Jun-05	WASTE GROUP ASSIGNMENT OF DOUBLE SHELL TANK (DST) 241-AY-102 FOR DILUTE CAUSTIC & WASTE ADDITIONS	105	ED5513	(null)	IRAD
57250801	RPP-RPT-26478	6-Jul-05	EVALUATION OF CAUSTIC ADDITION TO TANK 241-AY-102	26	ED5519	(null)	IRAD
57240089	RPP-22821	14-Jul-05	SPECIFICATION FOR REFURBISHMENT & DESIGN & MODIFICATION & TESTING OF A VERTICAL TURBINE TRANSFER PUMP FOR TANK 241-AY-102	14	ED5544	(null)	IRAD
57240140	RPP-24394	29-Sep-05	PROJECT W-211 QUALIFICATION TEST REPORT FOR THE TANK 241-AY-102 RETRIEVAL CONTROL SYSTEM [SEC 1 THRU 4]	911	ED5754	(null)	IRAD
57259103	W211-AY02-P-015	9-Mar-06	PROJECT W-211 241-AY-102 MIXER PUMP RISER EXTENSION LIFTING ATTACHMENT ANALYSIS	23	ED6083	(null)	IRAD
57259101	W211-AY02-P-003	9-Mar-06	PROJECT W-211 241-AY-102 IN TANK RECIRCULATION FLOW CONTROL VALVE SIZING	32	ED6083	(null)	IRAD
57259102	W211-AY02-P-007	9-Mar-06	PROJECT W-211 241-AY-102 3 INCH PW-404 HEAT TRACE SIZING	23	ED6083	(null)	IRAD
57130479	ECI-2006-10	30-Mar-06	TRANSFER PUMPS WITH PUREX CONNECTORS AW-102 & AY-102 & AP-102 & SY-102 & AZ-102	2	178789	(null)	IRAD
57240995	RPP-29464	14-Apr-06	CAUSTIC DYNAMIC MIXING ANALYSES FOR TANK 241-AY-102	71	SD5025	(null)	IRAD
57258939	W211-AY02-P-011	14-Aug-06	PROJECT W-211 CALCULATION DESIGN OF 241-AY-102 LIFTING ATTACHMENT FOR TRANSFER PUMP RISER ASSEMBLY	24	ED6531	(null)	IRAD
57258937	W211-AY02-C-012	14-Aug-06	PROJECT W-211 CALCULATION DOME LOADING TANK 241-AY-102	18	ED6531	(null)	IRAD
57241498	RPP-31976	6-Dec-06	DRAIN PATH EVALUATION FOR WASTE TRANSFER FROM 241-AY-102 TO 241-AN-106	4	ED6768	(null)	IRAD
57241861	RPP-32173	14-Dec-06	DRAIN PATH EVALUATION FOR WASTE TRANSFER FROM 241-AY-102 TO 241-AW-102	4	ED6795	(null)	IRAD
57249721	RPP-PLAN-32016	14-Dec-06	RADIOLOGICAL MONITORING PLAN FOR THE 241-AY-102 TO 241-AN-106 WASTE TRANSFER	19	ED6795	(null)	IRAD
57249547	RPP-PLAN-32016	14-Dec-06	RADIOLOGICAL MONITORING PLAN FOR THE 241-AY-102 TO 241-AN-106 WASTE TRANSFER	4	ED6795	(null)	IRAD
57249722	RPP-PLAN-32016	18-Dec-06	RADIOLOGICAL MONITORING PLAN FOR THE 241-AY-102 TO 241-AN-106 WASTE TRANSFER	20	ED6807	(null)	IRAD
57241862	RPP-32178	19-Dec-06	DRAIN PATH EVALUATION FOR WASTE TRANSFER FROM 241-AY-102 TO 241-AP-108 & FROM 241-AP-108 TO 241-AP-102	4	ED6809	(null)	IRAD
57248849	RPP-RPT-32169	19-Dec-06	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AY-102 WASTE WITH TANK 241-AW-102 WASTE	45	ED6805	(null)	IRAD
57249549	RPP-PLAN-32195	20-Dec-06	RADIOLOGICAL MONITORING PLAN FOR THE 241-AY-102 TO 241-AW-102 WASTE TRANSFER	20	ED6809	(null)	IRAD
57241863	RPP-32251	2-Jan-07	DRAIN PATH EVALUATION FOR WASTE TRANSFER FROM 241-AP-101 TO 241-AY-102	4	ED6827	(null)	IRAD

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57249724	RPP-PLAN-32235	5-Jan-07	RADIOLOGICAL MONITORING PLAN FOR 241-AP-101 TO 241-AY-102 WASTE TRANSFER	21	ED6839	(null)	IRAD
57248852	RPP-RPT-32256	5-Jan-07	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AP-101 WASTE WITH TANK 241-AY-102 WASTE	45	ED6839	(null)	IRAD
57251355	RPP-RPT-32256	10-Jan-07	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AP-101 WASTE WITH TANK 241-AY-102 WASTE	13	ED6851	(null)	IRAD
57246513	RPP-PLAN-24601	5-Feb-07	FY2007 TEST PLAN FOR EVALUATING THE CORROSIVITY OF 241-AY-102 DOUBLE SHELL TANK (DST) WASTE	19	ED6918	(null)	IRAD
57248844	RPP-RPT-31932	5-May-07	INTERIM REPORT FOR HANFORD TANKS AY-102 & AP-101 EFFECT OF CHEMISTRY & OTHER VARIABLES ON CORROSION & STRESS CORROSION CRACKING	40	CF	(null)	IRAD
57251376	RPP-RPT-33273	7-May-07	241-AT-101 & 241-AY-102 ANNULUS MOISTURE INTRUSION ANALYSIS	101	ED7192	(null)	IRAD
57249748	RPP-PLAN-34379	19-Jul-07	ELECTROCHEMICAL CORROSION REPORT FOR TANKS 241-AW-103 & 241-AZ-102 & 241-AN-106 & 241-AN-107 & 241-AY-101 & 241-AY-102	29	(null)	(null)	IRAD
62823652	RPP-RPT-34697	22-Aug-07	ELECTROCHEMICAL CORROSION REPORT FOR TANKS 241-AW-103 & 241-AZ-102 & 241-AN-106 & 241-AN-107 & 241-AY-101 & 241-AY-102	35	(null)	(null)	IRAD
76274677	RPP-SPEC-35429	5-Nov-07	PROCUREMENT SPECIFICATION FOR AY-102 CORROSION PROBE ASSEMBLY	18	(null)	(null)	IRAD
76890213	RPP-ASMT-35619	9-Nov-07	EXPERT PANEL OVERSIGHT COMMITTEE ASSESSMENT OF FY2007 CORROSION & STRESS CORROSION CRACKING SIMULANT TESTING PROGRAM & THE IMPACT ON DST 241-AY-102	9	(null)	(null)	IRAD
77865716	RPP-PLAN-34379	12-Nov-07	ELECTROCHEMICAL CORROSION TEST PLAN FOR TANKS 241-AW-103 & 241-AZ-102 & 241-AN-106 & 241-AN-107 & 241-AY-101 & 241-AY-102	3	(null)	(null)	IRAD
84886100	RPP-PLAN-35593	3-Dec-07	TANK 241-AY-102A LEAK DETECTIONPIT GRAB SAMPLING AND ANALYSIS PLAN	25	(null)	(null)	IRAD
94703661	RPP-PLAN-24604	4-Jan-08	TEST PLAN FOR EVALUATING SECONDARY REFERENCE ELECTRODE MATERIALS FOR THE 241-AN-102 & THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEMS	20	(null)	(null)	IRAD
119450293	RPP-RPT-36249	18-Jan-08	COMPATIBILITY ASSESSMENT OF 241-AZ-301 CONDENSATE AY-102A LDP LIQUID AND CHEMICAL ADDITIONS TO TANK 241-AY-101	106	(null)	(null)	IRAD
102854464	RPP-RPT-36150	24-Jan-08	FINAL REPORT FOR THE 241-AY-102A LEAK DETECTION PIT GRAB SAMPLES IN SUPPORT OF THE WASTE COMPATIBILITY PROGRAM	65	(null)	(null)	IRAD
103233691	RPP-SPEC-35429	31-Jan-08	PROCUREMENT SPECIFICATION FOR AY-102 CORROSION PROBE ASSEMBLY	19	(null)	(null)	IRAD
108577433	RPP-PLAN-36639	13-Feb-08	RADIOLOGICAL MONITORING PLAN FOR PUMPING 241-AY-102 LEAK DETECTOR PIT TO 241-AY-01A PIT	24	(null)	(null)	IRAD
130479450	RPP-ASMT-37199	23-Apr-08	LABORATORY ASSESSMENT OF CANDIDATE SECONDARY REFERENCE ELECTRODE MATERIALS FOR THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM	15	(null)	(null)	IRAD
138227015	RPP-31935	5-Jun-08	TANK 241-AY-101 AND 241-AY-102 CONDENSATE RETURN EVALUATION	73	(null)	(null)	IRAD
138350363	PRHA-00292	19-Jun-08	AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM (MPCMS)	5	(null)	(null)	IRAD
138360493	RPP-RPT-37131	19-Jun-08	CONSTRUCTION ACCEPTANCE AND PROCESS TEST REQUIREMENTS FOR THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM	34	(null)	(null)	IRAD
138377485	RPP-CALC-35476	19-Jun-08	STRUCTURAL ANALYSIS OF AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM	59	(null)	(null)	IRAD
138363898	RPP-RPT-35925	19-Jun-08	REQUIREMENTS VERIFICATION REPORT FOR TANK 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM	14	(null)	(null)	IRAD
138377865	RPP-PLAN-35914	19-Jun-08	TEST PLAN FOR 241-AY-102 MULTI-PROBE CORROSION MOINTORING SYSTEM	12	(null)	(null)	IRAD
138359123	RPP-RPT-37135	19-Jun-08	RECOMMENDATIONS FOR HANDLING AND STORAGE OF THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM (MPCMS)	13	(null)	(null)	IRAD
140644306	RPP-RPT-39019	1-Oct-08	PROCESS HAZARD ANALYSIS PERFORMED FOR THE TANK 241-AY-102 CORROSION PROBE INSTALLATION AND OPERATION	161	(null)	(null)	IRAD
140916943	PRHA-00538	16-Oct-08	AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM (MPCMS)	0	(null)	(null)	IRAD
140937799	RPP-36254	21-Oct-08	EVALUATION OF TANK 241-AY-102 WASTE HYDROXIDE CONCENTRATION FOLLOWING THE JANUARY 2007 SUPERNATANT REPLACEMENT	42	(null)	(null)	IRAD
141090490	PRHA-00557	3-Nov-08	AY-102 MPCMS C-RING COUPONS AND PART MODIFICATIONS	5	(null)	(null)	IRAD
141144147	PRHA-00566	10-Nov-08	AY-102 MPCMS PART MODIFICATIONS	5	(null)	(null)	IRAD
141658179	PRHA-00634	8-Jan-09	241-AY-102 MPCMS ELECTRICAL UPGRADES	5	(null)	(null)	IRAD
142013325	PRHA-00670	3-Feb-09	241-AY-102 MPCMS FACTORY ACCEPTANCE TEST (FAT) MODIFICATION	5	(null)	(null)	IRAD

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142013464	RPP-RPT-35924	3-Feb-09	FACTORY ACCEPTANCE TEST PROCEDURE FOR THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM		42	(null)	(null)	IRAD
142303307	PRHA-00671	4-Feb-09	AY-102 ENRAF RELOCATION DRAWINGS FOR THE MPCMS INSTALLATION		4	(null)	(null)	IRAD
142079932	RPP-RPT-37131	13-Feb-09	CONSTRUCTION ACCEPTANCE AND PROCESS TEST REQUIREMENTS FOR THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM		37	(null)	(null)	IRAD
142251858	RPP-RPT-37135	2-Mar-09	RECOMMENDATIONS FOR HANDLING AND STORAGE OF THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM (MPCMS)		11	(null)	(null)	IRAD
142680406	RPP-RPT-39538	2-Mar-09	241-AY-102 MPCMS C-RING COUPON PHOTOGRAPHS		399	(null)	(null)	IRAD
142554019	PRHA-00736	19-Mar-09	241-AY-102 MPCMS (MULTI-PROBE CORROSION MONITORING SYSTEM) FABRICATION AS-BUILT DRAWING		4	(null)	(null)	IRAD
142554022	PRHA-00743	25-Mar-09	241-AY-102 MPCMS (MULTI-PROBE CORROSION MONITORING SYSTEM) STRUCTURAL ANALYSIS REVISION	(null)	(null)	(null)	IRAD
142555836	RPP-CALC-35476	25-Mar-09	STRUCTURAL ANALYSIS OF AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM		61	(null)	(null)	IRAD
143026748	PRHA-00770	23-Apr-09	241-AY-102 MPCMS CONTRUCTION ACCEPTANCE PROCESS TEST		5	(null)	(null)	IRAD
143037410	RPP-RPT-40867	24-Apr-09	CONSTRUCTION ACCEPTANCE AND PROCESS TEST REPORT FOR THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM		26	(null)	(null)	IRAD
143120130	PRHA-00787	27-Apr-09	AY-102 MPCMS FIELD ELECTRICAL MODIFICATION		5	(null)	(null)	IRAD
143173025	RPP-RPT-40661	7-May-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM INITIAL OPERATION WEEKLY REPORT		60	(null)	(null)	IRAD
143305420	RPP-RPT-40633	21-May-09	FACTORY ACCEPTANCE TEST REPORT FOR THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM		168	(null)	(null)	IRAD
143300606	PRHA-00822	21-May-09	241-AY-102 MPCMS FACTORY ACCEPTANCE TEST REPORT (FATR)		4	(null)	(null)	IRAD
143306753	RPP-RPT-35925	22-May-09	REQUIREMENTS VERIFICATION REPORT FOR TANK 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM		18	(null)	(null)	IRAD
143308193	RPP-RPT-40661	22-May-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM WEEK 2 REPORT		48	(null)	(null)	IRAD
143401767	RPP-RPT-40661	2-Jun-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM WEEK 5 REPORT		56	(null)	(null)	IRAD
143403145	RPP-RPT-40661	2-Jun-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM WEEK 4 REPORT		56	(null)	(null)	IRAD
143401971	RPP-RPT-40661	2-Jun-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM WEEK 3 REPORT		61	(null)	(null)	IRAD
143402079	RPP-RPT-40661	2-Jun-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM WEEK 6 REPORT		56	(null)	(null)	IRAD
143819403	RPP-RPT-41204	8-Jul-09	TANK 241-AY-101 AND TANK 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM PROJECT LESSONS LEARNED		30	(null)	(null)	IRAD
143992378	RPP-PLAN-36639	20-Jul-09	RADIOLOGICAL MONITORING PLAN FOR PUMPING 241-AY-102 LEAK DETECTOR PIT TO 241-AY-01A PIT		31	(null)	(null)	IRAD
144598986	RPP-RPT-40661	18-Aug-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM WEEK 12 REPORT		59	(null)	(null)	IRAD
144598494	RPP-RPT-40661	18-Aug-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM WEEK 10 REPORT		63	(null)	(null)	IRAD
144598899	RPP-RTP-40661	18-Aug-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM WEEKS 8 REPORT		62	(null)	(null)	IRAD
144599194	RPP-RPT-40661	18-Aug-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM WEEKS 13 AND 14 REPORT		66	(null)	(null)	IRAD
144570288	RPP-RPT-40661	18-Aug-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM WEEK 11 REPORT		59	(null)	(null)	IRAD
144600017	RPP-RPT-40661	18-Aug-09	41-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM WEEKS 13 AND 14 REPORT		66	(null)	(null)	IRAD
144599187	RPP-RPT-40661	18-Aug-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM WEEK 7 REPORT		56	(null)	(null)	IRAD
144950162	RPP-RPT-40661	11-Sep-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM WEEKS 17 AND 18 REPORT		80	(null)	(null)	IRAD
144950530	RPP-RPT-40661	11-Sep-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM WEEKS 15 & 16 REPORT		69	(null)	(null)	IRAD
145107795	RPP-RPT-42920	12-Oct-09	2009 AUTO-TCR FOR TANK 241-AY-102		260	(null)	(null)	IRAD
145159391	RPP-42495	14-Oct-09	MULTI-PROBE CORROSION MONITORING SYSTEM DESIGN DIFFERENCES 24-AN-107 & 241-AY-101 & 241-AY-102 & 241-AN-102		8	(null)	(null)	IRAD
145457587	RPP-PLAN-36639	6-Nov-09	RADIOLOGICAL MONITORING PLAN FOR PUMPING 241-AY-102 LEAK DETECTOR PIT TO 241-AY-01A PIT		31	(null)	(null)	IRAD
146428357	RPP-RPT-40661	18-Dec-09	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM WEEKS 19 AND 20 REPORT		67	(null)	(null)	IRAD
146988310	RPP-RPT-40661	12-Jan-10	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM WEEKS 21 AND 22 REPORT		56	(null)	(null)	IRAD
147086032	RPP-RPT-44630	3-Feb-10	DERIVATION OF BEST-BASIS INVENTORY FOR TANK 241-AY-102		48	(null)	(null)	IRAD
147532988	PRHA-01284	2-Mar-10	INSTALL PRESSURE INDICATOR AY-101 & AY-102 & AZ-101 & AZ-102		4	(null)	(null)	IRAD

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148443141	RPP-RPT-44462	24-Mar-10	MULTI-PROBE CORROSION MONITORING SYSTEM DESIGN DIFFERENCES BETWEEN 241-AW-104 AND 241-AN-107 & 241-AY-101 & 241-AY-102 AND 241-AN-102	10 (null)	(null)	IRAD
148807617	RPP-44828	13-Apr-10	TANK 241-AY-102 DYNAMIC MIXING ANALYSIS	217 (null)	(null)	IRAD
149057508	RPP-44828	15-Apr-10	TANK 241-AY-102 DYNAMIC MIXING BENCHMARK ANALYSES	218 (null)	(null)	IRAD
149558841	RPP-RPT-46355	20-May-10	A COMPARATIVE EVALUATION OF TANK AY-102 WASTES FOR WTP HOT COMMISSIONING`	54 (null)	(null)	IRAD
151074392	RPP-RPT-46020	16-Jun-10	TANK 241-AY-102 WASTE FEED DELIVERY FLOWSHEET	335 (null)	(null)	IRAD
151075822	SVF-1874	16-Jun-10	AY-102 FLOWSHEET INPUT DATA.XLSX	1 (null)	(null)	IRAD
151073965	SVF-1875	16-Jun-10	AY-102 FLOWSHEET MATERIAL BALANCE.XLSX	1 (null)	(null)	IRAD
151074597	SVF-1873	16-Jun-10	AY-102 FLOWSHEET INVENTORY ESTIMATE.XLSX	1 (null)	(null)	IRAD
151074596	PRHA-01469	17-Jun-10	TANK 241-AY-102 WASTE FEED DELIVERY FLOWSHEET	4 (null)	(null)	IRAD
151975901	PRHA-01533	23-Jun-10	241-AY-101 AND 241-AY-102 MPCMS C-RING COUPON PHOTOGRAPHS	4 (null)	(null)	IRAD
152530916	RPP-RPT-40661	15-Jul-10	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM 12/2009 MONTHLY REPORT	70 (null)	(null)	IRAD
152530256	RPP-RPT-40661	15-Jul-10	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM WEEKS 25 THROUGH 31 REPORT	74 (null)	(null)	IRAD
152530258	RPP-RPT-40661	15-Jul-10	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM 11/2009 MONTHLY REPORT	67 (null)	(null)	IRAD
152645304	RPP-46717	19-Jul-10	TANK 241-AY-102 DYNAMIC MIXING ANALYSES FOLLOWING THE JANUARY 2007 SUPERNATANT REPLACEMENT	68 (null)	(null)	IRAD
154749705	RPP-RPT-46020	28-Sep-10	TANK 241-AY-102 WASTE FEED DELIVERY FLOWSHEET	12 (null)	(null)	IRAD
155761216	RPP-RPT-40661	19-Nov-10	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM FEBRUARY 2010 MONTHLY REPORT	61 (null)	(null)	IRAD
155811592	RPP-RPT-40661	19-Nov-10	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM FEBRUARY 2010 MONTHLY REPORT	61 (null)	(null)	IRAD
157322410	RPP-RPT-44630	15-Feb-11	DERIVATION OF BEST-BASIS INVENTORY FOR TANK 241-AY-102	50 (null)	(null)	IRAD
160277787	RPP-49053	18-Apr-11	SAFETY DESIGN STRATEGY FOR THE WASTE FEED DELIVERY INTEGRATED AY-102 UPGRADES PROJECT	19 (null)	(null)	IRAD
162866408	RPP-34669	5-Jun-11	EVALUATION OF TANK 241-AY-102 PRIMARY TANK KNUCKLE AND WALL TEMPERATURES DURING LOSS OF VENTILATION EVENTS	81 (null)	(null)	IRAD
164889971	RPP-RPT-44630	21-Sep-11	DERIVATION OF BEST-BASIS INVENTORY OF TANK 241-AY-102 AS OF 07/01/2011	43 (null)	(null)	IRAD
165286924	RPP-RPT-40661	13-Oct-11	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM MARCH 2010 MONTHLY REPORT	47 (null)	(null)	IRAD
165661090	RPP-RPT-40661	17-Oct-11	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM APRIL 2010 MONTHLY REPORT	50 (null)	(null)	IRAD
165662104	RPP-RPT-40661	18-Oct-11	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM MAY JUNE JULY 2010 QUARTERLY REPORT	63 (null)	(null)	IRAD
166609461	TOC-ENV-NOT-2011-0012	25-Oct-11	ENVIRONMENTAL NOTIFICATION FOR 241-AY-102 ANNULUS ENRAF 152 RAINWATER INTRUSION ON 10-13-11	6 (null)	(null)	IRAD
166119406	RPP-50817	9-Nov-11	241-AY-102 MIXER PUMP OPERATION EROSION-CORROSION SCOPING TEST PROGRAM	270 (null)	(null)	IRAD
166575643	RPP-RPT-40661	14-Dec-11	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM AUGUST & SEPTEMBER & OCTOBER 2010 QUARTERLY REPORT	54 (null)	(null)	IRAD
166719298	RPP-RPT-40661	20-Dec-11	241-AY-102 MULTI PROBE CORROSION MONITORING SYSTEM FEBRUARY & MARCH & APRIL 2011 QUARTERLY REPORT	44 (null)	(null)	IRAD
166722389	RPP-RPT-40661	20-Dec-11	241-AY-102 MULTI PROBE CORROSION MONITORING SYSTEM MAY & JUNE & JULY 2011 QUARTERLY REPORT	60 (null)	(null)	IRAD
166715274	RPP-RPT-40661	20-Dec-11	241-AY-102 MULTI PROBE CORRISION MONITORING SYSTEM NOVEMBER AND DECEMBER 2010 AND JANUARY 2011 QUARTERLY REPORT	55 (null)	(null)	IRAD
166894318	ORP-51443	29-Dec-11	FINAL REPORT INTEGRATED DM1200 MELTER TESTING USING AZ 102 AND C 106/AY-102 HLW SIMULANTS: HLW SIMULANT VERIFICATION VSL-05R5800-1 REV 0 6/27/05	387 (null)	(null)	IRAD
166903326	ORP-51503	29-Dec-11	FINAL REPORT DURAMELTER 100 HLW SIMULANT VALIDATION TESTS WITH C-106/AY-102 FEEDS VSL-05R5710-1 REV 0 6/2/05	89 (null)	(null)	IRAD
166894315	ORP-51441	29-Dec-11	FINAL REPORT INTEGRATED DM1200 MELTER TESTING OF REDOX EFFECTS USING HLW AZ-101 AND C-106/AY-102 SIMULANTS VSL-04R4800-1 REV 0 5/6/04	448 (null)	(null)	IRAD
166902604	ORP-51439	29-Dec-11	INTEGRATED DM 1200 MELTER TESTING OF HLW C-106/AY-102 COMPOSITION USING BUBBLERS VSL-03R3800-1 REV 0 9/15/03	175 (null)	(null)	IRAD

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167329094	RPP-PLAN-45270	15-Feb-12	TEST PLAN FOR EVALUATING THE POSSIBILITY OF EROSION-CORROSION DURING MIXER PUMP OPERATION IN 241-AY-102	57	(null)	(null)	IRAD
167327289	RPP-PLAN-45270	15-Feb-12	TEST PLAN FOR EVALUATING THE POSSIBILITY OF EROSION-CORROSION DURING MIXER PUMP OPERATION IN 241-AY-102	51	(null)	(null)	IRAD
167399824	RPP-PLAN-45270	21-Feb-12	TEST PLAN FOR EVALUATING THE POSSIBILITY OF EROSION-CORROSION DURING MIXER PUMP OPERATION IN 241-AY-102	55	(null)	(null)	IRAD
167643810	RPP-CALC-51848	28-Feb-12	DETERMINATION OF PEAK SLUDGE TEMPERATURE USED IN TANK AY-102 TTLFL CALCULATION	25	(null)	(null)	IRAD
168134883	RPP-CALC-51958	9-Mar-12	DECREASED TIME TO LFL IN TANK 241-AY-102 DUE TO TEMPERATURE LIMIT EXCEEDED	24	(null)	(null)	IRAD
168090033	RPP-OE-52015	14-Mar-12	AY-101 AND AY-102 VTA EXHAUSTER FAN BEARING	4	(null)	(null)	IRAD
168007468	RPP-RPT-44630	22-Mar-12	DERIVATION OF BEST-BASIS INVENTORY FOR TANK 241-AY-102 AS OF JANUARY 1 2012	43	(null)	(null)	IRAD
170559026	RPP-CALC-49943	20-Jun-12	STRUCTURAL EVALUATION OF THE AY-102 SLUDGE THERMOCOUPLE FOR REMOVAL	32	(null)	(null)	IRAD
170561039	RPP-CALC-49945	20-Jun-12	STRUCTURAL EVALUATION OF THE AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM FOR REMOVAL	27	(null)	(null)	IRAD
170560223	RPP-CALC-49323	21-Jun-12	STRUCTURAL EVALUATION OF THE AY-102 SHMS VAPOR PROBE FOR REMOVAL	26	(null)	(null)	IRAD
170559027	RPP-CALC-50544	21-Jun-12	AY-102 AGITATOR PUMP ASSEMBLY LIFTING EVALUATION	39	(null)	(null)	IRAD
170561044	RPP-CALC-50972	21-Jun-12	LIFTING ANALYSIS OF THE AY-102 LUBRICATED TURBINE PUMP	38	(null)	(null)	IRAD
170558295	RPP-CALC-49946	21-Jun-12	STRUCTURAL EVALUATION OF THE AY-102 MIT FOR REMOVAL	39	(null)	(null)	IRAD
170560224	RPP-CALC-50035	21-Jun-12	STRUCTURAL EVALUATION OF THE AY-102 PROFILE TEMPERATURE PROBE FOR REMOVAL	36	(null)	(null)	IRAD
170561050	RPP-CALC-50033	27-Jun-12	STRUCTURAL ANALYSIS OF THE STEAM COIL ASSEMBLY POSITIONED IN AY-102 TANK	176	(null)	(null)	IRAD
170559204	RPP-CALC-51144	27-Jun-12	STRUCTURAL ANALYSIS OF THE AIR LIFT CIRCULATORS POSITIONED IN AY-102 TANK	150	(null)	(null)	IRAD
172148470	RPP-RPT-53044	8-Aug-12	STRATEGY AND TECHNICAL BASIS FOR MANAGING FLAMMABLE GASES DURING TANK 241-AY-102 MIXER PUMP TESTING	40	(null)	(null)	IRAD
172147982	RPP-PLAN-53364	28-Aug-12	2012 GRAB SAMPLING AND ANALYSIS PLAN FOR THE 241-AY-102A TANK ANNULUS LEAK DETECTION PIT	24	(null)	(null)	IRAD
172053131	RPP-53216	28-Aug-12	PRESSURE TRANSIENT & STABILITY EVALUATION FOR THE 241-AY & 241-AZ TANK FARM PRIMARY VENTILATION SYSTEM WITH THE INDEPENDENT COOLING MODULE OPERATION ON TANK 241-AY-102	110	(null)	(null)	IRAD
172842556	RPP-PLAN-53352	20-Sep-12	TANK 241-AY-102 ANNALUS SAMPLING AND ANALYSIS PLAN	27	(null)	(null)	IRAD
172837189	RPP-53434	27-Sep-12	241-AY-102 ANNUALUS SAMPLING DATA QUALITY OBJECTIVES	45	(null)	(null)	IRAD
172842658	RPP-ENV-53694	27-Sep-12	241-AY-102 IN-TANK UPGRADES PROJECT REGULATORY ANALYSIS PLAN	25	(null)	(null)	IRAD
172898940	RPP-RPT-44630	1-Oct-12	DERIVATION OF BEST-BASIS INVENTORY FOR TANK 241-AY-102 AS OF 07/01/2012	47	(null)	(null)	IRAD
173991820	RPP-RPT-53511	4-Oct-12	FINAL REPORT FOR TANK 241-AY-102 ANNULUS SOLID SAMPLE TAKEN IN AUGUST 2012	94	(null)	(null)	IRAD
172952621	PRHA-01969	5-Oct-12	OBTAIN SAMPLE FROM AY-102 USING DRILL SAMPLING CRAWLER DSC	4	(null)	(null)	IRAD
173392116	RPP-PLAN-53086	2-Nov-12	WASTE FEED DELIVERY AY-102 TECHNOLOGY MATURATION MIXING SAMPLING DEMONSTRATION RISK AND OPPORTUNITY MANAGEMENT PLAN	47	(null)	(null)	IRAD
173482910	RPP-RPT-53805	5-Nov-12	FINAL REPORT FOR TANK 241-AY-102 ANNULUS LEAK DETECTION PIT 2012 LIQUID GRAB SAMPLES IN SUPPORT OF WASTE COMPATIBILITY	68	(null)	(null)	IRAD
173909545	RPP-ASMT-53793	7-Nov-12	TANK 241-AY-102 LEAK ASSESSMENT REPORT	448	(null)	(null)	IRAD
173885487	RPP-STE-00043	14-Nov-12	PERFORMANCE AND FUNCTIONAL REQUIREMENTS EVALUATION OF A SIMULATED TRUNNION BAR FOR THE AY-102 ANNULUS PUMP PIT	5	(null)	(null)	IRAD
173971981	RPP-PLAN-54083	26-Nov-12	FY2013 GRAB SAMPLING AND ANALYSIS PLAN FOR THE 241-AY-102A TANK ANNULUS LEAK DETECTION PIT	26	(null)	(null)	IRAD
174113705	RPP-STE-00045	5-Dec-12	AY-102 ANNULUS PUMP PIT RISER PLUG GAUGE 11-1/2 INCH	31	(null)	(null)	IRAD
174110262	RPP-RPT-54071	10-Dec-12	FINAL REPORT FOR TANK 241-AY-102 ANNULUS	58	(null)	(null)	IRAD
174182075	PRHA-01973	12-Dec-12	AY-102 EMERGENCY PUMPING EQUIPMENT	2	(null)	(null)	IRAD
174184882	RPP-ASMT-53794	18-Dec-12	TANK 241-AY-102 LEAK ASSESSMENT SUPPORTING DOCUMENTATION MISCELLANEOUS REPORTS LETTERS MEMORANDA AND DATA	553	(null)	(null)	IRAD
174288173	RPP-CALC-54091	18-Dec-12	AY-102 ANNULUS PUMP HOISTING ANALYSIS DOUBLE PUMP	19	(null)	(null)	IRAD
174327004	WRPS-2012-88	28-Dec-12	ABCASH RECORDS REQUEST AY-102 WDOH RTAM REQUEST 12.19.12	6	(null)	(null)	IRAD
174366967	RPP-RPT-54099	19-Dec-13	EVALUATION OF THE CORROSION THREAT OF THE WASTE IN THE TANK 241-AY-102 ANNULUS	40	(null)	(null)	IRAD

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57117130	HNF-SD-W320-PROC-001	(null)	Project W320 tank 241-AY-102 pump/winch maintenance procedure	1	(null)	(null)	IRAD
57194735	HNF-2965	(null)	Operational test report for the AY-102 Enraf densitometer control and acquisition system	120	(null)	(null)	IRAD
57198737	HNF-4798	(null)	Tank 241-AY-102 annulus continuous air monitor high readings	15	(null)	(null)	IRAD
57212900	HNF-SD-WM-CN-099	(null)	Radiological and toxicological analyses of tank 241-AY-102 and tank 241-C-106 ventilation systems	190	(null)	(null)	IRAD
57215983	HNF-SD-WM-TI-756	(null)	Chemical and chemically-related considerations associated with sluicing tank C-106 waste to tank AY-102	204	SD0750	(null)	IRAD
57322048	WHC-SD-WM-ER-534	(null)	Thermal hydraulic evaluation of consolidating tank C-106 waste into tank AY-102	128	CF	(null)	IRAD
57328363	WHC-SD-WM-TP-430	(null)	Sample Preparation of Tank 241-C-106 Grab Samples and Testing for Compatibility with Tank 241-AY-102 Supernate	1	CF	(null)	IRAD
57328526	WHC-SD-WM-TP-430	(null)	Sample preparation of tank 241-C-106 grab samples and testing For compatibility with tank 241-AY-102 supernate	21	CF	(null)	IRAD
57329118	WHC-SD-WM-TI-756	(null)	Chemical and chemically-telated considerations associated with sluicing tank C-106 waste to tank AY-102	155	SD0198	(null)	IRAD
57117164	HNF-SD-WM-ABU-024	(null)	Tank 241-C-106 and 241-AY-102 SHMS-C acceptance for beneficial use (ABU)	1	(null)	(null)	IRAD
57210271	HNF-SD-W320-ABU-003	(null)	Project W320, 241-AY-102 O2A pit equipment and modifications documentation required for acceptance for beneficial use	1	(null)	(null)	IRAD
57213110	HNF-SD-WM-DP-222	(null)	60-Day waste compatibility safety issues and final results for AY-102 grab samples	371	SD0624	(null)	IRAD
57213333	HNF-SD-WM-CN-099	(null)	Radiological and toxicological analyses of tank 241-AY-102 and tank 241-C-106 ventilation systems	255	(null)	(null)	IRAD
57213342	HNF-SD-WM-CN-113	(null)	Consequences of a postulated tank bump in AY-102 with a thin supernatant layer after transfer of sludge from tank C-106	1	(null)	(null)	IRAD
57253199	TWR-2103	(null)	TWRS retrieval level 1 logic waste feed delivery high-level waste fifth through ninth feed batches, third tank, 241-AY-102	1	(null)	(null)	IRAD
57320131	WHC-SD-W320-TI-003	(null)	An Analysis of Energy and Temperature Effects for Tank 241-AY-102	1	CF	(null)	IRAD
57324636	WHC-SD-WM-ES-290	(null)	Chemical Compatibility of Tank Wastes in Tanks 241-C-106, 241-AY-101, and 241-AY-102	1	(null)	(null)	IRAD
57325327	WHC-SD-WM-ETP-196	(null)	Engineering Task Plan for installing psychrometric instrumentation for waste tank 241-AY-102 (supports Project W320)	1	(null)	(null)	IRAD
57329374	WHC-SD-WM-TI-756	(null)	Chemical and chemically-related considerations associated with sluicing tank C-106 waste to tank AY-102	1	(null)	(null)	IRAD
142012627	PRHA-00643	(null)	241-AY-102 ENRAF RELOCATION FOR THE MPCMS INSTALLATION	4	(null)	(null)	IRAD
57195851	HNF-3254	(null)	Contingency plan for deployment of the void fraction instrument in Tank 241-AY-102	17	(null)	(null)	IRAD
57209557	HNF-SD-TWR-PE-001	(null)	Computer simulation of the leaching and washing of waste in tanks C-106, AY-102, AZ-101, and AZ-102	288	CF	(null)	IRAD
57212899	HNF-SD-WM-CN-099	(null)	Radiological and toxicological calculations for AY-102 and C-106 HEPA filters and pre-filters	71	SD0956	(null)	IRAD
57213059	HNF-SD-WM-CN-099	(null)	Radiological and toxicological analyses of tank 241-AY-102 and tank 241-C-106 ventilation systems	232	(null)	(null)	IRAD
57243792	RPP-6646	(null)	Control decision record for post-sluicing conditions in tanks 241-C-106 & 241-AY-102	51	(null)	(null)	IRAD
57324058	WHC-SD-WM-ER-454	(null)	Tank Characterization Report for Double-Shell Tank 241-AY-102	88	CF	(null)	IRAD
57116651	HNF-SD-W320-PROC-001	(null)	Project W320 tank 241-AY-102 pump/winch maintenance procedure	1	(null)	(null)	IRAD
57213058	HNF-SD-WM-CN-099	(null)	Radiological and toxicological analyses of tank 241-AY-102 and tank 241-C-106 ventilation systems	189	(null)	(null)	IRAD
57213060	HNF-SD-WM-CN-099	(null)	Radiological and Toxicological Analyses of Tank 241-AY-102 and Tank 241-C-106 Ventilation Systems	253	(null)	(null)	IRAD
57296166	WHC-SD-W320-EIP-001	(null)	Tank 241-AY-102, immersible pump P-0621 - winch assembly W-0621, assembly and installation instructions	1	CF	(null)	IRAD
57116650	HNF-SD-W320-PROC-001	(null)	Project W-320 tank 241-AY-102 pump/winch maintenance procedure	1	(null)	(null)	IRAD
57212901	HNF-SD-WM-CN-099	(null)	Radiological and toxicological analyses of tank 241-AY-102 and tank 241-C-106 ventilation systems	247	(null)	(null)	IRAD
57213067	HNF-SD-WM-CN-110	(null)	Consequences of a radioactive surface pool resulting from waste transfer operations between tanks 214-C-106 and 241-AY-102	259	SD0983	(null)	IRAD
57213691	HNF-SD-WM-DP-299	(null)	Tank 241-AY-102, grab samples 2AY-97-1, 2AY-97-2, 2AY-97-3, 2AY-97-4 and 2AY-97-5 analytical results for the final report	1	(null)	(null)	IRAD
57253467	TWR-2103	(null)	RPP retrieval level 1 logic waste feed delivery HLW feed batches tank 241-AY-102	6	(null)	(null)	IRAD
57257322	TM-DEP-99-002-MISC	(null)	Technology deployment fact sheet TM-DEP-99-002 "Enraf densitometer in tank AY-102"	1	151463	(null)	IRAD
57323791	WHC-SD-WM-ER-454	(null)	Tank characterization report for double-shell tank 241-AY-102	1	(null)	(null)	IRAD

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OBJID	DOCNO	DATE	TITLE	PAGES	RHA BOX #	ACC RIGHTS	IDMS CATEGORY
3711703	N/A	0	241-AY-102 TANK DOUBLE SHELL	6	BHI008	(null)	DOWNWINDER
5693144	B-131-31-2	19790330	ENLARGED PLAN TANK FARM 241-AY-102 - TERMINAL LIQUOR TRANSFER FACILITY	1	74083	(null)	DOWNWINDER
5924211	80-8	19800415	80-8 MISROUTING 241-A-103 TO 241-AY-102	3	60848	(null)	DOWNWINDER
5924000	N/A	19800521	OCCURRENCE REPORT 80-37 HIGH VACUUM TANK 241-AY-102 ANNULUS	1	60848	(null)	DOWNWINDER
5923999	80-37	19800627	80-37 HIGH VACUUM TANK - 241-AY-102 ANNULUS	6	60848	(null)	DOWNWINDER
5134902	N/A	19801008	TANK 241-AY-102 PUMPDOWN, PREVENTION OF ANNULUS CROSS CONTAMINATION	1	84691	(null)	DOWNWINDER
5759116	5290-81-01	19810701	OCCURRENCE REPORT OR 80-37, HIGH VACUUM TANK 241 AY-102 ANNULUS	2	83493	(null)	DOWNWINDER
5923787	81-52	19810828	81-52 MISROUTING TK-AY-101 TO TK-AY-102	4	60848	(null)	DOWNWINDER

IDMS SQL
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OBJID	DOCNO	DATE	TITLE	PAGES	RHA BOX #	ACC RIGHTS	IDMS CATEGORY
164555418	WRPS-PER-2011-1009	7-Sep-11	3-RE WRPS-PER-2011-1009 AY-102 SR 3.5.1 Surveillance Frequency .msg	(null)	(null)	(null)	BASIC
164556021	WRPS-PER-2011-1009	7-Sep-11	4-WRPS-PER-2011-1009 AY-102 SR 3.5.1 Surveillance Frequency .msg	(null)	(null)	(null)	BASIC
165004242	AY-102 FY11 Q4	21-Sep-11	AY-102 FY11 Q4	86	RM5946	DOES NOT CONTAIN C(	BASIC
169388811	CR11-01992	3-Oct-11	E146, 241 -AY-102 ANNULAS CAM	20	RM8343	DOES NOT CONTAIN C(	BASIC
169393371	CR11-02070	21-Oct-11	AY-102-ANNULUS CAM FILTER FROM HIGH RAD ALARM	28	RM8343	DOES NOT CONTAIN C(	BASIC
166173173	TF-11-1892	1-Dec-11	ECN 11-002075, AY-102 ANNULUS EXHAUSTER FILTER UPDATE	(null)	(null)	(null)	BASIC
166173263	TF-11-1892	1-Dec-11	ECN 11-002075, AY-102 ANNULUS EXHAUSTER FILTER UPDATE	(null)	(null)	(null)	BASIC
172266656	TFC-WO-11-5837	15-Dec-11	Perform Primary In-Tank Video Inspection of 241-AY-102 Open Riser, Install Top-Hat, Install Camera, Perform Inspection, Remove Camera, Remove Top-Hat, Close Riser. Work is expected to take 2 days to complete.	2	RM8408	DOES NOT CONTAIN C(	BASIC
166967963	WTO-0368	20-Dec-11	Replace HEPA filters on AY-102 Annulus exhaust system and related tasks associated with the package. (RBA/CA/RA)	1	RM7991	DOES NOT CONTAIN C(	BASIC
171803703	TFC-WO-11-5798	30-Dec-11	CHANGE ALL 8 HEPA FILTERS ON TEH AY-102 ANNULUS EXHAUSTER	2	RM8384	DOES NOT CONTAIN C(	BASIC
166685924	TF-12-0018	5-Jan-12	WORK ORDER TFC-WO-11-5789, AY-102 REPLACE ANNULUS HEPA FILTERS	(null)	(null)	(null)	BASIC
172094913	TFC-WO-11-5838	5-Jan-12	Perform Annulus Video Inspection of 241-AY-102 Open 4 Risers, Install Top Hat, Install Camera, Perform Inspection, Remove Camera, Remove Top Hat, Close Risers Work is expected to take 3 days to complete.	2	RM8408	DOES NOT CONTAIN C(	BASIC
166685741	TF-12-0018	5-Jan-12	WORK ORDER TFC-WO-11-5789, AY-102 REPLACE ANNULUS HEPA FILTERS	(null)	(null)	(null)	BASIC
176087881	WTO-0368 R1	10-Jan-12	Replace HEPA filters on AY-102 Annulus exhaust system and related tasks associated with the package. (RBA/CA/RA)	1	RM8574	DOES NOT CONTAIN C(	BASIC
166760807	TF-12-0018	12-Jan-12	WORK ORDER TFC-WO-11-5789, AY-102 REPLACE ANNULUS HEPA FILTERS AND WCN-001	(null)	(null)	(null)	BASIC
166760998	TF-12-0018	12-Jan-12	WORK ORDER TFC-WO-11-5789, AY-102 REPLACE ANNULUS HEPA FILTERS AND WCN-001	(null)	(null)	(null)	BASIC
176088959	WTO-0368 R2	12-Jan-12	Replace HEPA filters on AY-102 Annulus exhaust system and related tasks associated with the package. (RBA/CA/RA)	1	RM8574	DOES NOT CONTAIN C(	BASIC
167061287	TF-12-0130	2-Feb-12	WORK ORDER TFC-WO-12-1063, 241-AY-102 TANK ENRAF DRUM REPLACEMENT	(null)	(null)	(null)	BASIC
167060868	TF-12-0130	2-Feb-12	WORK ORDER TFC-WO-12-1063, 241-AY-102 TANK ENRAF DRUM REPLACEMENT	(null)	(null)	(null)	BASIC
172574921	CR12-00113	7-Feb-12	AY-102. ENRAF REPAIR, VERIFY ENG. CONTROLS N/S	7	RM8395	DOES NOT CONTAIN C(	BASIC
167966956	WRPS-1200674	22-Feb-12	CONTROL DECISION MEETING MINUTES FOR THE AY-102 IN-TANK YPGRADES PROJECT PDSA	20	(null)	DOES NOT CONTAIN C(	BASIC
167733221	TF-12-0304	9-Mar-12	RPP-CALC-51958, DECREASED TIME TO LFL IN TANK AY-102 DUE TO TEMPERATURE LIMIT EXCEEDED, REV. 0 AND RPP-CALC-52027, DECREASED TIME TO LFL IN TANK AN-106 DUE TO TEMPERATURE LIMIT EXCEEDED, REV. 0	(null)	(null)	(null)	BASIC
167733223	TF-12-0304	9-Mar-12	RPP-CALC-51958, DECREASED TIME TO LFL IN TANK AY-102 DUE TO TEMPERATURE LIMIT EXCEEDED, REV. 0 AND RPP-CALC-52027, DECREASED TIME TO LFL IN TANK AN-106 DUE TO TEMPERATURE LIMIT EXCEEDED, REV. 0	(null)	(null)	(null)	BASIC
167941782	WRPS-1201053	15-Mar-12	DELIVERABLE FOR WRPS-PER-2011-1931.10 - EVALUATION OF AY-102 PUMP INSTALLATION FOR POTENTIAL INTERFERENCE AND FIT-UP ISSUES THAT NEED TO BE ADDRESSED IN THE ONGOING DESIGN	2	(null)	(null)	BASIC
173069331	241-AY-102 FY12 Q2	20-Mar-12	241-AY-102 FY12 Q2	80	RM8419	DOES NOT CONTAIN C(	BASIC
171936852	AW-2009	21-Mar-12	PERFORM PRIMARY VIDEO OF AY-102, AND OTHER TASKS AS DESCRIBED IN THE WORK DOCUMENTS.	7	RM8384	DOES NOT CONTAIN C(	BASIC
168384847	TF-12-0561	19-Apr-12	TFC-WO-12-2235, AY-102 REPAIR ANNULUS ENRAF	(null)	(null)	(null)	BASIC
168384754	TF-12-0561	19-Apr-12	TFC-WO-12-2235, AY-102 REPAIR ANNULUS ENRAF	(null)	(null)	(null)	BASIC
168581906	TF-12-0647	30-Apr-12	WORK ORDER-TFC-WO-11-5837, PRIMARY IN-TANK VIDEO OF 241-AY-102	(null)	(null)	(null)	BASIC
168582474	TF-12-0647	30-Apr-12	WORK ORDER-TFC-WO-11-5837, PRIMARY IN-TANK VIDEO OF 241-AY-102	(null)	(null)	(null)	BASIC
168582475	TF-12-0642	30-Apr-12	TFC-WO-11-5838, 241-AY-102 ANNULUS VIDEO INSPECTION	(null)	(null)	(null)	BASIC
168582555	TF-12-0642	30-Apr-12	TFC-WO-11-5838, 241-AY-102 ANNULUS VIDEO INSPECTION	(null)	(null)	(null)	BASIC
168848589	WRPS-1201900	8-May-12	CRITICALITY SAFETY DETERMINATION FOR THE WASTE FEED DELIVERY IN-TANK UPGRADES PROJECT FOR AY-102	10	(null)	DOES NOT CONTAIN C(	BASIC

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169461706	TF-12-QSR-057	22-May-12	Training of Personnel Performing Criticality Safety Evaluation Reports	(null)	(null)	(null)	BASIC
169397511	TF-12-0561	31-May-12	TFC-WO-12-2235, AY-102 REPAIR ANNULUS ENRAF INCLUDING WCN-001	(null)	(null)	(null)	BASIC
169397208	TF-12-0561	31-May-12	TFC-WO-12-2235, AY-102 REPAIR ANNULUS ENRAF INCLUDING WCN-001	(null)	(null)	(null)	BASIC
170623083	TF-12-0561	29-Jun-12	TFC-WO-12-2235, AY-102 REPAIR ANNULUS ENRAF INCLUDING WCN-001, WCN-002	(null)	(null)	(null)	BASIC
170621476	TF-12-0561	29-Jun-12	TFC-WO-12-2235, AY-102 REPAIR ANNULUS ENRAF INCLUDING WCN-001, WCN-002	(null)	(null)	(null)	BASIC
170799385	TF-12-1151	9-Jul-12	TFC-WO-12-2235, AY-102 REPAIR ANNULUS ENRAF, WCN-003	(null)	(null)	(null)	BASIC
170797948	TF-12-1151	9-Jul-12	TFC-WO-12-2235, AY-102 REPAIR ANNULUS ENRAF, WCN-003	(null)	(null)	(null)	BASIC
170905999	TF-12-0647	13-Jul-12	WORK ORDER-TFC-WO-11-5837, PRIMARY IN-TANK VIDEO OF 241-AY-102 INCLUDING WCN-001	(null)	(null)	(null)	BASIC
170902373	TF-12-0647	13-Jul-12	WORK ORDER-TFC-WO-11-5837, PRIMARY IN-TANK VIDEO OF 241-AY-102 INCLUDING WCN-001	(null)	(null)	(null)	BASIC
172942180	CR12-01057	23-Jul-12	241 AY-102, ANNULUS REPAIR, VERIFY ENG. CONTROLS AIR SAMPLE	(null)	(null)	(null)	BASIC
171517445	TF-12-1251	24-Jul-12	TFC-WO-11-5837, PRIMARY IN-TANK VIDEO OF 241-AY-102 INCLUDING WCN-001, P&I 001		5	RM8392	DOES NOT CONTAIN C(BASIC
171519804	TF-12-1251	24-Jul-12	TFC-WO-11-5837, PRIMARY IN-TANK VIDEO OF 241-AY-102 INCLUDING WCN-001, P&I 001	(null)	(null)	(null)	BASIC
171648653	TF-12-1316	31-Jul-12	TFC-WO-11-5838, 241-AY-102 ANNULUS VIDEO INSPECTION, WCN-001	(null)	(null)	(null)	BASIC
171647897	TF-12-1316	31-Jul-12	TFC-WO-11-5838, 241-AY-102 ANNULUS VIDEO INSPECTION, WCN-001	(null)	(null)	(null)	BASIC
174927882	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR	(null)	(null)	(null)	BASIC
174928301	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		10	RM8444	DOES NOT CONTAIN C(BASIC
174928306	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		9	RM8444	DOES NOT CONTAIN C(BASIC
174924778	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		2	RM8444	DOES NOT CONTAIN C(BASIC
174924779	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		14	RM8444	DOES NOT CONTAIN C(BASIC
174927883	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		1	RM8444	DOES NOT CONTAIN C(BASIC
174927885	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		1	RM8444	DOES NOT CONTAIN C(BASIC
174928859	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		2	RM8444	DOES NOT CONTAIN C(BASIC
174927759	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		4	RM8444	DOES NOT CONTAIN C(BASIC
174928305	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		1	RM8444	DOES NOT CONTAIN C(BASIC
174928858	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		1	RM8444	DOES NOT CONTAIN C(BASIC
174928861	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		1	RM8444	DOES NOT CONTAIN C(BASIC
174924777	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		2	RM8444	DOES NOT CONTAIN C(BASIC
174927760	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		3	RM8444	DOES NOT CONTAIN C(BASIC
174927881	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		2	RM8444	DOES NOT CONTAIN C(BASIC
174928304	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		4	RM8444	DOES NOT CONTAIN C(BASIC
174924776	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		4	RM8444	DOES NOT CONTAIN C(BASIC
174927757	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		4	RM8444	DOES NOT CONTAIN C(BASIC
174927758	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		5	RM8444	DOES NOT CONTAIN C(BASIC
174927761	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		1	RM8444	DOES NOT CONTAIN C(BASIC
174927884	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		4	RM8444	DOES NOT CONTAIN C(BASIC
174928302	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		2	RM8444	DOES NOT CONTAIN C(BASIC
174928303	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		4	RM8444	DOES NOT CONTAIN C(BASIC
174928857	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		2	RM8444	DOES NOT CONTAIN C(BASIC
174928860	EM-RP--WRPS-TANKFARM-201	20-Aug-12	VIDEO INSPECTION OF TANK 241-AY-102 IDENTIFIES DRY MATERIAL ON ANNULUS FLOOR		9	RM8444	DOES NOT CONTAIN C(BASIC
					6	RM8444	DOES NOT CONTAIN C(BASIC
172009694	WRPS-PER-2012-1220	24-Aug-12	10-RE_ ECN_s_ Need Update - WRPS-PER-2012-1220 - RES_ AY-102 Feed Delivery System ECNs Do Not Have the Engineering Checker Checklist With Name_s_ Printed and Signed.msg	(null)	(null)	(null)	BASIC
172009696	WRPS-PER-2012-1220	24-Aug-12	9-ESTARS Task Inquiry - WRPS-PER-2012-1220 - RES_ AY-102 Feed Delivery System ECNs Do Not Have the Engineering Checker Checklist With Name_s_ Printed and Signed.msg	(null)	(null)	(null)	BASIC
172071102	WRPS-1203560	28-Aug-12	WRPS REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	(null)	BASIC

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172071333	WRPS-1203560	28-Aug-12	WRPS REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
172070991	WRPS-1203560	28-Aug-12	WRPS REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
172071331	WRPS-1203560	28-Aug-12	WRPS REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
172070993	WRPS-1203560	28-Aug-12	WRPS REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
172070995	WRPS-1203560	28-Aug-12	WRPS REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
172071335	WRPS-1203560	28-Aug-12	WRPS REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
172071213	WRPS-1203560	28-Aug-12	WRPS REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
172071215	WRPS-1203560	28-Aug-12	WRPS REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
172071217	WRPS-1203560	28-Aug-12	WRPS REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
172071325	WRPS-1203560	28-Aug-12	WRPS REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
172090132	WRPS-PER-2012-1379	29-Aug-12	8-WTO-0396 Install-remove video camera in AY-102 Annulus.pdf	(null)	(null)	(null)	BASIC
172090334	WRPS-PER-2012-1379	29-Aug-12	7-WTO-0395 AY-102 Annulus Video Inspection.pdf	(null)	(null)	(null)	BASIC
172098611	WRPS-1203643	30-Aug-12	WRPS PRELIMINARY NOTIFICATION OF CHANGE AND ACTIONS REGARDING THE INTEGRITY OF DOUBLE SHELL TANK AY-102	(null)	(null)	LIMITED	BASIC
172098613	WRPS-1203643	30-Aug-12	WRPS PRELIMINARY NOTIFICATION OF CHANGE AND ACTIONS REGARDING THE INTEGRITY OF DOUBLE SHELL TANK AY-102	(null)	(null)	LIMITED	BASIC
172099148	TF-12-1546	30-Aug-12	WORK ORDER TFC-WO-12-4894, 241-AY-102 LEAK DETECTOR PIT GRAB SAMPLE	(null)	(null)	(null)	BASIC
172095907	WRPS-1203643	30-Aug-12	WRPS PRELIMINARY NOTIFICATION OF CHANGE AND ACTIONS REGARDING THE INTEGRITY OF DOUBLE SHELL TANK AY-102	(null)	(null)	LIMITED	BASIC
172095918	WRPS-1203643	30-Aug-12	WRPS PRELIMINARY NOTIFICATION OF CHANGE AND ACTIONS REGARDING THE INTEGRITY OF DOUBLE SHELL TANK AY-102	(null)	(null)	LIMITED	BASIC
172098625	WRPS-1203643	30-Aug-12	WRPS PRELIMINARY NOTIFICATION OF CHANGE AND ACTIONS REGARDING THE INTEGRITY OF DOUBLE SHELL TANK AY-102 [DOCUMENT IS OUO AND LOCATED IN IDMS SENSITIVE FOLDER]	1	(null)	DOES NOT CONTAIN C(	BASIC
172095897	WRPS-1203643	30-Aug-12	WRPS PRELIMINARY NOTIFICATION OF CHANGE AND ACTIONS REGARDING THE INTEGRITY OF DOUBLE SHELL TANK AY-102	(null)	(null)	LIMITED	BASIC
172095909	WRPS-1203643	30-Aug-12	WRPS PRELIMINARY NOTIFICATION OF CHANGE AND ACTIONS REGARDING THE INTEGRITY OF DOUBLE SHELL TANK AY-102	(null)	(null)	LIMITED	BASIC
172095914	WRPS-1203643	30-Aug-12	WRPS PRELIMINARY NOTIFICATION OF CHANGE AND ACTIONS REGARDING THE INTEGRITY OF DOUBLE SHELL TANK AY-102	(null)	(null)	LIMITED	BASIC
172099241	TF-12-1546	30-Aug-12	WORK ORDER TFC-WO-12-4894, 241-AY-102 LEAK DETECTOR PIT GRAB SAMPLE	(null)	(null)	(null)	BASIC
172100145	WRPS-1203643	30-Aug-12	WRPS PRELIMINARY NOTIFICATION OF CHANGE AND ACTIONS REGARDING THE INTEGRITY OF DOUBLE SHELL TANK AY-102	(null)	(null)	(null)	BASIC
173774431	WTP-0184	30-Aug-12	Perform grab sampling in AY-102 Leak Detection Pit (LDP), and other tasks as described in the work documents. (RA/HRA/CA/HCA/ARA)	1	RM8408	DOES NOT CONTAIN C(	BASIC
172095911	WRPS-1203643	30-Aug-12	WRPS PRELIMINARY NOTIFICATION OF CHANGE AND ACTIONS REGARDING THE INTEGRITY OF DOUBLE SHELL TANK AY-102	(null)	(null)	LIMITED	BASIC

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172095916	WRPS-1203643	30-Aug-12	WRPS PRELIMINARY NOTIFICATION OF CHANGE AND ACTIONS REGARDING THE INTEGRITY OF DOUBLE SHELL TANK AY-102	(null)	(null)	LIMITED	BASIC
172098609	WRPS-1203643	30-Aug-12	WRPS PRELIMINARY NOTIFICATION OF CHANGE AND ACTIONS REGARDING THE INTEGRITY OF DOUBLE SHELL TANK AY-102	(null)	(null)	LIMITED	BASIC
172277072	WRPS-1200674.1	30-Aug-12	CONTROL DECISION MEETING MINUTES FOR THE AY-102 IN-TANK UPGRADES PROJECT PDSA (SECOND MEETING)		7 (null)	DOES NOT CONTAIN C(	BASIC
173173082	CR12-01383	4-Sep-12	AY-102 REMOVE COVER BLOCKS LEAK DETECTOR WORK FOR GRAB SAMPLING. DURING JOB SAMPLE		6 RM8392	DOES NOT CONTAIN C(	BASIC
173173370	CR12-01382	4-Sep-12	AY-102 REMOVE COVER BLOCKS LEAK DETECTOR WOR K FOR GRAB SAMPLING. AKI DOWN POST AIR SAMPLE		4 RM8392	DOES NOT CONTAIN C(	BASIC
173167069	CR12-01384	4-Sep-12	AY-102 REMOVE COVER BLOCKS LEAK DETECTOR WOR K FOR GRAB SAMPLING. 2 LAPEL SAMPLES		5 RM8392	DOES NOT CONTAIN C(	BASIC
173826755	CR12-01211	5-Sep-12	241 AY-102, 241 AP 101, 105 ANNULUS CAM SAMPLE, E146, S879685; E021, S900037; E01 7, S900036		7 RM8449	DOES NOT CONTAIN C(	BASIC
173173295	CR12-01415	6-Sep-12	241 -AY-102 RISER 91 ANNULUS REMOVE ENRAF AND VIDEO VERIFY ENG. CONTROLS GRAB AIR SAMPLE		5 RM8392	DOES NOT CONTAIN C(	BASIC
173207318	TF-12-QSR-111	6-Sep-12	Vendor Overview of ARES One System	(null)	(null)	(null)	BASIC
173996397	CR12-01574	7-Sep-12	E146 241-AY-102 ANNULUS BETA CAM AIR FILTER.		2 RM8469	DOES NOT CONTAIN C(	BASIC
172508382	WRPS-1203826	13-Sep-12	LIMIT STATE DETERMINATION MEETING MINUTES IN SUPPORT OF AY-102 IN-TANK UPGRADES PROJECT SAFETY-SIGNIFICANT QUALIFICATION		10 (null)	(null)	BASIC
176088975	WTO-0402	13-Sep-12	Pumping AY-102A Leak Detection Pit and associated work activities. (RBA, RA, CA)		1 RM8574	DOES NOT CONTAIN C(	BASIC
173312759	WRPS-1203899	15-Sep-12	CRITICALITY SAFETY DETERMINATION REGARDING TRANSFER OF 241-AY-101A AND 241-AY-102A LEAK DETECTION PIT LIQUID TO 241-AY-101		2 (null)	DOES NOT CONTAIN C(	BASIC
173998393	CR12-01575	16-Sep-12	E146 241-AY-102 ANNULUS BETA CAM AIR FILTER.		2 RM8469	DOES NOT CONTAIN C(	BASIC
172549781	TF-12-1647	17-Sep-12	WORK ORDER TFC-WO-12-4890, PUMP AY-102A PUMP LEAK DETECTION PIT TO AY-01A PUMP PIT	(null)	(null)	(null)	BASIC
172551850	TF-12-1647	17-Sep-12	WORK ORDER TFC-WO-12-4890, PUMP AY-102A PUMP LEAK DETECTION PIT TO AY-01A PUMP PIT	(null)	(null)	(null)	BASIC
172545603	WRPS-PER-2012-1363	17-Sep-12	10-H-14-010506 Sh 4 Rev 2 AY-102 Dome Penetration Schedule [1003171117].pdf	(null)	(null)	(null)	BASIC
172559903	TF-12-1651	18-Sep-12	WORK ORDER TFC-W0-12-4890, AY-102 PUMP LEAK DETECTION PIT, P&I DATED 9-18-12	(null)	(null)	(null)	BASIC
172559998	TF-12-1651	18-Sep-12	WORK ORDER TFC-W0-12-4890, AY-102 PUMP LEAK DETECTION PIT, P&I DATED 9-18-12	(null)	(null)	(null)	BASIC
173774130	WTP-0188	20-Sep-12	Perform sampling through riser 91 of material in the AY-102 annulus near riser 83, camera instal lation/rem oval, and tasks as described in the work documents. (RA/HRA/CA/HCA/ARA)		1 RM8408	DOES NOT CONTAIN C(	BASIC
173936714	CR12-01537	20-Sep-12	AY-102 VENT BLDG. VENT PORT INSTALL. GENERAL AREA JOB SPECIFIC GRAB AIR SAMPLE		1 RM8469	DOES NOT CONTAIN C(	BASIC
172613982	TF-12-1681	21-Sep-12	WORK ORDER TFC-WO-12-5318, 241-AY-102 OFF RISER SAMPLING SYSTEM (ORSS)	(null)	(null)	(null)	BASIC
172616770	WRPS-1203560.1	21-Sep-12	WRPS CANCELLATION OF REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
172616786	WRPS-1203560.1	21-Sep-12	WRPS CANCELLATION OF REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
173999693	CR12-01572	21-Sep-12	E061 241-AY-102 ANN RECORD AIR SAMPLE		5 RM8469	DOES NOT CONTAIN C(	BASIC
173999779	CR12-01573	21-Sep-12	E146 241-AY-102 ANNULUS BETA CAM AIR FILTER.		6 RM8469	DOES NOT CONTAIN C(	BASIC
172616772	WRPS-1203560.1	21-Sep-12	WRPS CANCELLATION OF REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
172616793	WRPS-1203560.1	21-Sep-12	WRPS CANCELLATION OF REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
172616163	WRPS-1203560.1	21-Sep-12	WRPS CANCELLATION OF REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	(null)	BASIC
172616784	WRPS-1203560.1	21-Sep-12	WRPS CANCELLATION OF REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
172616788	WRPS-1203560.1	21-Sep-12	WRPS CANCELLATION OF REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC

IDMS SQL
AY-102 (Title/Desc/Keyword)

172616791	WRPS-1203560.1		21-Sep-12	WRPS CANCELLATION OF REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
172616795	WRPS-1203560.1		21-Sep-12	WRPS CANCELLATION OF REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
172618345	TF-12-1687		21-Sep-12	WORK ORDER TFC-WO-12-5328, 241-AY-102 OFF RISER SAMPLING SYSTEM (ORSS)	(null)	(null)	(null)	BASIC
172616774	WRPS-1203560.1		21-Sep-12	WRPS CANCELLATION OF REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
172618547	TF-12-1687		21-Sep-12	WORK ORDER TFC-WO-12-5328, 241-AY-102 OFF RISER SAMPLING SYSTEM (ORSS)	(null)	(null)	(null)	BASIC
172613888	TF-12-1681		21-Sep-12	WORK ORDER TFC-WO-12-5318, 241-AY-102 OFF RISER SAMPLING SYSTEM (ORSS)	(null)	(null)	(null)	BASIC
172616780	WRPS-1203560.1		21-Sep-12	WRPS CANCELLATION OF REQUEST FOR APPROVAL TO TRANSFER TANK 241-AY-102 LEAK DETECTION PIT WATER TO TANK 241-AY-102	(null)	(null)	DOES NOT CONTAIN C(	BASIC
173775996	241-AY-102 FY12 Q4		24-Sep-12	241-AY-102 FY12 Q4		82 RM8463	DOES NOT CONTAIN C(	BASIC
173774238	WTP-0188 R1		25-Sep-12	Perform sampling through riser 91 of material in the AY-102 annulus near riser 83, camera installation/removal, and tasks as described in the work documents. (RA/HRA/CA/HCA/ARA)		1 RM8408	DOES NOT CONTAIN C(	BASIC
172699947	WRPS-PER-1438		26-Sep-12	PROBLEM EVALUATION REQUEST	(null)	(null)	(null)	BASIC
173775660	WTP-0188 R2		26-Sep-12	Perform sampling through riser 91 of material in the AY-102 annulus near riser 83, camera installation/rem oval, and other tasks as described in the work documents. (RA/HRA/CA/HCA/ARA)		1 RM8408	DOES NOT CONTAIN C(	BASIC
172818837	WRPS-1204222		1-Oct-12	Test Plan And Procedure For Solid Phase Characterization Of Annulus Samples From Tank 241-AY-102	(null)	(null)	(null)	BASIC
172842744	TF-12-1753		2-Oct-12	ECN-12-001023, UPDATE RISER ELEVATIONS FOR 241-AY-101 AND 241-AY-102	(null)	(null)	(null)	BASIC
172842852	TF-12-1753		2-Oct-12	ECN-12-001023, UPDATE RISER ELEVATIONS FOR 241-AY-101 AND 241-AY-102	(null)	(null)	(null)	BASIC
172842338	2S-12-1735		2-Oct-12	222-S LABORATORY TEST PLAN AND PROCEDURE FOR SOLID PHASE CHARACTERIZATION OF ANNULUS SAMPLES FROM TANK 241-AY-102, WRPS-120422	(null)	(null)	(null)	BASIC
172950780		20121249	3-Oct-12	20121249 Rev. 0 AY102 Residual Samples (RPP-RPT-53511) Final Report - 10/03/12	(null)	(null)	(null)	BASIC
173774131	WTP-0185		3-Oct-12	Perform sampling of material in the AY-102 annulus located near Riser 90, camera installation/rem oval, and other tasks as described in the work documents. (RA/HRA/CA/HCA/ARA)		1 RM8408	DOES NOT CONTAIN C(	BASIC
172900518	2S-12-1735		4-Oct-12	222-S LABORATORY TEST PLAN AND PROCEDURE FOR SOLID PHASE CHARACTERIZATION OF ANNULUS SAMPLES FROM TANK 241-AY-102, WRPS-120422	(null)	(null)	(null)	BASIC
172919960	TF-12-1780		5-Oct-12	WORK ORDER TFC-WO-12-4892, AY-102 SAMPLE MATERIAL IN ANNULUS USING AREVA DRILL SAMPLING CRAWLER	(null)	(null)	(null)	BASIC
172919863	TF-12-1780		5-Oct-12	WORK ORDER TFC-WO-12-4892, AY-102 SAMPLE MATERIAL IN ANNULUS USING AREVA DRILL SAMPLING CRAWLER	(null)	(null)	(null)	BASIC
174357557	CR12-01717		5-Oct-12	E146 S905890 241 -AY-102 ANNULUS BETA CAM AIR FILTER.		3 RM8485	DOES NOT CONTAIN C(	BASIC
172945662	TF-12-1797		8-Oct-12	WORK ORDER TFC-WO-12-4892, (ADDITIONAL CHANGE 10/8/12), AY-102 SAMPLE MATERIAL IN ANNULUS USING AREVA DRILL SAMPLING CRAWLER	(null)	(null)	(null)	BASIC

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172946254	TF-12-1797		8-Oct-12	WORK ORDER TFC-WO-12-4892, (ADDITIONAL CHANGE 10/8/12), AY-102 SAMPLE MATERIAL IN ANNULUS USING AREVA DRILL SAMPLING CRAWLER	(null)	(null)	(null)		BASIC
174357405	CR12-01628		10-Oct-12	TANK 102 @ RISER 077, IN SUPPORT OF AY-102 SAMPLING. GENERAL AREA, VERIFY ENG. CONTROLS AIR SAMPLE		2	RM8485	DOES NOT CONTAIN C(	BASIC
174360148	CR12-01629		10-Oct-12	AY-102 SAMPLE PLATFORM. TANK 102 SAMPLE. GENERAL AREA, VERIFY ENG. CONTROLS AKI AIR SAMPLE		3	RM8485	DOES NOT CONTAIN C(	BASIC
174025874	CR12-01637		11-Oct-12	241-AY-102, RISER 90. SAMPING ANNULUS. GENERAL AREA VERIFY ENG. CONTROLS.		6	RM8469	DOES NOT CONTAIN C(	BASIC
174025072	CR12-01638		11-Oct-12	241-AY-102, RISER 87. CAMERA IN ANNULUS. GENERAL AREA VERIFY ENG. CONTROLS.		3	RM8469	DOES NOT CONTAIN C(	BASIC
174025972	CR12-01639		11-Oct-12	241-AY-102, RISER 77. GENERAL AREA VERIFY ENG. CONTROLS.		3	RM8469	DOES NOT CONTAIN C(	BASIC
173142624		10/14/2012	14-Oct-12	Operate TK-241-AY-102 Annulus Ventilation System		2	RM8347	DOES NOT CONTAIN C(	BASIC
174357099	CR12-01710		15-Oct-12	AY-102 RISER 90, SAMPLE ANNULUS GLOVEBAG. GENERAL AREA VERIFY ENG. CONTROLS POST JOB AKI		2	RM8485	DOES NOT CONTAIN C(	BASIC
174357434	CR12-01707		15-Oct-12	AY-102 RISER 78, MANIPULATE CAMERA. GENERAL AREA VERIFY ENG. CONTROLS		4	RM8485	DOES NOT CONTAIN C(	BASIC
174360183	CR12-01708		15-Oct-12	AY-102 RISER 87, MANIPULATE CAMERA. GENERAL AREA VERIFY ENG. CONTROLS		3	RM8485	DOES NOT CONTAIN C(	BASIC
174360184	CR12-01709		15-Oct-12	AY-102 RISER 90, SAMPLE ANNULUS GLOVEBAG. GENERAL AREA VERIFY ENG. CONTROLS		3	RM8485	DOES NOT CONTAIN C(	BASIC
173091168	TF-12-1844		17-Oct-12	TFC-MD-089, 241-AY-102 ANNULUS SAMPLING ALARACT, REV. A	(null)	(null)	(null)		BASIC
174357438	CR12-01726		17-Oct-12	AY-102 R-87 ANNULUS, MANIPULATE CAMERA VER ENG. CNTRLS A/S		7	RM8485	DOES NOT CONTAIN C(	BASIC
174364954	CR12-01728		17-Oct-12	AY-102 R-87 ANNULUS, MANIPULATE CAMERA VER ENG. CNTRLS AKI A/S		3	RM8485	DOES NOT CONTAIN C(	BASIC
174365263	CR12-01725		17-Oct-12	AY-102 R-87 ANNULUS, MANIPULATE CAMERA VER ENG. CNTRLS A/S		4	RM8485	DOES NOT CONTAIN C(	BASIC
173091433	TF-12-1844		17-Oct-12	TFC-MD-089, 241-AY-102 ANNULUS SAMPLING ALARACT, REV. A	(null)	(null)	(null)		BASIC
174357102	CR12-01727		17-Oct-12	AY-102 R-87 ANNULUS, MANIPULATE CAMERA VER ENG. CNTRLS A/S		4	RM8485	DOES NOT CONTAIN C(	BASIC
173115939	12-CPM-0139		18-Oct-12	WAIVER OF AUDIT REGARDING CONTRACT NO. DE-AC27-08RV14800, PROPOSAL FOR 241-AY-102 SAFETY SIGNIFICANT (SS) UPGRADES		8	12-Oct	DOES NOT CONTAIN C(	BASIC
173115603	12-CPM-0139		18-Oct-12	WAIVER OF AUDIT REGARDING CONTRACT NO. DE-AC27-08RV14800, PROPOSAL FOR 241-AY-102 SAFETY SIGNIFICANT (SS) UPGRADES		4	12-Oct	DOES NOT CONTAIN C(	BASIC
174364960	CR12-01747		18-Oct-12	E146 S908928 241-AY-102 ANNULUS BETA CAM AIR FILTER.		3	RM8485	DOES NOT CONTAIN C(	BASIC
174357443	CR12-01749		21-Oct-12	241-AY-102 ANNULUS, MANIPULATE CAMERA AND VIDEO INSPECTION VERIFY ENGINEERING CONTROLS AIR SAMPLE		6	RM8485	DOES NOT CONTAIN C(	BASIC
173188388	AIR-12-1006		23-Oct-12	CHANGE IN SAMPLE STATUS FOR 241-AY-102 (EU 218)		2	(null)	DOES NOT CONTAIN C(	BASIC
173247486	AIR 12-1006		23-Oct-12	CHANGE IN SAMPLE STATUS FOR 241-AY-102 (EU 218)		3	12-Oct	DOES NOT CONTAIN C(	BASIC
174850122	WTP-0185 R1		24-Oct-12	Perform sampling of material in the AY-102 annulus located near Riser 90, camera installation/removal, and other tasks as described in the work documents. (RA/HRA/CA/HCA/ARA)		1	RM8511	DOES NOT CONTAIN C(	BASIC
173189711	WRPS-53899		24-Oct-12	REQUEST FROM WDOH FROM RTAM MEETING 09/25/2012	(null)	(null)	(null)		BASIC
173197093	TFC-MD-089		25-Oct-12	241-AY-102 Annulus Sampling ALARACT	(null)	(null)	(null)		BASIC
173197092	TFC-MD-089		25-Oct-12	241-AY-102 Annulus Sampling ALARACT	(null)	(null)	(null)		BASIC
173203380	TFC-MD-089		25-Oct-12	241-AY-102 Annulus Sampling ALARACT	(null)	(null)	(null)		BASIC
176838213	CR12-01786		25-Oct-12	AY-102 VIDEO RISER 83 VERIFY ENG. CONTROLS AIR SMAPLE		6	RM8603	DOES NOT CONTAIN C(	BASIC
173292288	12-CPM-0139 SIGNED		26-Oct-12	(SIGNED) WAIVER OF AUDIT REGARDING CONTRACT NO. DE-AC27-08RV14800, PROPOSAL FOR 241-AY-102 SAFETY SIGNIFICANT (SS) UPGRADES		8	12-Oct	DOES NOT CONTAIN C(	BASIC
176838405	CR12-01807		30-Oct-12	AY-102 VIDEO RISER 83 VIDEO. VERIFY ENG. CONTROLS AIR SAMPLE		7	RM8603	DOES NOT CONTAIN C(	BASIC

IDMS SQL
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173329152		20121430	31-Oct-12	20121430 Rev.0 AY102A-LDP (RPP-RPT-53805) Final Report - 10/31/12	(null)	(null)	(null)		BASIC
173922896	WTP-0199		12-Nov-12	Remove/reinstall cover blocks for hydrostatic test of PW-4532 at AY-102 A, F pits.	(null)	(null)	(null)		BASIC
173715894	WRPS-1204634		13-Nov-12	WRPS TANK 241-AY-102 PRIMARY TANK LEAK INTEGRITY CHANGE FROM SOUND TO ASSUMED LEAKER AND DOUBLE-SHELL WASTE TANK LEAK INTEGRITY DEFINITIONS	(null)	(null)	DOES NOT CONTAIN C(		BASIC
173715896	WRPS-1204634		13-Nov-12	WRPS TANK 241-AY-102 PRIMARY TANK LEAK INTEGRITY CHANGE FROM SOUND TO ASSUMED LEAKER AND DOUBLE-SHELL WASTE TANK LEAK INTEGRITY DEFINITIONS	(null)	(null)	DOES NOT CONTAIN C(		BASIC
173716928	WRPS-1204634		13-Nov-12	WRPS TANK 241-AY-102 PRIMARY TANK LEAK INTEGRITY CHANGE FROM SOUND TO ASSUMED LEAKER AND DOUBLE-SHELL WASTE TANK LEAK INTEGRITY DEFINITIONS	(null)	(null)	DOES NOT CONTAIN C(		BASIC
173716935	WRPS-1204634		13-Nov-12	Washington River Protection Solutions LLC Tank 241-AY-102 Primary Tank Leak Integrity Change From Sound to Assumed Leaker, and Double-Shell Waste Tank Leak Integrity Definitions	(null)	(null)	(null)		BASIC
173716939	WRPS-1204634		13-Nov-12	Washington River Protection Solutions LLC Tank 241-AY-102 Primary Tank Leak Integrity Change From Sound to Assumed Leaker, and Double-Shell Waste Tank Leak Integrity Definitions	(null)	(null)	(null)		BASIC
173713091	WRPS-1204634		13-Nov-12	Washington River Protection Solutions LLC Tank 241-AY-102 Primary Tank Leak Integrity Change From Sound to Assumed Leaker, and Double-Shell Waste Tank Leak Integrity Definitions	(null)	(null)	(null)		BASIC
173715892	WRPS-1204634		13-Nov-12	WRPS TANK 241-AY-102 PRIMARY TANK LEAK INTEGRITY CHANGE FROM SOUND TO ASSUMED LEAKER AND DOUBLE-SHELL WASTE TANK LEAK INTEGRITY DEFINITIONS	(null)	(null)	DOES NOT CONTAIN C(		BASIC
173715898	WRPS-1204634		13-Nov-12	WRPS TANK 241-AY-102 PRIMARY TANK LEAK INTEGRITY CHANGE FROM SOUND TO ASSUMED LEAKER AND DOUBLE-SHELL WASTE TANK LEAK INTEGRITY DEFINITIONS	(null)	(null)	DOES NOT CONTAIN C(		BASIC
173716926	WRPS-1204634		13-Nov-12	WRPS TANK 241-AY-102 PRIMARY TANK LEAK INTEGRITY CHANGE FROM SOUND TO ASSUMED LEAKER AND DOUBLE-SHELL WASTE TANK LEAK INTEGRITY DEFINITIONS	(null)	(null)	DOES NOT CONTAIN C(		BASIC
173716930	WRPS-1204634		13-Nov-12	WRPS TANK 241-AY-102 PRIMARY TANK LEAK INTEGRITY CHANGE FROM SOUND TO ASSUMED LEAKER AND DOUBLE-SHELL WASTE TANK LEAK INTEGRITY DEFINITIONS	(null)	(null)	DOES NOT CONTAIN C(		BASIC
173716932	WRPS-1204634		13-Nov-12	WRPS TANK 241-AY-102 PRIMARY TANK LEAK INTEGRITY CHANGE FROM SOUND TO ASSUMED LEAKER AND DOUBLE-SHELL WASTE TANK LEAK INTEGRITY DEFINITIONS	(null)	(null)	DOES NOT CONTAIN C(		BASIC
173716941	WRPS-1204634		13-Nov-12	Washington River Protection Solutions LLC Tank 241-AY-102 Primary Tank Leak Integrity Change From Sound to Assumed Leaker, and Double-Shell Waste Tank Leak Integrity Definitions	(null)	(null)	(null)		BASIC
173716920	WRPS-1204634		13-Nov-12	WRPS TANK 241-AY-102 PRIMARY TANK LEAK INTEGRITY CHANGE FROM SOUND TO ASSUMED LEAKER AND DOUBLE-SHELL WASTE TANK LEAK INTEGRITY DEFINITIONS	(null)	(null)	DOES NOT CONTAIN C(		BASIC
173716937	WRPS-1204634		13-Nov-12	Washington River Protection Solutions LLC Tank 241-AY-102 Primary Tank Leak Integrity Change From Sound to Assumed Leaker, and Double-Shell Waste Tank Leak Integrity Definitions	(null)	(null)	(null)		BASIC
173740221	12-CPM-0167		14-Nov-12	DIRECTION TO STOP SAFETY SIGNIFICANT (SS) DESIGN DEVELOPMENT ON TANK AY-102 IN TANK UPGRADES		7	12-Nov	DOES NOT CONTAIN C(	BASIC
173740832	1204045/12-CPM-0167/WRPS		14-Nov-12	DIRECTION TO STOP SAFETY SIGNIFICANT (SS) DESIGN DEVELOPMENT ON TANK AY-102 IN TANK UPGRADES		5	(null)	DOES NOT CONTAIN C(	BASIC

173740520	12-CPM-0167		14-Nov-12	DIRECTION TO STOP SAFETY SIGNIFICANT (SS) DESIGN DEVELOPMENT ON TANK AY-102 IN TANK UPGRADES		1	12-Nov	DOES NOT CONTAIN C(BASIC
173759826	TF-12-1681		15-Nov-12	WORK ORDER TFC-WO-12-5318, 241-AY-102 OFF RISER SAMPLING SYSTEM (ORSS); TFC-WO-12-5331, 241-AY-102 REMOVE ORSS EQUIPMENT & RE-INSTALL ENRAF	(null)	(null)	(null)	BASIC
173759825	TF-12-1681		15-Nov-12	WORK ORDER TFC-WO-12-5318, 241-AY-102 OFF RISER SAMPLING SYSTEM (ORSS); TFC-WO-12-5331, 241-AY-102 REMOVE ORSS EQUIPMENT & RE-INSTALL ENRAF	(null)	(null)	(null)	BASIC
173763326	WRPS-54068		15-Nov-12	UPDATE NEWSLETTER FOR NOVEMBER 2012	(null)	(null)	(null)	BASIC
173774397	ORP 12-120		16-Nov-12	ANNOUNCEMENT - LUNCH & LEARN - DOUBLE-SHELL TANK (DST) AY-102		1	12-Nov	DOES NOT CONTAIN C(BASIC
173802880	TF-12-2074		19-Nov-12	RPP-CALC-54015, AY-102 ANNULUS PUMP CENTER OF GRAVITY, REV. 0	(null)	(null)	(null)	BASIC
173802881	TF-12-2074		19-Nov-12	RPP-CALC-54015, AY-102 ANNULUS PUMP CENTER OF GRAVITY, REV. 0	(null)	(null)	(null)	BASIC
173978110	WRPS-1204931		26-Nov-12	DOUBLE-SHELL TANK 241-AY-102 PRIMARY TANK LEAK EXTENT OF OCNDITION EVALUATION AND RECOMMENDED ANNULUS VISUAL INSPECTION INTERVALS		22	(null)	DOES NOT CONTAIN C(BASIC
174850222	WTP-0184 R1		26-Nov-12	Perform grab sampling in AY-102 Leak Detection Pit (LDP), and other tasks as described in the work documents. (RA/HRA/CA/HCA/ARA)		1	RM8511	DOES NOT CONTAIN C(BASIC
173881093	TF-12-2098		27-Nov-12	WORK ORDER TFC-WO-12-4890, WCN-001, PUMP AY-102A PUMP LEAK DETECTION PIT TO AY-01A PUMP PIT	(null)	(null)	(null)	BASIC
173241920	WTP-0184		27-Nov-12	Perform Grab Sampling in AY-102 Leak Detection Pit (LDP) in 241-AY.	(null)	(null)	(null)	BASIC
173880981	TF-12-2098		27-Nov-12	WORK ORDER TFC-WO-12-4890, WCN-001, PUMP AY-102A PUMP LEAK DETECTION PIT TO AY-01A PUMP PIT	(null)	(null)	(null)	BASIC
173896399	TF-12-2105		28-Nov-12	WORK ORDER TFC-WO-12-5997, 241-AY-102 LEAK DETECTOR PIT GRAB SAMPLE	(null)	(null)	(null)	BASIC
173901567	TF-12-2105		28-Nov-12	WORK ORDER TFC-WO-12-5997, 241-AY-102 LEAK DETECTOR PIT GRAB SAMPLE	(null)	(null)	(null)	BASIC
173901578	TF-12-2115		28-Nov-12	FIRE PERMIT 2012-366, USE OF A PROPANE FUEL FIRED HEATER AT 241-AY-102	(null)	(null)	(null)	BASIC
173902230	TF-12-2115		28-Nov-12	FIRE PERMIT 2012-366, USE OF A PROPANE FUEL FIRED HEATER AT 241-AY-102	(null)	(null)	(null)	BASIC
173919500	12-TPD-0069		28-Nov-12	AY-102 INTEGRATED PROJECT TEAM PARTICIPATION		2	(null)	DOES NOT CONTAIN C(BASIC
173922257	12-TPD-0069		28-Nov-12	AY-102 INTEGRATED PROJECT TEAM PARTICIPATION		2	12-Nov	DOES NOT CONTAIN C(BASIC
173920836	12-TPD-0069/WRPS		28-Nov-12	AY-102 INTEGRATED PROJECT TEAM PARTICIPATION		3	(null)	DOES NOT CONTAIN C(BASIC
173922260	12-TPD-0069		28-Nov-12	AY-102 INTEGRATED PROJECT TEAM PARTICIPATION		4	12-Nov	DOES NOT CONTAIN C(BASIC
174036039		20121516	4-Dec-12	20121516 Rev. 0 AY102 Annulus (RPP-RPT-54071) Final Report - 12/04/12	(null)	(null)	(null)	BASIC
174077163	NA-NWP-186		5-Dec-12	Ecology Assessment Report for Field Monitoring Activities of the Waste Material Near Riser 83 of the 241-AY-102 Double Shell Tank (DST)		11	12-Dec	DOES NOT CONTAIN C(BASIC
174016334	TF-12-2174		5-Dec-12	RPP-CALC-54091, AY-102 ANNULUS PUMP HOISTING ANALYSIS - DOUBLE PUMP, REV. 0	(null)	(null)	(null)	BASIC
174081419	12-NWP-186		5-Dec-12	ECOLOGY ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITES OF THE WASTE MATERIAL NEAR RISER 83 OF THE 241-AY-102 DOUBLE SHELL TANK (DST)		10	(null)	DOES NOT CONTAIN C(BASIC
174015458	TF-12-2174		5-Dec-12	RPP-CALC-54091, AY-102 ANNULUS PUMP HOISTING ANALYSIS - DOUBLE PUMP, REV. 0	(null)	(null)	(null)	BASIC
174076678	12-NWP-186/WRPS		5-Dec-12	ECOLOGY ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITIES OF THE WASTE MATERIAL NEAR RISER 83 OF THE 241-AY-102 DST		10	(null)	DOES NOT CONTAIN C(BASIC
174357497	WRPS-1205367		10-Dec-12	TANK 241-AY-102 LEAK ASSESSMENT		2	(null)	DOES NOT CONTAIN C(BASIC

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174934852	WP-WRPSAY102002	10-Dec-12	ERDF WASTE PROFILE DATASHEET, 241-AY-102 EQUIPMENT AND DEBRIS	(null)		ET0245	(null)	BASIC
174090477	TF-12-1780	11-Dec-12	WORK ORDER TFC-WO-12-4892, AY-102 SAMPLE MATERIAL IN ANNULUS USING AREVA DRILL SAMPLING CRAWLER; WORK ORDER TFC-WO-12-5503, 2412-AY-102, REMOVE AREVA EQUIPMENT AND RESTORE	(null)		(null)	(null)	BASIC
174090372	TF-12-1780	11-Dec-12	WORK ORDER TFC-WO-12-4892, AY-102 SAMPLE MATERIAL IN ANNULUS USING AREVA DRILL SAMPLING CRAWLER; WORK ORDER TFC-WO-12-5503, 2412-AY-102, REMOVE AREVA EQUIPMENT AND RESTORE	(null)		(null)	(null)	BASIC
174168235	12-NWP-188	12-Dec-12	WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITIES CONDUCTED NOVEMBER 12, 2012 OF THE WASTE MATERIAL NEAR RISER 83 OF THE 241-AY-102 DOUBLE SHELL TANK (DST)		10	12-Dec	DOES NOT CONTAIN C(	BASIC
174168080	12-NWP-188/WRPS	12-Dec-12	DOEC ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITIES CONDUCTED NOVEMBER 12, 2012 OF THE WASTE MATERIAL NEAR RISER 83 OF THE 241-AY-102 DST		9	(null)	DOES NOT CONTAIN C(	BASIC
174202138	12-NWP-188	12-Dec-12	WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITIES CONDUCTED NOVEMBER 12, 2012 OF THE WASTE MATERIAL FOUND NEAR RISER 83 OF THE 241-AY-102 DOUBLE SHELL TANK (DST)		9	NA	DOES NOT CONTAIN C(	BASIC
174419082	WRPS-1205461	18-Dec-12	EVALUATION OF THE CONTINUED FUNCTIONALITY OF THE TANK 241-AY-102 LEAK DETECTION PIT SYSTEM		9	(null)	DOES NOT CONTAIN C(	BASIC
174199368	WRPS-54285-VA	19-Dec-12	DECISION CRITERIA FOR AY-102 PATH FORWARD DETERMINATION		16	(null)	(null)	BASIC
174203847	WRPS-54288-VA	19-Dec-12	AY-102 ANNULUS DQO AND SAP		18	(null)	(null)	BASIC
174287642	12-NWP-193	21-Dec-12	Re: RIVER PROTECTION PROJECT (RPP) AY-102 INTEGRATED PROJECT TEAM CHARTER		7	12-Dec	DOES NOT CONTAIN C(	BASIC
174297484	WRPS 2012-88	28-Dec-12	ABCASH RECORDS REQUEST, AY-102, WDOH RTAM REQUEST 12.19.12		6	(null)	PUBLIC	BASIC
174300087	WRPS-54304	28-Dec-12	RADWASTE SOLUTIONS ARTICLE FIRST DOUBLE-SHELL TANK LEAK DISCOVERED AT HANFORD		8	(null)	(null)	BASIC
174361651	TF-13-0005	2-Jan-13	TFC-WO-12-5503, 241-AY-102 REMOVE AREVA EQUIPMENT & RESTORE, CHANGES DATED 1-2-13	(null)		(null)	(null)	BASIC
174361650	TF-13-0005	2-Jan-13	TFC-WO-12-5503, 241-AY-102 REMOVE AREVA EQUIPMENT & RESTORE, CHANGES DATED 1-2-13	(null)		(null)	(null)	BASIC
176407289	CR13-00001	2-Jan-13	241-AY-102 RISER 83 ANNULUS VIDEO, VERIFICATION OF ENGINEERING CONTROLS AIR SAMPLE		7	RM8577	DOES NOT CONTAIN C(	BASIC
174376262	TF-13-0005	3-Jan-13	TFC-WO-12-5503, 241-AY-102 REMOVE AREVA EQUIPMENT & RESTORE, CHANGES DATED 1-2-13, P&I DATED 1-3-13	(null)		(null)	(null)	BASIC
174377365	TF-13-0005	3-Jan-13	TFC-WO-12-5503, 241-AY-102 REMOVE AREVA EQUIPMENT & RESTORE, CHANGES DATED 1-2-13, P&I DATED 1-3-13	(null)		(null)	(null)	BASIC
174853732	AR-13-03	7-Jan-13	Perform grab sampling at AY-102 Leak Detector Pit.		3	RM8511	DOES NOT CONTAIN C(	BASIC
174520153	WRPS 2012-90	14-Jan-13	WASHINGTON DEPARTMENT OF HEALTH DOCUMENT REQUEST AY-102 RAD SURVEY REPORT WT-023186 01.02.13	(null)		(null)	(null)	BASIC
174565816	241AY102-TPW-061	15-Jan-13	AY-102 Annulus Ventilation Upgrades Test Program Worksheet (TPW)		2	(null)	(null)	BASIC
174850227	WTP-0204	22-Jan-13	Modify pit configurations to pump the AY-102 annulus, and other tasks as described in the work documents. (RA/HRA/CA/HCA/ARA)		1	RM8511	DOES NOT CONTAIN C(	BASIC
174683443	LAB-RPT-12-00010	23-Jan-13	Solid Phase Characterization of Tank 241-AY-102 Annulus Space Particulate	(null)		(null)	(null)	BASIC
174799471	13-NWP-009	25-Jan-13	WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITIES CONDUCTED DECEMBER 27, 2012, OF THE WASTE MATERIAL NEAR RISER 83 OF THE 241-AY-102 DOUBLE SHELL TANK (DST)		8	(null)	DOES NOT CONTAIN C(	BASIC
174850326	WTP-0188 R3	25-Jan-13	Perform sampling through riser 91 of material in the AY-102 annulus near riser 83, camera installation/removal, and other tasks as described in the work documents. (RA/HRA/CA/HCA/ARA)		1	RM8511	DOES NOT CONTAIN C(	BASIC
174749718	13-NWP-009/WRPS	25-Jan-13	DOEC ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITIES CONDUCTED DECEMBER 27, 2012, OF THE WASTE MATERIAL NEAR RISER 83 OF THE 241-AY-102 DST		8	(null)	DOES NOT CONTAIN C(	BASIC
174761189	13-NWP-009	25-Jan-13	Washington State Department of Ecology (Ecology) Assessment Report for Field Monitoring Activities Conducted December 27, 2012, of the Waste Material Near Riser 82 of the 241-AY-102 Double Shell Tank (DST)		9	13-Jan	DOES NOT CONTAIN C(	BASIC
174850129	WTP-0185 R2	25-Jan-13	Perform sampling of material in the AY-102 annulus located near Riser 90, camera installation/removal, and other tasks as described in the work documents. (RA/HRA/CA/HCA/ARA)		1	RM8511	DOES NOT CONTAIN C(	BASIC

173241592	WTP-0188		28-Jan-13	Perform sampling through riser 91 of material in the AY-102 annulus near riser 83, camera installation/removal at 241-AY.	(null)	(null)	(null)	BASIC
175350092	AW-2124 R3		28-Jan-13	Perform sampling through riser 91 of material in the AY-102 annulus near riser 83, camera installation/removal, other tasks as described in the work documents.		10 RM8544	DOES NOT CONTAIN C(	BASIC
173877172	WTP-0190		28-Jan-13	Remove equipment from annulus, reinstall ENRAF, and other tasks associated with the work documents.	(null)	(null)	(null)	BASIC
173241586	WTP-0185		28-Jan-13	Perform sampling of material in the AY-102 annulus located near riser 90, camera installation/removal at 241-AY.	(null)	(null)	(null)	BASIC
173921834	WTP-0194		28-Jan-13	Remove AREVA cart and other equipment at AY-102 Annulus Riser 90.	(null)	(null)	(null)	BASIC
174795744	LAB-RPT-12-00010		30-Jan-13	SOLID PHASE CHARACTERIZATION OF TANK 241 AY-102 ANNULUS SPACE PARTICULATE	(null)	(null)	(null)	BASIC
174795807	LAB-RPT-12-00010		30-Jan-13	SOLID PHASE CHARACTERIZATION OF TANK 241 AY-102 ANNULUS SPACE PARTICULATE	(null)	(null)	(null)	BASIC
174795756	LAB-RPT-12-00010		30-Jan-13	SOLID PHASE CHARACTERIZATION OF TANK 241 AY-102 ANNULUS SPACE PARTICULATE	(null)	(null)	PUBLIC	BASIC
174795743	LAB-RPT-12-00010		30-Jan-13	SOLID PHASE CHARACTERIZATION OF TANK 241 AY-102 ANNULUS SPACE PARTICULATE	(null)	(null)	(null)	BASIC
174795753	LAB-RPT-12-00010		30-Jan-13	SOLID PHASE CHARACTERIZATION OF TANK 241 AY-102 ANNULUS SPACE PARTICULATE	(null)	(null)	(null)	BASIC
174795754	LAB-RPT-12-00010		30-Jan-13	SOLID PHASE CHARACTERIZATION OF TANK 241 AY-102 ANNULUS SPACE PARTICULATE	(null)	(null)	(null)	BASIC
174684000	WTP-0204		31-Jan-13	Modify pit configurations to pump the AY-102 annulus, and other tasks as described in the work documents.	(null)	(null)	(null)	BASIC
175466063	WTP-0204 R1		31-Jan-13	Modify pit configurations to pump the AY-102 annulus, and other tasks as described in the work documents. (RA/HRA/CA/HCA/ARA)		1 RM8544	DOES NOT CONTAIN C(	BASIC
174907907		20121727	6-Feb-13	20121727 Rev.0 AY102A-LDP2 (RPP-RPT-54251)Final Report - 02/06/13	(null)	(null)	(null)	BASIC
175011758	WRPS-1300331		13-Feb-13	WRPS SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	(null)	(null)	DOES NOT CONTAIN C(	BASIC
175011760	WRPS-1300331		13-Feb-13	WRPS SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	(null)	(null)	DOES NOT CONTAIN C(	BASIC
175011772	WRPS-1300331		13-Feb-13	WRPS SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	(null)	(null)	DOES NOT CONTAIN C(	BASIC
175011849	WRPS-1300331		13-Feb-13	Washington River Protection Solutions LLC Submittal of Off Permit Change Notification Request to Modify the License to Operate the Ventilation System in 241-AY/AZ Tank Farm to Include Operation of the AY-102 Tank Annulus Exhauster	(null)	(null)	(null)	BASIC

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175011853	WRPS-1300331		13-Feb-13	Washington River Protection Solutions LLC Submittal of Off Permit Change Notification Request to Modify the License to Operate the Ventilation System in 241-AY/AZ Tank Farm to Include Operation of the AY-102 Tank Annulus Exhauster	(null)	(null)	(null)	BASIC
175352720		2/13/2013	13-Feb-13	OPERATE TK-241-AY-102 ANNULUS VENTILATION SYSTEM		8 RM8545	DOES NOT CONTAIN C(	BASIC
175011762	WRPS-1300331		13-Feb-13	WRPS SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	(null)	(null)	DOES NOT CONTAIN C(	BASIC
175011766	WRPS-1300331		13-Feb-13	WRPS SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	(null)	(null)	DOES NOT CONTAIN C(	BASIC
175011768	WRPS-1300331		13-Feb-13	WRPS SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	(null)	(null)	DOES NOT CONTAIN C(	BASIC
175011778	WRPS-1300331		13-Feb-13	WRPS SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	(null)	(null)	DOES NOT CONTAIN C(	BASIC
175011781	WRPS-1300331		13-Feb-13	WRPS SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	(null)	(null)	DOES NOT CONTAIN C(	BASIC
175011785	WRPS-1300331		13-Feb-13	WRPS SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	(null)	(null)	DOES NOT CONTAIN C(	BASIC
175011855	WRPS-1300331		13-Feb-13	Washington River Protection Solutions LLC Submittal of Off Permit Change Notification Request to Modify the License to Operate the Ventilation System in 241-AY/AZ Tank Farm to Include Operation of the AY-102 Tank Annulus Exhauster	(null)	(null)	(null)	BASIC
175011857	WRPS-1300331		13-Feb-13	Washington River Protection Solutions LLC Submittal of Off Permit Change Notification Request to Modify the License to Operate the Ventilation System in 241-AY/AZ Tank Farm to Include Operation of the AY-102 Tank Annulus Exhauster	(null)	(null)	(null)	BASIC
175011783	WRPS-1300331		13-Feb-13	WRPS SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	(null)	(null)	DOES NOT CONTAIN C(	BASIC
175011787	WRPS-1300331		13-Feb-13	WRPS SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	(null)	(null)	DOES NOT CONTAIN C(	BASIC
175011847	WRPS-1300331		13-Feb-13	Washington River Protection Solutions LLC Submittal of Off Permit Change Notification Request to Modify the License to Operate the Ventilation System in 241-AY/AZ Tank Farm to Include Operation of the AY-102 Tank Annulus Exhauster	(null)	(null)	(null)	BASIC
175015816	WRPS-1300331		13-Feb-13	WRPS SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	(null)	(null)	DOES NOT CONTAIN C(	BASIC
175020906	WRPS-1300331		13-Feb-13	Washington River Protection Solutions LLC Submittal of Off Permit Change Notification Request to Modify the License to Operate the Ventilation System in 241-AY/AZ Tank Farm to Include Operation of the AY-102 Tank Annulus Exhauster	(null)	(null)	(null)	BASIC
175011764	WRPS-1300331		13-Feb-13	WRPS SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	(null)	(null)	DOES NOT CONTAIN C(	BASIC

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175011770	WRPS-1300331		13-Feb-13	WRPS SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	(null)		(null)	DOES NOT CONTAIN C(	BASIC
175011863	WRPS-1300331		13-Feb-13	Washington River Protection Solutions LLC Submittal of Off Permit Change Notification Request to Modify the License to Operate the Ventilation System in 241-AY/AZ Tank Farm to Include Operation of the AY-102 Tank Annulus Exhauster	(null)		(null)	(null)	BASIC
175015818	WRPS-1300331		13-Feb-13	WRPS SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	(null)		(null)	DOES NOT CONTAIN C(	BASIC
175011789	WRPS-1300331		13-Feb-13	WRPS SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	(null)		(null)	DOES NOT CONTAIN C(	BASIC
175011859	WRPS-1300331		13-Feb-13	Washington River Protection Solutions LLC Submittal of Off Permit Change Notification Request to Modify the License to Operate the Ventilation System in 241-AY/AZ Tank Farm to Include Operation of the AY-102 Tank Annulus Exhauster	(null)		(null)	(null)	BASIC
175011861	WRPS-1300331		13-Feb-13	Washington River Protection Solutions LLC Submittal of Off Permit Change Notification Request to Modify the License to Operate the Ventilation System in 241-AY/AZ Tank Farm to Include Operation of the AY-102 Tank Annulus Exhauster	(null)		(null)	(null)	BASIC
175015812	WRPS-1300331		13-Feb-13	WRPS SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	(null)		(null)	DOES NOT CONTAIN C(	BASIC
175015814	WRPS-1300331		13-Feb-13	WRPS SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	(null)		(null)	DOES NOT CONTAIN C(	BASIC
175165630	IHSP-COPC-AYAZ-01		19-Feb-13	AY-102A Leak Detection Pit Investigative Sampling	(null)		(null)	(null)	BASIC
175355492		2/22/2013	22-Feb-13	OPERATE TK-241-AY-102 ANNULUS VENTILATION SYSTEM		8	RM8545	DOES NOT CONTAIN C(	BASIC
175355493		2/27/2013	27-Feb-13	OPERATE TK-241-AY-102 ANNULUS VENTILATION SYSTEM		8	RM8545	DOES NOT CONTAIN C(	BASIC
173267231	WTO-0402		28-Feb-13	Pumping AY-102A Leak Detection Pit and associated work activities	(null)		(null)	(null)	BASIC
175231194	TF-13-0339		28-Feb-13	TO-060-121, OPERATE TK-241-AY-102 ANNULUS VENTILATION SYSTEM, REV. F-0	(null)		(null)	(null)	BASIC
175232417	TF-13-0339		28-Feb-13	TO-060-121, OPERATE TK-241-AY-102 ANNULUS VENTILATION SYSTEM, REV. F-0	(null)		(null)	(null)	BASIC
175284126	WRPS 2013-11		4-Mar-13	WDOH DOCUMENT REQUEST - RTAM MTG 02.05.13 AY-102 ABCASH REPORT	(null)		(null)	(null)	BASIC
175284030	WRPS 2013-14		4-Mar-13	WDOH DOCUMENT REQUEST - RTAM MTG 02.12.13 AY-102 ABCASH REPORT (02.13.2013)	(null)		(null)	(null)	BASIC
175376642	13-ECD-0012		7-Mar-13	U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER		4	13-Mar	DOES NOT CONTAIN C(	BASIC
175372579	13-ECD-0012		7-Mar-13	U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER		67	(null)	DOES NOT CONTAIN C(	BASIC
175375313	13-ECD-0012/WRPS		7-Mar-13	DOE-ORP SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER		67	(null)	DOES NOT CONTAIN C(	BASIC
175375427	13-ECD-0012		7-Mar-13	U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER		67	13-Mar	DOES NOT CONTAIN C(	BASIC
175433358		3/8/2013	8-Mar-13	OPERATE TK-241-AY-102 ANNULUS VENTILATION SYSTEM		8	RM8557	DOES NOT CONTAIN C(	BASIC

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173268209	WTO-0399		14-Mar-13	AY-102 Preparation and opening of selected risers, removal and reinstallation of shield plugs/flanges, performance of annulus video inspections, removal of equipment, and clean up.	(null)	(null)	(null)		BASIC
176113713		3/14/2013	14-Mar-13	OPERATE TK-241-AY-102 ANNULUS VENTILATION SYSTEM		9	RM8578	DOES NOT CONTAIN C(	BASIC
175468009	AIRA-13-307		15-Mar-13	APPLICATION APPROVED ACCORDING TO ENCLOSED LICENSE FOR OPERATION OF 296-A-19 ANNULUS EXHAUSTER AY-102 (NOC 877; EU 218)		9	(null)	DOES NOT CONTAIN C(	BASIC
175548135	AIR 13-307		15-Mar-13	WDOH CERTIFIED MAIL: OPERATION OF 296-A-19 ANNULUS EXHAUSTER AY-102 (NOC 877; EU 218) REVISED APPLICATION		10	13-Mar	DOES NOT CONTAIN C(	BASIC
175464542	TF-13-0462		18-Mar-13	OSD-RAP-54802, AY-102 ANNULUS EXHAUST VENTILATION SYSTEM SHUTDOWN, REV. 0	(null)	(null)	(null)		BASIC
175464980	TF-13-0462		18-Mar-13	OSD-RAP-54802, AY-102 ANNULUS EXHAUST VENTILATION SYSTEM SHUTDOWN, REV. 0	(null)	(null)	(null)		BASIC
176113615		3/19/2013	19-Mar-13	OPERATE TK-241-AY-102 ANNULUS VENTILATION SYSTEM		8	RM8578	DOES NOT CONTAIN C(	BASIC
175544702	13-TF-0010		20-Mar-13	THE U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) RESPONSE TO WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) LETTER 13-N WP-009, REGARDING TANK AY-102		1	(null)	DOES NOT CONTAIN C(	BASIC
175544899	13-TF-0010		20-Mar-13	THE U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) RESPONSE TO WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) LETTER 13-N WP-009, REGARDING TANK AY-102		1	13-Mar	DOES NOT CONTAIN C(	BASIC
175545322	13-TF-0010 - REISSUE		20-Mar-13	THE U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) RESPONSE TO WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) LETTER 13-NWP-009, REGARDING TANK AY-102		1	(null)	DOES NOT CONTAIN C(	BASIC
175545097	13-TF-0010		20-Mar-13	THE U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) RESPONSE TO WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) LETTER 13-N WP-009, REGARDING TANK AY-102		7	13-Mar	DOES NOT CONTAIN C(	BASIC
175545514	13-TF-0010 - REISSUE		20-Mar-13	THE U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) RESPONSE TO WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) LETTER 13-NWP-009, REGARDING TANK AY-102		1	13-Mar	DOES NOT CONTAIN C(	BASIC
176114117		3/20/2013	20-Mar-13	OPERATE TK-241-AY-102 ANNULUS VENTILATION SYSTEM		8	RM8578	DOES NOT CONTAIN C(	BASIC
175544900	13-TF-0010		20-Mar-13	THE U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) RESPONSE TO WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) LETTER 13-N WP-009, REGARDING TANK AY-102		1	13-Mar	DOES NOT CONTAIN C(	BASIC
175545720	13-TF-0010 - REISSUE		20-Mar-13	THE U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) RESPONSE TO WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) LETTER 13-NWP-009, REGARDING TANK AY-102		7	13-Mar	DOES NOT CONTAIN C(	BASIC
176113811		3/26/2013	26-Mar-13	OPERATE TK-241-AY-102 ANNULUS VENTILATION SYSTEM		7	RM8578	DOES NOT CONTAIN C(	BASIC
175661182	NA		28-Mar-13	AY-102 ITU Project Record Index	(null)	(null)	(null)		BASIC
175740133	13-CPM-0064		1-Apr-13	U.S. DEPARTMENT OF ENERGY DETERMINATION REGARDING DEFINITIZATION OF THE AY-102 SAFETY SIGNIFICANT UPGRADES CHANGE ORDER MODIFICATION		10	13-Apr	DOES NOT CONTAIN C(	BASIC
177012943	AY-102 FY13 Q2		1-Apr-13	AY-102 FY13 Q2		51	ID1034	DOES NOT CONTAIN C(	BASIC
175723425	TF-13-0548		1-Apr-13	WORK ORDER TFC-WO-13-1466, 241-AY-102 ANNULUS RECORD SAMPLER CABINET, UPDATE ELECTRICAL CIRCUIT	(null)	(null)	(null)		BASIC
175722000	TF-13-0548		1-Apr-13	WORK ORDER TFC-WO-13-1466, 241-AY-102 ANNULUS RECORD SAMPLER CABINET, UPDATE ELECTRICAL CIRCUIT	(null)	(null)	(null)		BASIC
176114619		4/1/2013	1-Apr-13	OPERATE TK-241-AY-102 ANNULUS VENTILATION SYSTEM		5	RM8578	DOES NOT CONTAIN C(	BASIC
175740131	1301167/13-CPM-0064/WRPS		1-Apr-13	DOE DETERMINATION REGARDING DEFINITIZATION OF THE AY-102 SAFETY SIGNIFICANT UPGRADES CHANGE ORDER MODIFICATION		2	(null)	DOES NOT CONTAIN C(	BASIC
175735737	13-CPM-0064		1-Apr-13	U.S. DEPARTMENT OF ENERGY DETERMINATION REGARDING DEFINITIZATION OF THE AY-102 SAFETY SIGNIFICANT UPGRADES CHANGE ORDER MODIFICATION		1	13-Apr	DOES NOT CONTAIN C(	BASIC

IDMS SQL
AY-102 (Title/Desc/Keyword)

176084175	13-NWP-036/WRPS		3-Apr-13	DOEC ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITIES OF THE WASTE MATERIAL NEAR RISER 83 OF THE 241-AY-102 DOUBLE SHELL TANK (DST)		10	(null)	DOES NOT CONTAIN C(	BASIC
176184205	13-NWP-036		3-Apr-13	DEPARTMENT OF ECOLOGY (ECOLOGY) ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITIES OF THE WASTE MATERIAL NEAR RISER 83 OF TH 241-AY-102 DOUBLE SHELL TANK (DST)		11	13-Apr	DOES NOT CONTAIN C(	BASIC
176455707	AIR-13-401		15-Apr-13	MODIFICATION OF EMISSION UNIT (EU) 218 APPROVED ON APRIL 9, 2013, AS NEGOTIATED ACCORDING TO THE ENCLOSED LICENSE FOR OPERATION OF 296-A-19 ANNULUS EXHAUSTER AY-102 (NOC 877; EU 218)		5	(null)	DOES NOT CONTAIN C(	BASIC
176547140	TF-13-0548		18-Apr-13	WORK ORDER TFC-WO-13-1466, 241-AY-102 ANNULUS RECORD SAMPLER CABINET, UPDATE ELECTRICAL CIRCUIT; P&I DATED 4/15/13 AND P&I DATED 4/17/13	(null)		(null)	(null)	BASIC
176543515	TF-13-0548		18-Apr-13	WORK ORDER TFC-WO-13-1466, 241-AY-102 ANNULUS RECORD SAMPLER CABINET, UPDATE ELECTRICAL CIRCUIT; P&I DATED 4/15/13 AND P&I DATED 4/17/13	(null)		(null)	(null)	BASIC
176745991		4/19/2013	19-Apr-13	OPERATE TK-241-AY-102 ANNULUS VENTILATION SYSTEM		7	RM8597	DOES NOT CONTAIN C(	BASIC
176678428	WTO-0428		23-Apr-13	AY-102 Annulus ENRAF Replace Displacer	(null)		(null)	(null)	BASIC
176907649	13-TF-0024		6-May-13	ANALYSIS OF 40 CFR 265.196 REQUIREMENTS FOR DOUBLE-SHELL TANK (DST) SYSTEM TANK 241-AY-102, AND DISCUSSION OF DOUBLE-SHELL TANK EMERGENCY PUMPING GUIDE, HNF-3484, REVISION 10		11	13-May	DOES NOT CONTAIN C(	BASIC
176908252	13-TF-0024		6-May-13	ANALYSIS OF 40 CFR 265.196 REQUIREMENTS FOR DOUBLE-SHELL TANK (DST) SYSTEM TANK 241-AY-102, AND DISCUSSION OF DOUBLE-SHELL TANK EMERGENCY PUMPING GUIDE, HNF-3484, REVISION 10		11	(null)	DOES NOT CONTAIN C(	BASIC
176907142	13-TF-0024		6-May-13	ANALYSIS OF 40 CFR 265.196 REQUIREMENTS FOR DOUBLE-SHELL TANK (DST) SYSTEM TANK 241-AY-102, AND DISCUSSION OF DOUBLE-SHELL TANK EMERGENCY PUMPING GUIDE, HNF-3484, REVISION 10		8	13-May	DOES NOT CONTAIN C(	BASIC
176907650	13-TF-0024		6-May-13	ANALYSIS OF 40 CFR 265.196 REQUIREMENTS FOR DOUBLE-SHELL TANK (DST) SYSTEM TANK 241-AY-102, AND DISCUSSION OF DOUBLE-SHELL TANK EMERGENCY PUMPINVG GUIDE, HNF-3484, REVISION 10		11	13-May	DOES NOT CONTAIN C(	BASIC
176908353	13-TF-0024		6-May-13	ANALYSIS OF 40 CFR 265.196 REQUIREMENTS FOR DOUBLE-SHELL TANK (DST) SYSTEM TANK 241-AY-102, AND DISCUSSION OF DOUBLE-SHELL TANK EMERGENCY PUMPINVG GUIDE, HNF-3484, REVISION 10		11	13-May	DOES NOT CONTAIN C(	BASIC
176939492	WRPS-PER-2012-0934		8-May-13	2-AY-102_RPP-RPT-53425_Project_Closeout_Report.doc	(null)		(null)	(null)	BASIC
176940431	WRPS-PER-2012-0932		8-May-13	2-AY-102_RPP-RPT-53425_Project_Closeout_Report.doc	(null)		(null)	(null)	BASIC
176956126	WRPS-PER-2012-0933		9-May-13	2-AY-102_RPP-RPT-53425_Project_Closeout_Report.doc	(null)		(null)	(null)	BASIC

IDMS SQL
AY-102 (Title/Desc/Keyword)

OBJID	DOCNO	DATE	TITLE	PAGES	RHA BOX #	ACC RIGHTS	IDMS CATEGORY
173928133	1218040	28-Nov-12	AY-102 INTEGRATED PROJECT TEAM PARTICIPATION	2	AR2189	DOES NOT CONTAIN C(	AR
174081442	1218178	5-Dec-12	12-NWP-186: ECOLOGY ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITIES OF THE WASTE MATERIAL NEAR RISER 83 OF THE 241-AY-102 DOUBLE SHELL TANK (DST)	10	(null)	DOES NOT CONTAIN C(	AR
174294311	1218419	12-Dec-12	12-NWP-188: RE WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITIES CONDUCTED NOVEMBER 12 2012 OF THE WASTE MATERIAL NEAR RISER 83 OF THE 241-AY-102 DOUBLE SHELL TANK (DST)	9	AR2206	DOES NOT CONTAIN C(	AR
174809388	1219160	25-Jan-13	13-NWP-009: RE: WASHINGTON STATE DEPARTMENT OF ECOLOGY ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITIES CONDUCTED DECEMBER 27 2012 OF THE WASTE MATERIAL NEAR RISER 83 OF THE 241-AY-102 DOUBLE SHELL TANK (DST)	8	AR2235	DOES NOT CONTAIN C(	AR
175407177	1219731	7-Mar-13	13-ECD-0012: US DEPARTMENT OF ENERGY (DOE) OFFICE OF RIVER PROTECTION (ORP) SUBMITTAL OF OFF-PERMIT CHANGE NOTIFICATION REQUEST TO MODIFY THE LICENSE TO OPERATE THE VENTILATION SYSTEM IN 241-AY/AZ TANK FARM TO INCLUDE OPERATION OF THE AY-102 TANK ANNULUS EXHAUSTER	67	AR2263	DOES NOT CONTAIN C(	AR
175588977	1219911	22-Mar-13	13-TF-0010-REISSUE: THE US DEPARTMENT OF ENERY (DOE) OFFICE OF RIVER PROTECTION (ORP) RESPONSE TO WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECOLOGY) LETTER 13-NWP-009 REGARDING TANK AY-102	1	AR2272	DOES NOT CONTAIN C(	AR
176394630	1220155	3-Apr-13	RE: DEPARTMENT OF ECOLOGY ASSESSMENT REPORT FOR FIELD MONITORING ACTIVITIES OF THE WASTE MATERIAL NEAR RISER 83 OF THE 241-AY-102 DOUBLE SHELL TANK (DST)	10	AR2284	DOES NOT CONTAIN C(	AR

IDMS SQL
AY-102 (Title/Desc/Keyword)

OBJID	DOCNO	DATE	TITLE	PAGES	RHA BOX #	ACC RIGHTS	IDMS CATEGORY
NA	NA		WGI C", WGI CONTRACT 13272 RELEASE 18 "w-314 241-A-A VALVE PIT BYPASS", WGI CONTRACT 13272 RELEASE 19 "W-211 241-AY-102 PHASE 2 INITIAL TANK RETRIEVAL SYSTEM"	(null)	214433	NA	RHA

DMCS SEARCH RESULTS

Number	Document	Date Effective	Class Name	Title
39506-059-IC-12-001	Current	3/21/2012	Vendor and Subcontractor\TOC Ver	FW: Criticality Safety Evaluation Report - 241-AY-102 In Tank Upgrade Project PDSA
39506-059-IC-12-002	Current	3/21/2012	Vendor and Subcontractor\TOC Ver	RE: Criticality Safety Evaluation Report - 241-AY-102 In Tank Upgrade Project PDSA
39506-059-IC-12-003	Current	3/21/2012	Vendor and Subcontractor\TOC Ver	RE: Criticality Safety Evaluation Report - 241-AY-102 In Tank Upgrade Project PDSA
39506-059-IC-12-005	Current	4/16/2012	Vendor and Subcontractor\TOC Ver	FW: Draft criticality safety determination for 241-AY-102 In Tank Upgrade Project PDSA
39506-059-OC-12-001	Current	3/21/2012	Vendor and Subcontractor\TOC Ver	RE: Criticality Safety Evaluation Report - 241-AY-102 In Tank Upgrade Project PDSA
39506-059-OC-12-004	Current	4/16/2012	Vendor and Subcontractor\TOC Ver	RE: Draft criticality safety determination for 241-AY-102 In Tank Upgrade Project PDSA
50597	Current	6/19/2009	Engineering\Vendor Information	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM
A888-9984 004	Current	1/1/1975	Engineering\Drawing	CVI BAND POSITIONING X-RAY 5853-2102-71
A888-9984 005	Current	1/1/1975	Engineering\Drawing	CVI BAND POSITIONS X-RAY 5853-2102-71
A888-9984 006	Current	1/1/1975	Engineering\Drawing	CVI BAND POSITIONING X-RAY 5853-2102-71
A888-9984 007	Current	1/1/1975	Engineering\Drawing	CVI BAND POSITIONS X-RAYS 5853-2102-71
A888-9984 010	Current	1/1/1975	Engineering\Drawing	CVI TANK & PIPE JOINTS WELD (X-RAY) 5853-2102-71
A888-9984 011	Current	1/1/1975	Engineering\Drawing	CVI BAND POSITIONS X-RAY 5853-2102-71
B672-C001	Current	4/11/1988	Engineering\Specification	AY-102 ANNULUS VENT UPGRADE EARTHWORK
B672-C002	Current	4/11/1988	Engineering\Specification	AY-102 ANNULUS VENT UPGRADE PIPING WITH CATHODIC PROTECTION
ECN-10-000413	Current	7/1/2010	Engineering\Change Package	241-AY-101 AND 241-AY-102 MPCMS C-RING COUPON PHOTOGRAPHS
ECN-10-000989	Current	1/18/2011	Engineering\Change Package	REPLACE DAMAGED, OUT-OF-SERVICE RECIRCULATING FAN AY102-K4-5-1
ECN-10-001284	Current	9/28/2010	Engineering\Change Package	TANK 241-AY-102 WASTE FEED DELIVERY FLOWSHEET
ECN-102622	Historic	5/5/1989	Engineering\Change Package	SUPPL DWG CHANGE TO PURCHASE & INSTALL A NEW SEISMOGRAPH FOR PUREX TERRA TECHNOLOGY MODEL DCA-3:
ECN-103613	Historic	10/12/1988	Engineering\Change Package	SUPPL DWG CHANGE TO PURCHASE & INSTALL A NEW SEISMOGRAPH FOR PUREX TERRA TECHNOLOGY MODEL DCA-3:
ECN-11-000740	Current	8/6/2012	Engineering\Change Package	Project T3W11: AY-102 Profile Thermocouple Probe Removals
ECN-11-000741	Current	8/6/2012	Engineering\Change Package	Project T3W11: AY-102 Sludge Thermocouple Removals
ECN-11-000743	Current	6/21/2012	Engineering\Change Package	Project T3W11: Removal of Multi-Function Instrument Tree from tank 241-AY-102
ECN-11-000744	Current	6/21/2012	Engineering\Change Package	Project T3w11: AY-102 Corrosion Monitoring System and Probe Removal from Riser 073/22A
ECN-11-000745	Current	8/1/2012	Engineering\Change Package	Project T3W11: Removal of AY-102 Sludge Measurement Instrument
ECN-11-002075	Current	12/1/2011	Engineering\Change Package	AY-102 Annulus Exhauster Filter Update
ECN-12-000942	Current	8/24/2012	Engineering\Change Package	Relocate AY102-WSTA-LDT-152 ENRAF from RTiser 90 to 89
ECN-12-000980	Current	11/20/2012	Engineering\Change Package	Install AY102-WSTA-LDT-152 ENRAF Permanent Wiring.
ECN-12-000985	Current	8/27/2012	Engineering\Change Package	Relocate AY102-WSTA-LDT-152 ENRAF from Riser 90 to 89
ECN-12-001023	Current	10/4/2012	Engineering\Change Package	Update Riser Elevations for 241-AY-101 and 241-AY-102
ECN-12-001101	Current	10/2/2012	Engineering\Change Package	AY101 and AY102 Instrumentation Table Removal
ECN-12-001241	Current	10/18/2012	Engineering\Change Package	AY101 and AY102 PDIs Installation
ECN-12-001261	Current	1/25/2013	Engineering\Change Package	AY/AZ Vent Upgrades: Recirc/Cooling Module Meter Addition for AZ-102
ECN-12-001264	Current	1/25/2013	Engineering\Change Package	AY/AZ Vent Upgrades: Recirc/Cooling Module Meter Addition for AY-102
ECN-133363	Historic	8/15/1991	Engineering\Change Package	CHANGE TO ADD 241C FARM LIGHTS AS THE CONNECTIONS TO THE RELAYS WERE ACCIDENTALLY OMITTED FOR 241C1
ECN-171044	Historic	8/25/1992	Engineering\Change Package	CHANGE TO 241AY PRESSURE TRANSMITTER PF-102-2 TO REPLACE BROKEN MANIFOLD VALVE AS IT CAUSES WRONG R
ECN-609992	Historic	7/15/1996	Engineering\Change Package	CHEMICAL & CHEMICALLY RELATED CONSIDERATIONS ASSOCIATED WITH SLUICING TANK C-106 TO TANK AY-102
ECN-618315	Current	2/13/1995	Engineering\Change Package	AY-102 TRANSFER
ECN-619176	Current	12/19/1995	Engineering\Change Package	AY-102 ANNULUS CAM CONTROL

ECN-629864	Current	9/22/1999	Engineering\Change Package	241-AY 102 VENTILATION SYSTEM FLOW TRANSMITTER REPLACEMENT
ECN-629866	Current	9/22/1999	Engineering\Change Package	241-AY 102 VENTILATION SYSTEM FLOW TRANSMITTER REPLACEMENT
ECN-633702	Historic	8/27/1996	Engineering\Change Package	AY-102 DENSITOMETER
ECN-633703	Historic	8/27/1996	Engineering\Change Package	AY-102 LEVEL GAUGE
ECN-635067	Current	10/29/1996	Engineering\Change Package	241-AY TANK 102 ANNULUS MAINTENANCE OUTAGE
ECN-638510	Historic	5/22/1997	Engineering\Change Package	AY-102 ANNULUS CAM CONTROL
ECN-644154	Historic	9/28/1998	Engineering\Change Package	CHEMICAL COMPATIBILITY OF TANK WASTES IN 241-C-106, 241-AY-101 AND 241-AY-102
ECN-644494	Historic	9/28/1998	Engineering\Change Package	TANK CHARACTERIZATION REPORT FOR DOUBLE-SHELL TANK 241-AY-102
ECN-644544	Historic	2/3/1998	Engineering\Change Package	ENRAF LEVEL GAUGE UPGRADE / AY-102
ECN-645712L	Historic	6/2/1998	Engineering\Change Package	ENRAF SPRAY NOZZLE ON 241-SX-102
ECN-645848L	Historic	1/13/1998	Engineering\Change Package	SUPPORT AY-102 ANNULUS VENTILATION AIR TEST
ECN-647017	Current	2/11/1998	Engineering\Change Package	ADD LEAK DETECTOR TO RISER #15-I ON TK-AY-102
ECN-647828	Current	6/25/1998	Engineering\Change Package	SUPPORT REPLACEMENT OF TANK AY-102 ANNULUS AIR FLOW MONITORING INSTRUMENTS
ECN-653811	Historic	6/4/1999	Engineering\Change Package	TANK 241-AY-102 TANK CHARACTERIZATION REPORT PAGE CHANGE
ECN-657171	Historic	10/16/2000	Engineering\Change Package	PROVIDE REMOTE DATA FROM THE TANK 241-AY-101 AND 241-AY-102 ANNULUS CAMS
ECN-660350	Historic	8/31/2000	Engineering\Change Package	TANK 241-AY-102 PUSH MODE CORE SAMPLING AND ANALYSIS PLAN
ECN-666714	Historic	11/13/2001	Engineering\Change Package	EXAMINE TANK 241-AY-102
ECN-670716	Current	12/28/2001	Engineering\Change Package	241-AY-102 VENTILATION SYSTEM FLOW TRANSMITTER REPLACEMENT
ECN-672926	Current	10/24/2002	Engineering\Change Package	THE DRAWING REFERENCE AY102 INSTEAD OF AY101 FOR THE MULTI PACK STARTER ASSEMBLY
ECN-704332	Historic	10/6/1994	Engineering\Change Package	241-AY INSTALL KAMLOK CONNECTION ON 102AY
ECN-720173-R0	Historic	5/14/2003	Engineering\Change Package	241-AY-102 ANNULUS LEAK DETECTION USING THREE ENRAF LEVEL GAUGES
ECN-720173-R1	Historic	9/2/2003	Engineering\Change Package	241-AY-102 ANNULUS LEAK DETECTION
ECN-720173-R2	Historic	10/29/2003	Engineering\Change Package	241-AY-102 ANNULUS LEAK DETECTION USING THREE ENRAF LEVEL GAUGES
ECN-720176-R0	Historic	9/16/2003	Engineering\Change Package	241-AY-102 ELECTRICAL INSTALLATION FOR ANNULUS LEAK DETECTORS
ECN-720439-R0	Current	4/24/2003	Engineering\Change Package	C-106 WRS WATER ADDITION HOSE ASSEMBLY AT AY-102 (PHASE 1)
ECN-720487-R0	Current	8/22/2003	Engineering\Change Package	241-AY-102 ANNULUS EXHAUST MOTOR BASE (AY102-VTA-M-002)
ECN-720487-R1	Current	1/14/2004	Engineering\Change Package	241-AY-102 ANNULUS EXHAUST MOTOR BASE (AY-102-VTA-M-002)
ECN-720944-R1	Historic	10/9/2003	Engineering\Change Package	REMOVE FLOW TRANSMITTER FROM AY-102 RESULTING FROM C-106 INTERIM ISOLATION
ECN-721013-R0	Current	9/20/2003	Engineering\Change Package	TANK 241-C-106 WASTE RETRIEVAL SYSTEM WATER ADDITION HOSE ASSEMBLY (AY-102) MODIFICATIONS
ECN-721023-R0	Current	9/18/2003	Engineering\Change Package	CHANGE TIME DELAY ON LDK3-TD FOR S-102 RETRIEVAL PROJECT
ECN-722364-R0	Historic	2/2/2005	Engineering\Change Package	REVISE ANALYSIS OF C-FARM AND AY-FARM DOME LOADS FOR C-102 RETRIEVAL
ECN-722523-R0	Current	3/28/2005	Engineering\Change Package	W-211 (AY-102) PROJECT FACILITY MODIFICATIONS
ECN-722575-R0	Historic	2/3/2005	Engineering\Change Package	C-102 WRS EQUIPMENT INSTALL AT AY-102
ECN-722575-R1	Historic	6/23/2005	Engineering\Change Package	C-FARM WRS: EQUIPMENT INSTALL AT AY-102
ECN-722944-R0	Historic	3/21/2005	Engineering\Change Package	JUMPER PIPING ASSEMBLY 241-AY-102 PUMP PIT
ECN-723102-R0	Historic	5/12/2005	Engineering\Change Package	UPDATE AY-102 CONFIG DRAWING TO DOCUMENT DROPPED DRILL STRING BELOW RISER 058
ECN-723164-R0	Current	8/4/2005	Engineering\Change Package	OPTIONAL SHIELD PLUG INSTALLATION FOR SLUDGE MEASUREMENT PORT ON AY-102
ECN-723217-R0	Historic	5/19/2005	Engineering\Change Package	CAUSTIC DYNAMIC MIXING ANALYSES FOR TANKS 241-AY-101 241-AY-102 241-AZ-102 241-AN-102 AND 241-AN-107
ECN-724052-R0	Historic	9/11/2006	Engineering\Change Package	REMOVE SUPPLEMENTAL COVERS DESIGNATION FROM AY-101 AND AY-102 P&IDS

ECN-724341-R0	Historic	12/6/2006	Engineering\Change Package	ELECTRICAL ISOLATION OF AY102-PP1
ECN-724357-R0	Historic	12/14/2006	Engineering\Change Package	CHANGES TO SEL FOR PROJECT TURNOVER OF LEAK DETECTION EQUIPMENT TO SUPPORT AY-102 TRANSFER
ECN-725219-R0	Historic	12/12/2007	Engineering\Change Package	CORRECT AY-101 & AY-102 VTA EQUIPMENT SCHEDULES
ECN-725226-R0	Historic	6/19/2008	Engineering\Change Package	UPDATE 241-AY-102 MPCMS DRAWING
ECN-725279-R0	Current	6/25/2008	Engineering\Change Package	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM INSTALLATION
ECN-725280-R0	Historic	6/25/2008	Engineering\Change Package	REMOVE HIGH LIQUID LEVEL PROBE FROM 241-AY-102 RISER
ECN-725280-R1	Current	12/16/2008	Engineering\Change Package	REMOVE HIGH LIQUID LEVEL PROBE FROM 241-AY-102 RISER 39
ECN-725284-R0	Historic	6/25/2008	Engineering\Change Package	REMOVE ENRAF FROM RISER-073 OF 241-AY-102 AND REINSTALL THE ENRAF AT RISER-039
ECN-725284-R1	Current	12/19/2008	Engineering\Change Package	REMOVE ENRAF FROM RISER-073 ON 241-AY-102 AND REINSTALL THE ENRAF AT RISER-039
ECN-725284-R2	Historic	4/9/2009	Engineering\Change Package	241AY102 ENRAF AY102-WST-LIT-101 RELOCATED FROM RISER 73 TO 39
ECN-725442-R0	Current	3/11/2008	Engineering\Change Package	241-AY-102 ANNULUS EXHAUSTER FAN SHAFT DETAIL TO SUPPORT FABRICATION
ECN-725784-R0	Historic	11/3/2008	Engineering\Change Package	AY-102 MPCMS PART DESCRIPTION MODIFICATIONS
ECN-725787-R0	Historic	11/3/2008	Engineering\Change Package	UPDATE AY-102 MPCMS C-RING COUPON ASSEMBLY
ECN-725966-R0	Historic	11/10/2008	Engineering\Change Package	MODIFY 241-AY-102 MPCMS COPPER/COPPER SULFATE PART NUMBER AND DESCRIPTION
ECN-726021-R0	Historic	1/27/2009	Engineering\Change Package	241-AY-102 MPMCS ELECTRICAL MODIFICATION
ECN-726022-R0	Historic	1/21/2009	Engineering\Change Package	241-AY-102 MPMCS ELECTRICAL MODIFICATION MECHANICAL CHANGES
ECN-726023-R0	Historic	1/8/2009	Engineering\Change Package	REMOVE PERMANENT POWER TO AY1-2 ENRAF. AY-102 DENSITOMETER, AND AY101 ENRAF
ECN-726085-R0	Historic	2/13/2009	Engineering\Change Package	241-AY-102 MPCMS CONSTRUCTION ACCEPTANCE TEST REVISION
ECN-726086-R0	Historic	2/3/2009	Engineering\Change Package	241-AY-102 MPCMS FACTORY ACCEPTANCE TEST MODIFICATION TO INCLUDE ELECTRICAL SWITCHES
ECN-726112-R0	Historic	2/3/2009	Engineering\Change Package	241-AY-102 RISER 39 (12A) REFERENCE LEVEL CALCULATION
ECN-726141-R0	Historic	2/4/2009	Engineering\Change Package	241-AY-102 RISER 39 (12A) REFERENCE LEVEL AND RISER ELEVATION UPDATE
ECN-726177-R0	Historic	3/12/2009	Engineering\Change Package	241-AY-101 MPCMS DESIGN UPDATES BASED ON 241-AY-102 MPCMS LESSONS LEARNED
ECN-726226-R0	Historic	3/23/2009	Engineering\Change Package	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM FABRICATION AS-BUILT DRAWINGS
ECN-726229-R0	Historic	3/25/2009	Engineering\Change Package	REVISE STRUCTURAL ANALYSIS OF AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM
ECN-726308-R0	Current	4/27/2009	Engineering\Change Package	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM FIELD ELECTRICAL MODIFICATION
ECN-726309-R0	Historic	5/22/2009	Engineering\Change Package	241-AY-102 MPCMS REQUIREMENTS VERIFICATION REPORT REVISION
ECN-726415-R0	Current	6/17/2009	Engineering\Change Package	241-AY-102 RISER ELEVATION MODIFICATION
ECN-726418-R0	Current	6/17/2009	Engineering\Change Package	241-AY-102 MPCMS ELECTRICAL ENCLOSURE SHIELD MODIFICATIONS
ECN-726422-R0	Historic	6/17/2009	Engineering\Change Package	241-AY-102 ENRAF WST-TBX-602A TB2 AS-BUILT
ECN-727421-R0	Historic	4/14/2010	Engineering\Change Package	NEW FLOOR DRAIN SEAL ASSEMBLIES FOR 241-AY-102 LEAK DETECTION PIT
ECN-727421-R1	Historic	5/24/2010	Engineering\Change Package	NEW FLOOR DRAIN SEAL ASSEMBLIES FOR 241-AY-102 LEAK DETECTION PIT
ECN-W211-AY2-001-R0	Current	3/24/2005	Engineering\Change Package	W211-AY-102 PROJECT NON-FACILITY MODIFICATIONS
ECN-W211-AY2-005-R0	Historic	3/24/2005	Engineering\Change Package	PROJECT W-211 TEMPERATURE TREE MODIFICATION (AY-102 RETRIEVAL)
ECN-W211-AY2-007-R0	Current	5/17/2005	Engineering\Change Package	PROJECT W-211 (AY-102) MODIFY MIXER PUMP SPRAY WASH RISER EXTENSION TO ALLOW FOR CONST WELD
ECN-W211-AY2-008-R0	Current	5/31/2005	Engineering\Change Package	PROJECT W-211 AY-102 RELOCATE CONSTRUCTION TIE-IN INTERFACE POINT FOR PW-404 PIPE
ECN-W211-AZ2-013-R0	Current	6/25/2004	Engineering\Change Package	AS-BUILT CHANGES FOR MIXER PUMP SPRAY WASH RISER EXTENSION PROJECT W-211 AZ-102 RETRIEVAL
ECN-W320-596	Historic	4/17/1997	Engineering\Change Package	TANK AY-102 PIT MODIFICATIONS
ECN-W320-688	Historic	11/19/1997	Engineering\Change Package	DELETE INSTALLATION OF 241-AY-102 DOME SPACE HUMIDITY MONITOR
ECN-W320-730	Historic	1/28/1998	Engineering\Change Package	SUPPORT AY-102 JUMPER FABRICATION

EDT-823974	Current	6/16/2010	Engineering\Supporting Document	TANK 241-AY-102 WFD FLOWSHEET
EDT-824478	Current	4/18/2011	Administrative Technical Non-Engin	SAFETY DESIGN STRATEGY FOR THE WASTE FEED DELIVERY INTEGRATED AY-102 UPGRADES PROJECT
EDT-825196	Current	8/8/2012	Administrative Technical Non-Engin	Strategy and Technical Basis for Managing Flammable Gases During Tank 241-AY-102 Mixer Pump Testing
EDT-825341	Current	11/14/2012	Administrative Technical Non-Engin	Performance and Functional Requirements Evaluation of a Simulated Trunnion Bar for the AY-102 Annulus Pump Pit
H-1-23102 001	Current	10/25/1954	Engineering\Drawing	PACKING BLOCK LAYERS BLOCK #102
H-14-010506 003	Historic	3/30/2000	Engineering\Drawing	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102
H-14-010506 003	Historic	11/17/2000	Engineering\Drawing	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102
H-14-010506 003	Historic	6/20/2001	Engineering\Drawing	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102
H-14-010506 003	Historic	1/6/2003	Engineering\Drawing	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102
H-14-010506 003	Historic	9/23/2003	Engineering\Drawing	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102
H-14-010506 003	Historic	1/14/2004	Engineering\Drawing	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102
H-14-010506 003	Historic	6/23/2004	Engineering\Drawing	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102
H-14-010506 003	Historic	6/10/2005	Engineering\Drawing	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102
H-14-010506 003	Historic	9/6/2005	Engineering\Drawing	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102
H-14-010506 003	Historic	1/15/2007	Engineering\Drawing	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102
H-14-010506 003	Historic	3/3/2008	Engineering\Drawing	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102
H-14-010506 003	Historic	4/21/2009	Engineering\Drawing	DONE PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102
H-14-010506 003	Historic	5/13/2009	Engineering\Drawing	DONE PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102
H-14-010506 003	Historic	7/21/2009	Engineering\Drawing	DONE PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102
H-14-010506 003	Historic	3/16/2010	Engineering\Drawing	DONE PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102
H-14-010506 003	Historic	10/29/2012	Engineering\Drawing	DONE PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102
H-14-010506 003	Changing	12/10/2012	Engineering\Drawing	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102
H-14-010506 004	Historic	3/30/2000	Engineering\Drawing	DOME PENETRATION SCHEDULES WST/WSTA TANK 241-AY-102
H-14-010506 004	Historic	11/17/2000	Engineering\Drawing	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102
H-14-010506 004	Current	3/16/2010	Engineering\Drawing	DOME PENETRATION SCHEDULES (WST/WSTA) TANK 241-AY-102
H-14-012602 002	Current	4/26/2012	Engineering\Drawing	ARRANGEMENT ENCLOSURE LAYOUT MCS AW241-WT-ENCL-102
H-14-012602 004	Current	4/26/2012	Engineering\Drawing	ARRANGEMENT ENCLOSURE LAYOUT MCS AW271-WT-ENCL-102/103
H-14-106420 001	Current	12/28/2004	Engineering\Drawing	CIVIL SITE PLAN AY-102 TANK FARM
H-14-106437 001	Current	12/28/2004	Engineering\Drawing	PIPING/INSTR PROCESS FLOW DIAGRAM AY-101/102 WASTE XFR
H-14-106467 001	Current	12/28/2004	Engineering\Drawing	INSTRUMENTATION AY102 BLOCK DIAGRAM CONTROL SYSTEM CABLING
H-14-106467 002	Current	12/28/2004	Engineering\Drawing	INSTRUMENTATION AY102 BLOCK DIAGRAM CONTROL SYSTEM CABLING
H-14-106467 003	Current	12/28/2004	Engineering\Drawing	INSTRUMENTATION AY102 BLOCK DIAGRAM CONTROL SYSTEM CABLING
H-14-106467 004	Current	12/28/2004	Engineering\Drawing	INSTRUMENTATION AY102 BLOCK DIAGRAM CONTROL SYSTEM CABLING
H-14-106497 001	Historic	12/28/2004	Engineering\Drawing	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM
H-14-106497 001	Historic	8/12/2011	Engineering\Drawing	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM
H-14-106497 002	Historic	12/28/2004	Engineering\Drawing	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM
H-14-106497 002	Historic	8/12/2011	Engineering\Drawing	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM
H-14-106497 003	Historic	12/28/2004	Engineering\Drawing	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM & SCHED
H-14-106497 003	Historic	4/5/2011	Engineering\Drawing	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM & SCHED

H-14-106497 004	Historic	12/28/2004	Engineering\Drawing	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM & SCHED
H-14-106497 004	Historic	4/5/2011	Engineering\Drawing	ELECTRICAL 241-AY-102 ONE LINE DIAGRAM & SCHED
H-14-106498 001	Current	12/28/2004	Engineering\Drawing	ELECTRICAL 241-AY-102 SITE PLAN
H-14-106498 002	Current	12/28/2004	Engineering\Drawing	ELECTRICAL 241-AY-102 DETAILS & SECTIONS
H-14-106502 001	Current	12/28/2004	Engineering\Drawing	ELECTRICAL 241-AY-102 PLAN
H-14-106502 002	Current	12/28/2004	Engineering\Drawing	ELECTRICAL 241-AY-102 ELEVATIONS & DETAILS
H-14-106515 001	Current	12/28/2004	Engineering\Drawing	ELECTRICAL AY102 HEAT TRACE PLAN
H-14-106515 002	Current	12/28/2004	Engineering\Drawing	ELECTRICAL AY102 HEAT TRACE PLAN
H-14-106515 003	Current	12/28/2004	Engineering\Drawing	ELECTRICAL AY102 HEAT TRACE PLAN & ELEVATION
H-14-106515 004	Current	12/28/2004	Engineering\Drawing	ELECTRICAL AY102 HEAT TRACE DIAGRAMS
H-14-106516 001	Current	12/28/2004	Engineering\Drawing	ELECTRICAL AY102 HEAT TRACE PLAN
H-14-106516 002	Current	12/28/2004	Engineering\Drawing	ELECTRICAL AY102 HEAT TRACE PLAN
H-14-106573 002	Current	2/9/2005	Engineering\Drawing	C-102 TO AY-101 C-102 ENLGD PLAN
H-14-107561 001	Historic	6/19/2008	Engineering\Drawing	AY102 MPCMS DRAWING LIST & VICINITY MAP
H-14-107561 001	Current	3/23/2009	Engineering\Drawing	AY102 MPCMS DRAWING LIST & VICINITY MAP
H-14-107562 001	Historic	6/19/2008	Engineering\Drawing	AY102 MPCMS 241-AY-102 MULTI PROBE INSTALLATION
H-14-107562 001	Changing	3/23/2009	Engineering\Drawing	AY102 MPCMS 241-AY-102 MULTI PROBE INSTALLATION
H-14-107563 001	Historic	6/19/2008	Engineering\Drawing	AY102 MPCMS MULTI PROBE ASSEMBLY
H-14-107563 001	Current	3/23/2009	Engineering\Drawing	AY102 MPCMS MULTI PROBE ASSEMBLY
H-14-107564 001	Historic	6/19/2008	Engineering\Drawing	AY102 MPCMS FIXED PROBE NOTES AND PARTS LIST
H-14-107564 001	Current	3/23/2009	Engineering\Drawing	AY102 MPCMS FIXED PROBE NOTES AND PARTS LIST
H-14-107564 002	Historic	6/19/2008	Engineering\Drawing	AY102 MPCMS FIXED PROBE ASSEMBLY
H-14-107564 002	Current	3/23/2009	Engineering\Drawing	AY102 MPCMS FIXED PROBE ASSEMBLY
H-14-107564 003	Historic	6/19/2008	Engineering\Drawing	AY102 MPCMS FIXED PROBE DETAILS
H-14-107564 003	Current	3/23/2009	Engineering\Drawing	AY102 MPCMS FIXED PROBE DETAILS
H-14-107564 004	Historic	6/19/2008	Engineering\Drawing	AY102 MPCMS FIXED PROBE DETAILS
H-14-107564 004	Current	3/23/2009	Engineering\Drawing	AY102 MPCMS FIXED PROBE DETAILS
H-14-107564 005	Historic	6/19/2008	Engineering\Drawing	AY102 MPCMS FIXED PROBE DETAILS
H-14-107564 005	Current	3/23/2009	Engineering\Drawing	AY102 MPCMS FIXED PROBE DETAILS
H-14-107564 006	Historic	6/19/2008	Engineering\Drawing	AY102 MPCMS FIXED PROBE DETAILS
H-14-107564 006	Current	3/23/2009	Engineering\Drawing	AY102 MPCMS FIXED PROBE DETAILS
H-14-107565 001	Historic	6/19/2008	Engineering\Drawing	AY102 MPCMS REMOVABLE PROBE ASSEMBLY
H-14-107565 001	Current	3/23/2009	Engineering\Drawing	AY102 MPCMS REMOVABLE PROBE ASSEMBLY
H-14-107565 002	Historic	6/19/2008	Engineering\Drawing	AY102 MPCMS REMOVABLE PROBE DETAILS
H-14-107565 002	Current	3/23/2009	Engineering\Drawing	AY102 MPCMS REMOVABLE PROBE DETAILS
H-14-107566 001	Historic	12/19/2007	Engineering\Drawing	AY102 MPCMS DETAILS
H-14-107566 001	Historic	6/19/2008	Engineering\Drawing	AY102 MPCMS DETAILS
H-14-107566 001	Current	11/11/2008	Engineering\Drawing	AY102 MPCMS DETAILS
H-14-107567 001	Historic	6/19/2008	Engineering\Drawing	AY102 MPCMS SPRAY RING ASSEMBLY

H-14-107567 001	Current	3/23/2009	Engineering\Drawing	AY102 MPCMS SPRAY RING ASSEMBLY
H-14-107567 002	Current	6/19/2008	Engineering\Drawing	AY102 MPCMS SPRAY RING DETAILS
H-14-107568 001	Historic	6/19/2008	Engineering\Drawing	AY102 MPCMS LIFTING ASSEMBLY NOTES AND PARTS LIST
H-14-107568 001	Current	3/23/2009	Engineering\Drawing	AY102 MPCMS LIFTING ASSEMBLY NOTES AND PARTS LIST
H-14-107568 002	Historic	6/19/2008	Engineering\Drawing	AY102 MPCMS LIFTING ASSEMBLY
H-14-107568 002	Current	3/23/2009	Engineering\Drawing	AY102 MPCMS LIFTING ASSEMBLY
H-14-107569 001	Historic	6/19/2008	Engineering\Drawing	AY102 MPCMS MULTI PROBE ELECTRICAL
H-14-107569 001	Historic	1/27/2009	Engineering\Drawing	AY102 MPCMS MULTI PROBE TERM BOX AY102-WST-TBX-101
H-14-107569 001	Changing	3/23/2009	Engineering\Drawing	AY102 MPCMS MULTI PROBE TERM BOX AY102-WST-TBX-101
H-14-107569 002	Changing	1/27/2009	Engineering\Drawing	AY102 MPCMS MULTI PROBE ELECTRICAL CONNECTION DIAGRAM
H-14-107618 001	Historic	10/20/2008	Engineering\Drawing	AY TANK FARM ROUTE MAP AY-101 & AY-102
H-14-107618 001	Historic	4/22/2009	Engineering\Drawing	AY TANK FARM ROUTE MAP AY-101 & AY-102
H-14-107618 001	Historic	12/9/2009	Engineering\Drawing	AY TANK FARM ROUTE MAP AY-101 & AY-102
H-14-107618 001	Historic	5/18/2011	Engineering\Drawing	AY TANK FARM ROUTE MAP AY-101 & AY-102
H-14-107618 001	Changing	2/5/2013	Engineering\Drawing	AY TANK FARM ROUTE MAP AY-101 & AY-102
H-14-107618 002	Historic	10/20/2008	Engineering\Drawing	AY TANK FARM ROUTE MAP AY-101 AND AY-102
H-14-107618 002	Historic	4/22/2009	Engineering\Drawing	AY TANK FARM ROUTE MAP AY-101 and AY-102
H-14-107618 002	Historic	12/9/2009	Engineering\Drawing	AY TANK FARM ROUTE MAP AY-101 and AY-102
H-14-107618 002	Historic	5/18/2011	Engineering\Drawing	AY TANK FARM ROUTE MAP AY-101 and AY-102
H-14-107618 002	Changing	2/5/2013	Engineering\Drawing	AY TANK FARM ROUTE MAP AY-101 and AY-102
H-14-107638 001	Historic	1/14/2009	Engineering\Drawing	AY101 MPCMS MULTI PROBE TERM BOX AY101-WST-TBX-102
H-14-107638 001	Historic	3/12/2009	Engineering\Drawing	AY101 MPCMS MULTI PROBE TERM BOX AY101-WST-TBX-102
H-14-107638 001	Current	4/23/2009	Engineering\Drawing	AY101 MPCMS MULTI PROBE TERM BOX AY101-WST-TBX-102
H-14-108266 001	Current	8/25/2011	Engineering\Drawing	INSTRUMENTATION AY102-WST-CP-001 LAYOUT & MAT LIST
H-14-108266 002	Current	8/25/2011	Engineering\Drawing	INSTRUMENTATION AY102-WST-CP-001 CONNECTION DIAGRAM
H-14-108266 003	Current	8/25/2011	Engineering\Drawing	INSTRUMENTATION AY102-WST-CP-001 CONNECTION DIAGRAM
H-14-109361 001	Current	8/25/2011	Engineering\Drawing	INSTRUMENTATION AY102-WST-CP-001 WIRING DIAGRAMS
H-14-109361 002	Current	8/25/2011	Engineering\Drawing	INSTRUMENTATION AY102-WST-CP-001 WIRING DIAGRAMS
H-14-109361 003	Current	8/25/2011	Engineering\Drawing	INSTRUMENTATION AY102-WST-CP-001 WIRING DIAGRAMS
H-14-109361 004	Current	8/25/2011	Engineering\Drawing	INSTRUMENTATION AY102-WST-CP-001 WIRING DIAGRAMS
H-14-109361 005	Current	8/25/2011	Engineering\Drawing	INSTRUMENTATION AY102-WST-CP-001 WIRING DIAGRAMS
H-14-109361 006	Current	8/25/2011	Engineering\Drawing	INSTRUMENTATION AY102-WST-CP-001 WIRING DIAGRAMS
H-14-109361 007	Current	8/25/2011	Engineering\Drawing	INSTRUMENTATION AY102-WST-CP-001 WIRING DIAGRAMS
H-14-109361 008	Current	8/25/2011	Engineering\Drawing	INSTRUMENTATION AY102-WST-CP-001 WIRING DIAGRAMS
H-14-109361 009	Current	8/25/2011	Engineering\Drawing	INSTRUMENTATION AY102-WST-CP-001 WIRING DIAGRAMS
H-14-109361 010	Current	8/25/2011	Engineering\Drawing	INSTRUMENTATION AY102-WST-CP-001 WIRING DIAGRAMS
H-14-109361 011	Current	8/25/2011	Engineering\Drawing	INSTRUMENTATION AY102-WST-CP-001 WIRING DIAGRAMS
H-14-109629 002	Historic	5/7/2012	Engineering\Drawing	ELECTRICAL 2-WAY SPLITTER BOX TBX-101 & TBX-102 LAYOUT
H-14-109629 002	Current	11/20/2012	Engineering\Drawing	ELECTRICAL 2-WAY SPLITTER BOX TBX-101 & TBX-102 LAYOUT

H-14-109637 001	Current	1/23/2013	Engineering\Drawing	AY/AZ VTP SYSTEM UPGRADES AY102 ICM COOLING P&ID
H-14-109637 002	Current	1/23/2013	Engineering\Drawing	AY/AZ VTP SYSTEM UPGRADES AY102 ICM COOLING P&ID
H-14-109637 003	Current	1/23/2013	Engineering\Drawing	AY/AZ VTP SYSTEM UPGRADES AY102 ICM COOLING P&ID
H-14-109640 001	Current	1/23/2013	Engineering\Drawing	AY/AZ VTP SYSTEM UPGRADES AY102 ICM COOLING PARTS/MATERIAL LIST
H-14-109640 002	Current	1/23/2013	Engineering\Drawing	AY/AZ VTP SYSTEM UPGRADES AY102 ICM COOLING GENERAL NOTES
H-14-109640 003	Current	1/23/2013	Engineering\Drawing	AY/AZ VTP SYSTEM UPGRADES AY102 ICM COOLING ENLARGED PLAN
H-14-109640 004	Current	1/23/2013	Engineering\Drawing	AY/AZ VTP SYSTEM UPGRADES AY102 ICM COOLING PARTIAL PLAN
H-14-109640 005	Current	1/23/2013	Engineering\Drawing	AY/AZ VTP SYSTEM UPGRADES AY102 ICM COOLING PARTIAL PLAN
H-14-109640 006	Current	1/23/2013	Engineering\Drawing	AY/AZ VTP SYSTEM UPGRADES AY102 ICM COOLING VIEWS
H-14-109640 007	Current	1/23/2013	Engineering\Drawing	AY/AZ VTP SYSTEM UPGRADES AY102 ICM COOLING VIEWS
H-14-109640 008	Current	1/23/2013	Engineering\Drawing	AY/AZ VTP SYSTEM UPGRADES AY102 ICM COOLING DETAILS
H-14-109640 009	Current	1/23/2013	Engineering\Drawing	AY/AZ VTP SYSTEM UPGRADES AY102 ICM COOLING DETAILS
H-14-109640 010	Current	1/23/2013	Engineering\Drawing	AY/AZ VTP SYSTEM UPGRADES AY102 ICM COOLING DETAILS
H-14-109640 011	Current	1/23/2013	Engineering\Drawing	AY/AZ VTP SYSTEM UPGRADES AY102 ICM COOLING DETAIL
H-14-109641 001	Current	1/23/2013	Engineering\Drawing	AY/AZ VTP SYSTEM UPGRADES AY102 ICM COOLING CONCRETE DETAILS
H-14-109641 002	Current	1/23/2013	Engineering\Drawing	AY/AZ VTP SYSTEM UPGRADES AY102 ICM COOLING CONCRETE DETAILS
H-14-109658 002	Current	1/23/2013	Engineering\Drawing	AY/AZ VTP SYSTEM UPGRADES ELECTRICAL POR218-VTP-DP-102 PNLBD SCHED
H-1-48934 002	Current	4/1/1987	Engineering\Drawing	DC-85151 DOORWAY 102 & 103 ENCLOSURES
H-2-131063 001	Historic	3/27/1996	Engineering\Drawing	P & ID AY102K4 RECIRC VENT COOLING
H-2-131063 001	Historic	10/30/1997	Engineering\Drawing	P & ID AY102K4 RECIRC VENT COOLING
H-2-131063 001	Historic	6/19/1998	Engineering\Drawing	P & ID AY102K4 RECIRC VENT COOLING
H-2-131063 001	Historic	7/26/1998	Engineering\Drawing	P & ID AY102K4 RECIRC VENT COOLING
H-2-131065 001	Historic	3/27/1996	Engineering\Drawing	P & ID AY102K4 RECIRC VENT COOLING
H-2-131065 001	Historic	10/30/1997	Engineering\Drawing	P & ID AY102K4 RECIRC VENT COOLING
H-2-131065 001	Historic	6/19/1998	Engineering\Drawing	P & ID AY102K4 RECIRC VENT COOLING
H-2-131068 001	Historic	3/27/1996	Engineering\Drawing	P & ID AY102EW RECIRC COND COOLING
H-2-131068 001	Historic	10/30/1997	Engineering\Drawing	P & ID AY102EW RECIRC COND COOLING
H-2-131068 001	Historic	6/9/1998	Engineering\Drawing	P & ID AY102EW RECIRC COND COOLING
H-2-131068 001	Historic	7/26/1998	Engineering\Drawing	P & ID AY102EW RECIRC COND COOLING
H-2-131087 008	Historic	5/24/1994	Engineering\Drawing	PIPING DETAILS MODULE TIE-IN FOR AY-102
H-2-131087 008	Historic	11/14/1997	Engineering\Drawing	PIPING DETAILS MODULE TIE-IN FOR AY-102
H-2-131087 008	Current	4/7/1998	Engineering\Drawing	PIPING DETAILS MODULE TIE-IN FOR AY-102
H-2-131101 001	Historic	6/15/1994	Engineering\Drawing	PIPING EVAPORATOR AY102-EW-T-I PLAN, SECTIONS & DETAILS
H-2-131101 001	Historic	4/7/1998	Engineering\Drawing	PIPING EVAPORATOR AY102-EW-T-1 PLAN, SECTIONS & DETAILS
H-2-131101 001	Changing	8/16/2011	Engineering\Drawing	PIPING EVAPORATOR AY102-EW-T-1 PLAN, SECTIONS & DETAILS
H-2-131108 015	Historic	6/15/1994	Engineering\Drawing	PIPE SUPPORTS DETAILS EVAPORATOR AY102-EW-T-1
H-2-131108 015	Current	7/23/1998	Engineering\Drawing	PIPE SUPPORTS DETAILS EVAPORATOR AY102-EW-T-1
H-2-131108 016	Historic	6/15/1994	Engineering\Drawing	PIPE SUPPORTS DETAILS EVAPORATOR AY102-EW-T-1
H-2-131108 016	Current	7/23/1998	Engineering\Drawing	PIPE SUPPORTS DETAILS EVAPORATOR AY102-EW-T-1

H-2-131108 017	Historic	6/15/1994	Engineering\Drawing	PIPE SUPPORTS DETAILS EVAPORATOR AY102-EW-T-1
H-2-131108 017	Changing	7/23/1998	Engineering\Drawing	PIPE SUPPORTS DETAILS EVAPORATOR AY102-EW-T-1
H-2-131329 002	Historic	2/10/1995	Engineering\Drawing	INSTM WIRING/ASSEMBLY/DETAIL ENCLOSURE AY102
H-2-131329 002	Historic	10/31/1997	Engineering\Drawing	INSTM WIRING/ASSEMBLY/DETAIL ENCLOSURE AY102
H-2-131329 002	Historic	6/9/1998	Engineering\Drawing	INSTM WIRING/ASSEMBLY/DETAIL ENCLOSURE AY102
H-2-131329 002	Historic	6/24/2005	Engineering\Drawing	INSTM WIRING/ASSEMBLY/DETAIL ENCLOSURE AY102
H-2-131329 002	Changing	4/23/2010	Engineering\Drawing	INSTM WIRING/ASSEMBLY/DETAIL ENCLOSURE AY102
H-2-131331 001	Historic	5/24/1994	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4
H-2-131331 001	Historic	10/31/1997	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4
H-2-131331 001	Historic	6/9/1998	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4
H-2-131331 001	Changing	10/11/2011	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4
H-2-131331 002	Historic	5/24/1994	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4 WIRING
H-2-131331 002	Historic	4/7/1998	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4 WIRING
H-2-131331 002	Current	10/11/2011	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4 WIRING
H-2-131331 003	Historic	5/24/1994	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4 WIRING
H-2-131331 003	Historic	10/31/1997	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4 WIRING
H-2-131331 003	Historic	6/9/1998	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4 WIRING
H-2-131331 003	Changing	10/11/2011	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4 WIRING
H-2-131331 004	Historic	5/24/1994	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4 WIRING
H-2-131331 004	Historic	4/7/1998	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4 WIRING
H-2-131331 004	Current	10/11/2011	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4 WIRING
H-2-131331 005	Historic	5/24/1994	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4 WIRING
H-2-131331 005	Historic	4/7/1998	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4 WIRING
H-2-131331 005	Current	10/11/2011	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4 WIRING
H-2-131331 006	Historic	5/24/1994	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4
H-2-131331 006	Current	7/23/1998	Engineering\Drawing	INSTM ENCLOSURE AY101K4/AY102K4
H-2-131333 002	Historic	6/22/1994	Engineering\Drawing	INSTM AY102K4 RECIRC VENT COOLING LOOP DIAGRAM
H-2-131333 002	Historic	4/7/1998	Engineering\Drawing	INSTM AY102K4 RECIRC VENT COOLING LOOP DIAGRAM
H-2-131333 002	Current	10/13/2011	Engineering\Drawing	INSTM AY102K4 RECIRC VENT COOLING LOOP DIAGRAM
H-2-131333 004	Historic	6/22/1994	Engineering\Drawing	INSTM AY102EW RECIRC COND COOLING LOOP DIAGRAM
H-2-131333 004	Historic	4/7/1998	Engineering\Drawing	INSTM AY102EW RECIRC COND COOLING LOOP DIAGRAM
H-2-131333 004	Current	10/13/2011	Engineering\Drawing	INSTM AY102EW RECIRC COND COOLING LOOP DIAGRAM
H-2-131333 006	Historic	6/22/1994	Engineering\Drawing	INSTM AY102EW RECIRC COND COOLING LOOP DIAGRAM
H-2-131333 006	Historic	4/7/1998	Engineering\Drawing	INSTM AY102EW RECIRC COND COOLING LOOP DIAGRAM
H-2-131333 006	Current	10/13/2011	Engineering\Drawing	INSTM AY102EW RECIRC COND COOLING LOOP DIAGRAM
H-2-131333 008	Historic	6/22/1994	Engineering\Drawing	INSTM AY102K4 RECIRC VENT COOLING LOOP DIAGRAM
H-2-131333 008	Historic	10/30/1997	Engineering\Drawing	INSTM AY102K4 RECIRC VENT COOLING LOOP DIAGRAM
H-2-131333 008	Historic	6/9/1998	Engineering\Drawing	INSTM AY102K4 RECIRC VENT COOLING LOOP DIAGRAM
H-2-131333 008	Changing	10/13/2011	Engineering\Drawing	INSTM AY102K4 RECIRC VENT COOLING LOOP DIAGRAM

H-2-131333 014	Historic	6/22/1994	Engineering\Drawing	INSTM AY102K4 RECIRC VENT COOLING LOOP DIAGRM
H-2-131333 014	Historic	4/7/1998	Engineering\Drawing	INSTM AY102K4 RECIRC VENT COOLING LOOP DIAGRAM
H-2-131333 014	Current	10/13/2011	Engineering\Drawing	INSTM AY102K4 RECIRC VENT COOLING LOOP DIAGRAM
H-2-131333 015	Historic	6/22/1994	Engineering\Drawing	INSTM AY102K4 RECIRC VENT COOLING LOOP DIAGRAM
H-2-131333 015	Historic	4/7/1998	Engineering\Drawing	INSTM AY102K4 RECIRC VENT COOLING LOOP DIAGRAM
H-2-131333 015	Current	10/13/2011	Engineering\Drawing	INSTM AY102K4 RECIRC VENT COOLING LOOP DIAGRAM
H-2-131366 001	Historic	6/22/1994	Engineering\Drawing	ELECTRICAL ELEMENTARY DIAGRAM RECIRC BLDG AY-101 & AY-102
H-2-131366 001	Historic	10/31/1997	Engineering\Drawing	ELECTRICAL ELEMENTARY DIAGRAM RECIRC BLDG AY-101 & AY-102
H-2-131366 001	Historic	6/9/1998	Engineering\Drawing	ELECTRICAL ELEMENTARY DIAGRAM RECIRC BLDG AY-101 & AY-102
H-2-131366 001	Historic	3/20/2000	Engineering\Drawing	ELECTRICAL ELEMENTARY DIAGRAM RECIRC BLDG AY-101 & AY-102
H-2-131366 001	Historic	11/6/2000	Engineering\Drawing	ELECTRICAL ELEMENTARY DIAGRAM RECIRC BLDG AY-101 & AY-102
H-2-131366 001	Changing	8/10/2011	Engineering\Drawing	ELECTRICAL ELEMENTARY DIAGRAM RECIRC BLDG AY-101 & AY-102
H-2-131366 004	Historic	6/22/1994	Engineering\Drawing	ELECTRICAL ELEMENTARY DIAGRAM EVAP TWR AY-102
H-2-131366 004	Historic	10/31/1997	Engineering\Drawing	ELECTRICAL ELEMENTARY DIAGRAM EVAP TWR AY-102
H-2-131366 004	Historic	6/9/1998	Engineering\Drawing	ELECTRICAL ELEMENTARY DIAGRAM EVAP TWR AY-102
H-2-131366 004	Current	8/29/2012	Engineering\Drawing	ELECTRICAL ELEMENTARY DIAGRAM EVAP TWR AY-102
H-2-28403 007	Changing	8/7/1992	Engineering\Drawing	GENERAL PIPING LAYOUT CHEMICAL PREPARATION ROOM #40 TK-A-101 & TK-A-102
H-2-64365 010	Historic	6/24/2005	Engineering\Drawing	241-AY-801A INSTR PANEL ARRANGEMENT AY101-LIT-101/102-LIT-101
H-2-64365 010	Current	4/21/2010	Engineering\Drawing	241-AY-801A INSTR PANEL ARRANGEMENT AY101-LIT-101/102-LIT-101
H-2-64365 011	Historic	6/24/2005	Engineering\Drawing	241-AY-801A INSTR PANEL ARRANGEMENT KPAS-101-1/KPAS-102-1
H-2-64365 011	Current	4/21/2010	Engineering\Drawing	241-AY-801A INSTR PANEL ARRANGEMENT KPAS-101-1/KPAS-102-1
H-2-64462 002	Historic	7/24/1998	Engineering\Drawing	P&ID TANK 241-AY-102 ANNULUS
H-2-64462 002	Historic	12/30/1998	Engineering\Drawing	P&ID TANK 241-AY-102 ANNULUS
H-2-64462 002	Historic	2/28/2000	Engineering\Drawing	P&ID TANK 241-AY-102 ANNULUS
H-2-64462 002	Historic	5/8/2000	Engineering\Drawing	P&ID TANK 241-AY-102 ANNULUS
H-2-64462 002	Historic	8/28/2000	Engineering\Drawing	P&ID TANK 241-AY-102 ANNULUS
H-2-64462 002	Historic	2/18/2005	Engineering\Drawing	P&ID TANK 241-AY-102 ANNULUS
H-2-64462 002	Historic	2/4/2008	Engineering\Drawing	P&ID TANK 241-AY-102 ANNULUS
H-2-64462 002	Historic	5/22/2008	Engineering\Drawing	P & ID TANK 241-AY-102 ANNULUS
H-2-64462 002	Historic	1/20/2010	Engineering\Drawing	P & I D TANK 241-AY-102 ANNULUS
H-2-64462 002	Historic	11/10/2010	Engineering\Drawing	P & I D TANK 241-AY-102 ANNULUS
H-2-64462 002	Historic	12/17/2010	Engineering\Drawing	P & I D TANK 241-AY-102 ANNULUS
H-2-64462 002	Historic	1/25/2012	Engineering\Drawing	P & I D TANK 241-AY-102 ANNULUS
H-2-64462 002	Historic	4/12/2012	Engineering\Drawing	P & I D TANK 241-AY-102 ANNULUS
H-2-64462 002	Changing	10/16/2012	Engineering\Drawing	P & I D TANK 241-AY-102 ANNULUS
H-2-70764 001	Changing	10/30/1980	Engineering\Drawing	PIPING PLAN 241-AX-B VALVE PIT TO 241-AY-TK 101 & 102
H-2-70764 002	Current	10/30/1980	Engineering\Drawing	PIPING PLAN 241-AX-B VALVE PIT TO 241-AY-TK-101 & 102
H-2-70766 001	Current	10/30/1980	Engineering\Drawing	PIPING SUPPORT PLAN 241-AX-B VALVE PIT TO 241-AY-TK-101 & 102
H-2-74908 001	Historic	10/1/1979	Engineering\Drawing	101AY 102AY 101AZ & 102AZ FIC GAUGE COMP TIE-IN

H-2-74908 002	Historic	10/1/1979	Engineering\Drawing	101AY 102AY 101AZ & 102AZ FIC GAUGE COMP TIE-IN
H-2-77323 001	Current	5/2/1996	Engineering\Drawing	ABANDONED ANNULUS VENT PIPING TANK 241-AY-102
H-2-79219 001	Current	6/28/1994	Engineering\Drawing	TWRS - 42 FLEXIBLE RECEIVER ASSEMBLY AY-102-02B SLUICE PIT"
H-2-79276 001	Current	11/3/1994	Engineering\Drawing	TWRS, AY-102-02B SLUICE PIT AGITATOR PUMP FLEX RCVR BAG ASSY
H-2-79276 002	Current	3/15/1994	Engineering\Drawing	TWRS, AY-102-02B SLUICE PIT AGITATOR PUMP FLEX RCVR BAG ASSY
H-2-79276 003	Current	11/3/1994	Engineering\Drawing	TWRS, AY-102-02B SLUICE PIT AGITATOR PUMP FLEX RCVR BAG ASSY
H-2-818434 001	Historic	2/26/1997	Engineering\Drawing	CIVIL 241-AY-102 TRANSFER SYSTEM PLAN & PROFILE
H-2-818434 001	Current	4/13/1998	Engineering\Drawing	CIVIL 241-AY-102 TRANSFER SYSTEM PLAN & PROFILE
H-2-818540 001	Historic	2/26/1997	Engineering\Drawing	PIPING TANK 241-AY-102 PLAN
H-2-818540 001	Historic	4/8/1998	Engineering\Drawing	PIPING TANK 241-AY-102 PLAN
H-2-818540 001	Changing	8/5/1998	Engineering\Drawing	PIPING TANK 241-AY-102 PLAN
H-2-818540 002	Historic	2/26/1997	Engineering\Drawing	PIPING TANK 241-AY-102 DETAILS
H-2-818540 002	Historic	4/24/1998	Engineering\Drawing	PIPING TANK 241-AY-102 DETAILS
H-2-818540 002	Historic	8/11/1998	Engineering\Drawing	PIPING TANK 241-AY-102 DETAILS
H-2-818540 002	Historic	8/10/1999	Engineering\Drawing	PIPING TANK 241-AY-102 DETAILS
H-2-818540 002	Historic	7/22/2003	Engineering\Drawing	PIPING TANK 241-AY-102 DETAILS
H-2-818540 002	Current	1/15/2008	Engineering\Drawing	PIPING TANK 241-AY-102 DETAILS
H-2-818540 003	Historic	2/26/1997	Engineering\Drawing	PIPING TANK 241-AY-102 SECTIONS & DETAILS
H-2-818540 003	Current	4/24/1998	Engineering\Drawing	PIPING TANK 241-AY-102 SECTIONS & DETAILS
H-2-818540 004	Historic	2/26/1997	Engineering\Drawing	PIPING TANK 241-AY-102 SECTIONS & DETAILS
H-2-818540 004	Current	4/9/1998	Engineering\Drawing	PIPING TANK 241-AY-102 SECTIONS & DETAILS
H-2-818540 005	Historic	4/24/1998	Engineering\Drawing	PIPING TANK 241-AY-102 SECTIONS & DETAILS
H-2-818540 005	Historic	8/11/1998	Engineering\Drawing	PIPING TANK 241-AY-102 SECTIONS & DETAILS
H-2-818540 005	Current	1/15/2008	Engineering\Drawing	PIPING TANK 241-AY-102 SECTIONS & DETAILS
H-2-818540 006	Historic	4/24/1998	Engineering\Drawing	PIPING TANK 241-AY-102 SECTIONS & DETAILS
H-2-818540 006	Historic	8/5/1998	Engineering\Drawing	PIPING TANK 241-AY-102 SECTIONS & DETAILS
H-2-818540 006	Current	1/15/2008	Engineering\Drawing	PIPING TANK 241-AY-102 SECTIONS & DETAILS
H-2-818540 007	Historic	4/24/1998	Engineering\Drawing	PIPING TANK 241-AY-102 SECTIONS & DETAILS
H-2-818540 007	Historic	8/5/1998	Engineering\Drawing	PIPING TANK 241-AY-102 SECTIONS & DETAILS
H-2-818540 007	Current	1/15/2008	Engineering\Drawing	PIPING TANK 241-AY-102 SECTIONS & DETAILS
H-2-818541 001	Historic	2/26/1997	Engineering\Drawing	PIPING TANK 241-AY-102 SECTION & PLAN
H-2-818541 001	Historic	4/8/1998	Engineering\Drawing	PIPING TANK 241-AY-102 SECTION & PLAN
H-2-818541 001	Current	8/5/1998	Engineering\Drawing	PIPING TANK 241-AY-102 SECTION & PLAN
H-2-818560 001	Historic	1/26/1997	Engineering\Drawing	PROJECT W-320 P & ID TANK 241-AY-102
H-2-818560 001	Historic	2/26/1998	Engineering\Drawing	PROJECT W-320 P & ID TANK 241-AY-102
H-2-818560 001	Historic	4/27/1998	Engineering\Drawing	PROJECT W-320 P & ID TANK 241-AY-102
H-2-818560 001	Historic	7/26/1998	Engineering\Drawing	PROJECT W-320 P & ID TANK 241-AY-102
H-2-818560 002	Historic	1/26/1997	Engineering\Drawing	PROJECT W-320 P & ID TANK 241-AY-102
H-2-818560 002	Historic	2/26/1998	Engineering\Drawing	PROJECT W-320 P & ID TANK 241-AY-102

H-2-818560 002	Historic	4/27/1998	Engineering\Drawing	PROJECT W-320 P & ID TANK 241-AY-102
H-2-818560 002	Historic	7/26/1998	Engineering\Drawing	PROJECT W-320 P & ID TANK 241-AY-102
H-2-818560 003	Historic	1/26/1997	Engineering\Drawing	PROJECT W-320 P & ID TK 241-AY-102
H-2-818560 003	Historic	2/26/1998	Engineering\Drawing	PROJECT W-320 P & ID TK 241-AY-102
H-2-818560 003	Historic	4/27/1998	Engineering\Drawing	PROJECT W-320 P & ID TK 241-AY-102
H-2-818560 003	Historic	7/26/1998	Engineering\Drawing	PROJECT W-320 P & ID TANK 241-AY-102
H-2-818560 004	Historic	2/26/1997	Engineering\Drawing	PROJECT W-320 P & ID TANK 241-AY-102
H-2-818560 004	Historic	2/26/1998	Engineering\Drawing	PROJECT W-320 P & ID TANK 241-AY-102
H-2-818560 004	Historic	4/27/1998	Engineering\Drawing	PROJECT W-320 P & ID TANK 241-AY-102
H-2-818560 004	Historic	7/26/1998	Engineering\Drawing	PROJECT W-320 P & ID TANK 241-AY-102
H-2-818560 005	Historic	2/26/1998	Engineering\Drawing	PROJECT W-320 P&ID TANK 241-AY-102
H-2-818560 005	Historic	4/27/1998	Engineering\Drawing	PROJECT W-320 P&ID TANK 241-AY-102
H-2-818560 005	Historic	7/26/1998	Engineering\Drawing	PROJECT W-320 P&ID TANK 241-AY-102
H-2-818568 001	Historic	2/26/1997	Engineering\Drawing	INSTRUMENTATION INSTRUMENTS LOCATION PLAN TANK 241-AY-102
H-2-818568 001	Historic	4/24/1998	Engineering\Drawing	INSTRUMENTATION INSTRUMENTS LOCATION PLAN TANK 241-AY-102
H-2-818568 001	Changing	8/11/1998	Engineering\Drawing	INSTRUMEMTATION TANK 241-AY-102 INSTRUMENTS LOCATION PLAN
H-2-818568 002	Historic	4/28/1998	Engineering\Drawing	INSTRUMENTATION TANK 241-AY-102 INSTALLATION DETAILS
H-2-818568 002	Historic	8/11/1998	Engineering\Drawing	INSTRUMENTATION TANK 241-AY-102 INSTALLATION DETAILS
H-2-818568 002	Changing	2/18/1999	Engineering\Drawing	INSTRUMENTATION TANK 241-AY-102 INSTALLATION DETAILS
H-2-818568 003	Historic	4/28/1998	Engineering\Drawing	INSTRUMENTATION TANK 241-AY-102 DET & CONN DIAG
H-2-818568 003	Historic	8/11/1998	Engineering\Drawing	INSTRUMENTATION TANK 241-AY-102 DET & CONN DIAG
H-2-818568 003	Changing	6/17/1999	Engineering\Drawing	INSTRUMENTATION TANK 241-AY-102 DET & CONN DIAG
H-2-818568 004	Historic	4/28/1998	Engineering\Drawing	INSTRUMENTATION TANK 241-AY-102 VC--622 ARRANGEMENT
H-2-818568 004	Changing	8/11/1998	Engineering\Drawing	INSTRUMENTATION TANK 241-AY-102 VC-0622 ARRANGMENT
H-2-818568 005	Current	8/11/1998	Engineering\Drawing	INSTRUMENTATION TANK 241-AY-102 SECTIONS & DETAILS
H-2-818568 006	Current	8/11/1998	Engineering\Drawing	INSTRUMENTATION TANK 241-AY-102 FLOW XMTR ENCL ASSY
H-2-818568 007	Changing	8/11/1998	Engineering\Drawing	INSTRUMENTATION TANK 241-AY-102 FLOW XMTR ENCL DETAILS
H-2-818602 001	Historic	3/20/1997	Engineering\Drawing	INSTRUMENTATION LOOP DIAGRAM TANK 241-AY-102 PRESSURE
H-2-818602 001	Historic	4/28/1998	Engineering\Drawing	INSTRUMENTATION LOOP DIAGRAM TANK 241-AY-102 PRESSURE
H-2-818602 001	Changing	8/11/1998	Engineering\Drawing	INSTRUMENTATION LOOP DIAGRAM TANK 241-AY-102 PRESSURE
H-2-820724 001	Historic	10/7/1994	Engineering\Drawing	CIVIL 241-AY-102 ENLARGED SITE PLAN
H-2-820724 001	Historic	4/13/1998	Engineering\Drawing	CIVIL 241-AY-102 ENLARGED SITE PLAN
H-2-820724 001	Current	7/24/1998	Engineering\Drawing	CIVIL 241-AY-102 ENLARGED SITE PLAN
H-2-92481 008	Historic	6/24/2005	Engineering\Drawing	ANNULUS EXHAUST SYS CONNECTION DIAGRAM AY102-VTA-ENCL-200
H-2-92481 008	Current	4/21/2010	Engineering\Drawing	ANNULUS EXHAUST SYS CONNECTION DIAGRAM AY102-VTA-ENCL-200
H-2-93374 001	Changing	10/15/1987	Engineering\Drawing	241-AY-102 ANNULUS EXHAUST STACK MONITOR INSTALLATION
H-2-93374 002	Historic	5/30/1997	Engineering\Drawing	241-AY-102 ANNULUS EXHAUST STACK MONITOR FLOW DIA & ELEC
H-2-93374 002	Historic	2/28/2000	Engineering\Drawing	241-AY-102 ANNULUS EXHAUST STACK MONITOR FLOW DIA & ELEC
H-2-93374 002	Historic	7/15/2003	Engineering\Drawing	241-AY-102 ANNULUS EXHAUST STACK MONITOR FLOW DIA & ELEC

H-2-93374 002	Historic	6/24/2005	Engineering\Drawing	241-AY-102 ANNULUS EXHAUST STACK MONITOR FLOW DIA & ELEC
H-2-93374 002	Current	4/18/2011	Engineering\Drawing	241-AY-102 ANNULUS EXHAUST STACK MONITOR FLOW DIA & ELEC
H-3-32625 001	Historic	10/1/1973	Engineering\Drawing	SPRAY SOLIDIFIER PRCS PPG FLOW DIAG EDL-102
H-3-32626 001	Historic	1/21/1974	Engineering\Drawing	SPRAY SOLIDIFIER INST ENG DIAG EDL-102
H-4-30531 001	Current	1/6/1977	Engineering\Drawing	MODULE ASSEMBLY - CONTROL MOTOR CONTROL RELAY CENTER II C1150 IDENT17 & 102
H-4-30531 002	Current	1/6/1977	Engineering\Drawing	MODULE ASSEMBLY - CONTROL MOTOR CONTROL RELAY CENTER II C1150 IDENT17 & 102
H-4-33718 001	Current	4/8/1981	Engineering\Drawing	DRAWER LAYOUT MODEL AD-I-SA-12-1024 ADACUS
H-4-36502 245	Current	7/22/1981	Engineering\Drawing	PIPE SUPPORT REACTOR CONTAINMENT BUILDING FROM E-215 TO PIPEWAY FORCLOSED LOOP SYSTEM 102 AS BUILT I
H-4-36502 246	Current	7/22/1981	Engineering\Drawing	PIPE SUPPORT REACTOR CTMT BLDG FROM E-215 TO PIPEWAY FOR CLOSED LOOPSYSTEM 102 SYSTEM 25 AS BUILT PR
H-4-36502 558	Current	7/13/1981	Engineering\Drawing	PIPE SUPPORT REACTOR CONTAINMENT BUILDING FROM PIPE WAY FOR CLS 102TO E-215 COOLER SYSTEM 25 AS BUIL
H-4-36502 567	Current	7/24/1981	Engineering\Drawing	PIPE SUPPORT DESIGN REQUIREMENT REACTOR CTMT BLDG FROM E215 TO PIPEWAY FOR CLS 102 SYSTEM 25 AS BUIL
H-4-52057 001	Current	6/20/1979	Engineering\Drawing	DESIGN LAYOUT - DRIP POT CHANGE FIXTURE IEM CELL M211 IDENT 102
H-4-52057 002	Current	11/11/1911	Engineering\Drawing	DESIGN LAYOUT - DRIP POT CHANGE FIXTURES IEM CELL M211 IDENT 102
H-4-52057 003	Current	11/11/1911	Engineering\Drawing	DESIGN LAYOUT-DRIP POT CHANGE FIXTURE IEM CELL M-211 IDENT 102
HNF-1682	Current	2/10/2000	Engineering\Supporting Document	TANK 241-AY-102, GRAB SAMPLES FOR THE WASTE RETRIEVAL SLUICING PROJECT ANALYTICAL RESULTS FOR THE FINAL
HNF-2254	Current	3/25/1998	Engineering\Supporting Document	RELIABILITY STUDY OF THE AY-102 ANNULUS VENTILATION SYSTEM
HNF-2312	Current	3/23/1998	Engineering\Supporting Document	ACCEPTANCE TEST REPORT FOR THE AY-102 ENRAF DENSITOMETER
HNF-2317	Current	3/12/1998	Engineering\Supporting Document	PROJECT W-320 HIGH VACUUM 241-AY-102 ANNULUS VENTILATION SYSTEM OPERABILITY TEST RPORT
HNF-2637	Current	8/31/1998	Engineering\Supporting Document	PROJECT W-320 PORTABLE EXHAUSTER EVALUATION FOR TANK 241-AY-102
HNF-2958	Historic	7/2/1998	Engineering\Supporting Document	TANK 241-AY-102 GRAB SAMPLING AND ANALYSIS PLAN FOR WASTE RETRIEVAL SLUICING SYSTEM PROCESS CONTROL
HNF-2958	Historic	11/3/1998	Engineering\Supporting Document	TANK 241-AY-102 GRAB SAMPLING AND ANALYSIS PLAN FOR WASTE RETRIEVAL SLUICING SYSTEM PROCESS CONTROL
HNF-2958	Historic	12/21/1998	Engineering\Supporting Document	TANK 241-AY-102 GRAB SAMPLING AND ANALYSIS PLAN FOR WASTE RETRIEVAL SLUICING SYSTEM PROCESS CONTROL
HNF-2958	Historic	6/15/1999	Engineering\Supporting Document	TANK 241-AY-102 GRAB SAMPLING AND ANALYSIS PLAN FOR WASTE RETRIEVAL SLUICING SYSTEM PROCESS CONTROL
HNF-2958	Current	8/18/1999	Engineering\Supporting Document	TANK 241-AY-102 GRAB SAMPLING AND ANALYSIS PLAN FOR WASTE RETRIEVAL SLUICING SYSTEM PROCESS CONTROL
HNF-2965	Current	7/24/1998	Engineering\Supporting Document	OPERATIONAL TEST REPORT FOR THE AY-102 ENRAF DENSITOMETER CONTROL AND ACQUISITION SYSTEM
HNF-3254	Current	10/8/1998	Engineering\Supporting Document	CONTINGENCY PLAN FOR DEPLOYMENT OF THE VOID FRACTION INSTRUMENT IN TANK 241-AY-102
HNF-4798	Current	7/28/1999	Engineering\Supporting Document	TANK 241-AY-102 ANNULUS CONTINUOUS AIR MONITOR HIGH READINGS
HNF-4818	Current	7/21/1999	Engineering\Supporting Document	FINAL RESULTS OF DOUBLE-SHELL TANK 241-AY-102 ULTRASONIC INSPECTION
HNF-5391	Current	11/17/1999	Engineering\Supporting Document	TEST PLAN FOR RETRIEVAL TESTING OF SLUDGE FROM TANKS 241-AZ-101, 241-AZ-102, AND 241-AY-102
HNF-6047	Historic	9/25/2000	Engineering\Supporting Document	TANK 241-AY-102 CORES 270, 271, 272, AND 273 ANALYTICAL RESULTS FOR THE FINAL REPORT
HNF-6047	Current	9/25/2002	Engineering\Supporting Document	TANK 241-AY-102 CORES 270, 271, 272, AND 273 ANALYTICAL RESULTS FOR THE FINAL REPORT
HNF-SD-TWR-PE-001	Current	7/14/1997	Engineering\Supporting Document	COMPUTER SIMULATION OF THE LEACHING AND WASHING OF WASTE IN TANKS C-106 AY-102 AZ-101 AND AZ-102
HNF-SD-W320-ABU-003	Current	6/26/1997	Engineering\Supporting Document	PROJECT W-320, 241-AY-102 02A PIT EQUIPMENT AND MODIFICATIONS DOCUMENTATION REQUIRED FOR ACCEPTAN(
HNF-SD-W320-CN-001	Current	4/25/1997	Engineering\Supporting Document	TANK FARM DEFLAGRATION RATES DUE TO VARIOUS IGNITION SOURCES RELATEDTO SLUICING C-106 TO AY-102
HNF-SD-W320-PROC-001	Historic	6/17/1997	Engineering\Supporting Document	PROJECT W-320 TANK 241-AY-102 PUMP/WINCH MAINTENANCE PROCEDURE
HNF-SD-W320-PROC-001	Current	5/20/1998	Engineering\Supporting Document	PROJECT W320 TANK 241-AY-102 PUMP/WINCH MAINTENANCE PROCEDURE
HNF-SD-W320-PROC-001	Historic	10/16/1997	Engineering\Supporting Document	PROJECT W320 TANK 241-AY-102 PUMP/WINCH MAINTENANCE PROCEDURE
HNF-SD-WM-ABU-024	Current	12/18/1997	Engineering\Supporting Document	241-C-106 AND 241-AY-102 SHMS-C ACCEPTANCE FOR BENEFICAL USE ABU
HNF-SD-WM-CN-099	Historic	7/22/1997	Engineering\Supporting Document	RADIOLOGICAL AND TOXICOLOGICAL CALCULATIONS FOR AY-102 AND C-106 HEPA FILTERS AND PREFILTERS

HNF-SD-WM-CN-099	Historic	8/11/1998	Engineering\Supporting Document	RADIOLOGICAL AND TOXICOLOGICAL ANALYSES OF TANK 241-AY-102 AND TANK 241-C-106 VENTILATION SYSTEMS
HNF-SD-WM-CN-099	Historic	8/24/1998	Engineering\Supporting Document	RADIOLOGICAL AND TOXICOLOGICAL ANALYSES OF TANK 241-AY-102 AND TANK 241-C-106 VENTILATION SYSTEMS
HNF-SD-WM-CN-099	Historic	9/10/1998	Engineering\Supporting Document	RADIOLOGICAL AND TOXICOLOGICAL ANALYSES OF TANK 241-AY-102 AND TANK 241-C-106 VENTILATION SYSTEMS
HNF-SD-WM-CN-099	Historic	9/15/1998	Engineering\Supporting Document	RADIOLOGICAL AND TOXICOLOGICAL ANALYSES OF TANK 241-AY-102 AND TANK 241-C-106 VENTILATION SYSTEMS
HNF-SD-WM-CN-099	Historic	10/15/1998	Engineering\Supporting Document	RADIOLOGICAL AND TOXICOLOGICAL ANALYSES OF TANK 241-AY-102 AND TANK 241-C-106 VENTILATION SYSTEMS
HNF-SD-WM-CN-099	Current	12/16/1998	Engineering\Supporting Document	RADIOLOGICAL AND TOXICOLOGICAL ANALYSES OF TANK 241-AY-102 AND TANK 241-C-106 VENTILATION SYSTEMS
HNF-SD-WM-CN-110	Current	8/5/1997	Engineering\Supporting Document	CONSEQUENCES OF A RADIOACTIVE SURFACE POOL RESULTING FROM WASTE TRANSFER OPERATIONS BETWEEN TANK
HNF-SD-WM-DP-222	Current	1/31/1997	Engineering\Supporting Document	60-DAY WASTE COMPATIBILITY SAFETY ISSUES AND FINAL RESULTS FOR AY-102 GRAB SAMPLES
HNF-SD-WM-DP-299	Historic	5/14/1998	Engineering\Supporting Document	TANK 241-AY-102, GRAB SAMPLES 2AY-97-1, 2AY-97-2, 2AY-97-3, 2AY-97-4 AND 2AY-97-5 ANALYTICAL RESULTS FOR T
HNF-SD-WM-DP-299	Current	8/12/1998	Engineering\Supporting Document	TANK 241-AY-102, GRAB SAMPLES 2AY-97-1, 2AY-97-2, 2AY-97-3, 2AY-97-4 AND 2AY-97-5 ANALYTICAL RESULTS FOR T
HNF-SD-WM-ER-454	Historic	1/3/2001	Engineering\Supporting Document	TANK CHARACTERIZATION REPORT FOR DOUBLE-SHELL TANK 241-AY-102
HNF-SD-WM-TI-756	Current	4/4/1997	Engineering\Supporting Document	CHEMICAL AND CHEMICALLY-RELATED CONSIDERATIONS ASSOCIATED WITH SLUICING TANK C-106 WASTE TO TANK AY
OSD-RAP-54802	Current	3/18/2013	Engineering\Supporting Document	AY-102 Annulus Exhaust Ventilation System Shutdown Recovery Action Plan
PRHA-00292	Current	6/19/2008	Engineering\Supporting Document	AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM (MPCMS)
PRHA-00538	Current	10/16/2008	Engineering\Supporting Document	AY-102 MULTI CORROSION MONITORING SYSTEM (MPCMS)
PRHA-00557	Current	11/3/2008	Engineering\Supporting Document	AY-102 MPCMS C-RING COUPONS AND PART MODIFICATIONS
PRHA-00566	Current	11/10/2008	Engineering\Supporting Document	AY-102 MPCMS PART MODIFICATIONS
PRHA-00634	Current	1/8/2009	Engineering\Supporting Document	241-AY-102 MPCMS ELECTRICAL UPGRADES
PRHA-00643	Current	2/3/2009	Engineering\Supporting Document	241-AY-102 ENRAF RELOCATION FOR THE MPCMS INSTALLATION
PRHA-00670	Current	2/3/2009	Engineering\Supporting Document	241-AY-102 MPCMS FACTORY ACCEPTANCE TEST (FAT) MODIFICATION
PRHA-00671	Current	2/4/2009	Engineering\Supporting Document	AY-102 ENRAF RELOCATION DRAWINGS FOR THE MPCMS INSTALLATION
PRHA-00736	Current	3/19/2009	Engineering\Supporting Document	241-AY-102 MPCMS FABRICATION AS-BUILT DRAWING
PRHA-00743	Current	3/25/2009	Engineering\Supporting Document	241-AY-102 MPCMS STRUCTURAL ANALYSIS REVISION
PRHA-00760	Current	4/9/2009	Engineering\Supporting Document	ENRAF AY102-WST-LIT-101 RELOCATED FROM R-73 TO R-39.
PRHA-00770	Current	4/23/2009	Engineering\Supporting Document	241-AY-102 MPCMS CONTRUCTION ACCEPTANCE AND PROCESS TEST
PRHA-00787	Historic	4/27/2009	Engineering\Supporting Document	AY-102 MPCMS FIELD ELECTRICAL MODIFICATION
PRHA-00787	Current	6/17/2009	Engineering\Supporting Document	AY-102 MPCMS FIELD ELECTRICAL MODIFICATION.
PRHA-00822	Current	5/21/2009	Engineering\Supporting Document	241-AY-102 MPCMS FACTORY ACCEPTANCE TEST REPORT (FATR)
PRHA-00855	Current	6/18/2009	Engineering\Supporting Document	241-AY-102 ENRAF SHIELDING WIRE CHANGES
PRHA-01089	Current	12/14/2009	Engineering\Supporting Document	CORRECT FILTER LOSSES FOR 241-AY-101 & 102 AND 241-AZ FARMS
PRHA-01284	Current	3/2/2010	Engineering\Supporting Document	INSTALL PRESSURE INDICATOR AY-101, AY-102, AZ-101, AZ-102
PRHA-01469	Current	6/16/2010	Engineering\Supporting Document	TANK 241-AY-102 WASTE FEED DELIVERY FLOWSHEET
PRHA-01533	Current	6/23/2010	Engineering\Supporting Document	241-AY-101 AND 241-AY-102 MPCMS C-RING COUPON PHOTOGRAPHS
PRHA-01932	Current	5/18/2012	Engineering\Supporting Document	AY-102 In-Tank Upgrades/T3W11
PRHA-01964	Current	8/24/2012	Engineering\Supporting Document	Relocate AY102-WSTA-LDT-152 ENRAF From Riser 90 to 89
PRHA-01969	Current	10/5/2012	Engineering\Supporting Document	Obtain Sample from AY-102 Using Drill Sampling Crawler (DSC)
PRHA-01973	Current	12/12/2012	Engineering\Supporting Document	AY-102 Emergency Pumping Equipment
RPP-10370	Current	7/8/2002	Engineering\Supporting Document	WASTE COMPATIBILITY ASSESSMENT OF CONDENSATE FROM TANK 241-AZ-151 WITH TANK 241-AY-101 WASTE AND T,
RPP-11757	Current	9/25/2002	Engineering\Supporting Document	EVALUATION OF TANK 241-AY-102 WASTE MIXING USING AIRLIFT CIRCULATORS

RPP-12077	Current	9/25/2002	Engineering\Supporting Document	ELECTROCHEMICAL CORROSION STUDY FOR TANK 241-AY-102 SLUDGE
RPP-12387	Historic	2/26/2004	Engineering\Supporting Document	CAUSTIC DYNAMIC MIXING ANALYSES FOR TANKS AY101/ AY102 /AZ102/ AN102/ AND AN107
RPP-12387	Current	5/19/2005	Engineering\Supporting Document	CAUSTIC DYNAMIC MIXING ANALYSES FOR TANKS 241- AY-101 241- AY-102 241-AZ-102 241- AN-102 AND 241-AN-107
RPP-13321	Current	10/30/2002	Engineering\Supporting Document	DOUBLE-SHELL TANK 241-AY-102 CHEMISTRY CONTROL SAMPLING AND ANALYSIS PLAN FOR FISCAL YEAR 2003
RPP-14387	Current	2/24/2003	Engineering\Supporting Document	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-C-106 (SST-02-14) WASTE WITH TANK 241-AY-102 WASTE
RPP-15512	Current	5/16/2003	Engineering\Supporting Document	STRUCTURAL ANALYSIS FOR PROPOSED ENRAF INSTALLATION ON 3 RISERS OF TANKS 241-AY-101/102"
RPP-15622	Current	4/18/2003	Engineering\Supporting Document	TANK 241-AY-102 PUSH MODE CORE SAMPLING AND ANALYSIS PLAN FOR FISCAL YEAR 2003
RPP-15758	Current	6/3/2003	Engineering\Supporting Document	ANALYSIS OF CORROSION PRODUCT RETRIEVED FROM THE PRIMARY TANK WALL IN THE ANNULUS OF TANK 241-AY-10
RPP-16644	Current	6/4/2003	Engineering\Supporting Document	WASTE COMPATIBILITY ASSESSMENT OF 244-AR VAULT WASTE WITH 241-AY-102 WASTE
RPP-16716	Current	7/1/2003	Engineering\Supporting Document	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AZ-151 WASTE WITH TANK 241-AY-102 AND 241-AY-101 WASTE
RPP-18243	Current	10/9/2003	Engineering\Supporting Document	TANK 241-AY-102 PUSH-MODE CORE SAMPLING AND ANALYSIS PLAN FOR FISCAL YEAR 2004
RPP-18399	Current	10/30/2003	Engineering\Supporting Document	ELECTROCHEMICAL CORROSION STUDIES CORE 308, SEGMENTS 14R1 AND 14R2, TANK 241-AY-102
RPP-18436	Current	10/30/2003	Engineering\Supporting Document	CALCULATION OF THE EFFECT OF SLUDGE CAUSTIC DEMAND ON CHEMISTRY CONTROL OF TANK 241-AY-102
RPP-18648	Current	11/6/2003	Engineering\Supporting Document	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AZ-151 CONDENSATE WITH TANK 241-AY-102 WASTE AND TANK 24
RPP-18743	Current	11/6/2003	Engineering\Supporting Document	WASTE GROUP ASSIGNMENT OF DOUBLE-SHELL TANK 241-AY-102 FOR TRANSFER FROM TANK 241-AZ-151
RPP-19888	Current	2/23/2004	Engineering\Supporting Document	TEST PLAN FOR COLD TESTING TANK 241-AY-102 SLUDGE SIMULANT
RPP-20168	Historic	3/25/2004	Engineering\Supporting Document	TEST PLAN/PROCEDURE FOR ELECTROCHEMICAL CORROSION TESTING OF TANK 241-AN-107 TANK 241-AY-102 AND TA
RPP-20168	Historic	5/6/2004	Engineering\Supporting Document	TEST PLAN/PROCEDURE FOR ELECTROCHEMICAL CORROSION TESTING OF TANK 241-AN-107 TANK 241-AY-102 AND TA
RPP-20168	Current	5/24/2004	Engineering\Supporting Document	TEST PLAN/PROCEDURE FOR ELECTROCHEMICAL CORROSION TESTING OF TANK 241-AN-107 TANK 241-AY-102 AND TA
RPP-21071	Current	6/29/2004	Engineering\Supporting Document	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AZ-151 CONDENSATE WITH TANK 241-AY-102 WASTE AND TANK 24
RPP-21138	Current	6/21/2004	Engineering\Supporting Document	TANK BUMP CALCULATION FOR TANK 241-AY-102
RPP-21377	Current	2/8/2005	Engineering\Supporting Document	TANK 241-AY-101 SOLIDS AND LIQUID LEVELS AFTER TRANSFER OF TANK 241-C-102
RPP-21380	Current	2/8/2005	Engineering\Supporting Document	AY-101 SUPERNATANT PUMP PROCESS FLOW FOR C-102 SLUICING
RPP-21520	Current	2/2/2005	Engineering\Supporting Document	ANALYSIS OF C-FARM AND AY-FARM DOME LOADS FOR C-102 RETRIEVAL
RPP-22124	Current	8/25/2004	Engineering\Supporting Document	AY-102 SLURRY DISTRIBUTOR LIFT ANALYSIS
RPP-22782	Current	12/13/2004	Engineering\Specification	PROJECT W-211 RETRIEVAL CONTROL SYSTEM SYSTEM REQUIREMENTS SPECIFICATION FOR TANK 241-AY-102
RPP-22783	Current	12/13/2004	Engineering\Supporting Document	PROJECT W-211 RETRIEVAL CONTROL SYSTEM QUALIFICATION TEST PROCEDURE FOR TANK 241-AY-102
RPP-22821	Historic	9/30/2004	Engineering\Specification	SPECIFICATION FOR REFURBISHMENT/DESIGN/MODIFICATION AND TESTING OF A VERTICAL TURBINE TRANSFER PUMP
RPP-22821	Current	7/18/2005	Engineering\Specification	SPECIFICATION FOR REFURBISHMENT, DESIGN, MODIFICATION, AND TESTING OF A VERTICAL TURBINE TRANSFER PUM
RPP-23754	Historic	12/7/2004	Engineering\Supporting Document	ENGINEERING EVALUATION OF SPECIAL TOOLS OR TEST EQUIPMENT AY-102 PUMP INSTALLATION DEPLOYMENT CANN
RPP-23754	Current	3/8/2005	Engineering\Supporting Document	ENGINEERING EVALUATION OF SPECIAL TOOLS OR TEST EQUIPMENT AY-102 PUMP INSTALLATION DEPLOYMENT CANN
RPP-24394	Current	9/29/2005	Engineering\Supporting Document	PROJECT W-211 QUALIFICATION TEST REPORT FOR THE TANK 241-AY-102 RETRIEVAL CONTROL SYSTEM
RPP-29464	Current	4/14/2006	Engineering\Supporting Document	CAUSTIC DYNAMIC MIXING ANALYSES FOR TANK 241-AY-102
RPP-31935	Current	6/5/2008	Engineering\Supporting Document	TANK 241-AY-101 AND 241-AY-102 CONDENSATE RETURN EVALUATION
RPP-31976	Current	12/6/2006	Engineering\Supporting Document	DRAIN PATH EVALUATION FOR WASTE TRANSFER FROM 241-AY-102 TO 241-AN-106
RPP-32173	Current	12/14/2006	Engineering\Supporting Document	DRAIN PATH EVALUATION FOR WASTE TRANSFER FROM 241-AY-102 TO 241-AW-102
RPP-32251	Current	1/3/2007	Engineering\Supporting Document	DRAIN PATH EVALUATION FOR WASTE TRANSFER FROM 241-AP-101 TO 241-AY-102
RPP-34669	Current	7/5/2011	Engineering\Supporting Document	EVALUATION OF TANK 241-AY-102 PRIMARY TANK KNUCKLE AND WALL TEMPERATURES DURING LOSS OF VENTILATIO
RPP-36254	Current	10/21/2008	Engineering\Supporting Document	EVALUATION OF TANK 241-AY-102 WASTE HYDROXIDE CONCENTRATION FOLLOWING THE JANUARY 2007 SUPERNATA

RPP-42495	Current	10/14/2009	Engineering\Supporting Document	MULTI-PROBE CORROSION MONITORING SYSTEM DESIGN DIFFERENCES - 24-AN-107, 241-AY-101, 241-AY-102, 241-AN
RPP-44828	Historic	4/13/2010	Engineering\Supporting Document	TANK 241-AY-102 DYNAMIC MIXING ANALYSES
RPP-44828	Current	4/15/2010	Engineering\Supporting Document	TANK 241-AY-102 DYNAMIC MIXING BENCHMARK ANALYSES
RPP-46717	Current	7/19/2010	Engineering\Supporting Document	TANK 241-AY-102 DYNAMIC MIXING ANALYSES FOLLOWING THE JANUARY 2007 SUPERNATANT REPLACEMENT
RPP-49053	Current	4/18/2011	Engineering\Supporting Document	SAFETY DESIGN STRATEGY FOR THE WASTE FEED DELIVERY INTEGRATED AY-102 UPGRADES PROJECT
RPP-50817	Current	11/9/2011	Engineering\Supporting Document	241-AY-102 Mixer Pump Operation Erosion-Corrosion Scoping Test Program
RPP-53216	Current	8/22/2012	Engineering\Supporting Document	Pressure Transient and Stability Evaluation for the 241-AY and 241-AZ Tank Farm Primary Ventilation System with the I
RPP-53434	Current	9/27/2012	Engineering\Supporting Document	241-AY-102 Annulus Sampling Data Quality Objectives
RPP-5378	Historic	11/23/1999	Engineering\Supporting Document	TANK 241-AY-102 PUSH MODE CORE SAMPLING AND ANALYSIS PLAN
RPP-5378	Historic	8/31/2000	Engineering\Supporting Document	TANK 241-AY-102 PUSH MODE CORE SAMPLING AND ANALYSIS PLAN
RPP-5378	Historic	12/9/1999	Engineering\Supporting Document	TANK 241-AY-102 PUSH MODE CORE SAMPLING AND ANALYSIS PLAN
RPP-5378	Historic	9/14/2000	Engineering\Supporting Document	TANK 241-AY-102 PUSH MODE CORE SAMPLING AND ANALYSIS PLAN
RPP-5378	Current	1/31/2001	Engineering\Supporting Document	TANK 241-AY-102 PUSH MODE CORE SAMPLING AND ANALYSIS PLAN
RPP-54132	Current	12/13/2012	Engineering\Supporting Document	HRR LDM Evaluation for AY102 Ex-Tank Monitoring and Subsurface Imaging
RPP-54402	Current	4/3/2013	Engineering\Supporting Document	Tank AY-102 Emergency Pumping System Fabrication and Test Reports
RPP-6463	Current	8/9/2000	Engineering\Supporting Document	THERMAL ANALYSES FOR TANKS 241-AY-102 AND 241-C-106
RPP-6646	Current	8/30/2000	Engineering\Supporting Document	CONTROL DECISION RECORD FOR POST SLUICING CONDITIONS IN TANKS 241-C-106 AND 241-AY-102
RPP-7274	Historic	11/3/2000	Engineering\Supporting Document	TANK 241-AY-102 GRAB SAMPLING AND ANALYSIS PLAN
RPP-7274	Historic	11/8/2000	Engineering\Supporting Document	TANK 241-AY-102 GRAB SAMPLING AND ANALYSIS PLAN
RPP-7274	Historic	11/20/2000	Engineering\Supporting Document	TANK 241-AY-102 GRAB SAMPLING AND ANALYSIS PLAN
RPP-7274	Historic	12/1/2000	Engineering\Supporting Document	TANK 241-AY-102 GRAB SAMPLING AND ANALYSIS PLAN
RPP-7274	Historic	1/8/2001	Engineering\Supporting Document	TANK 241-AY-102 GRAB SAMPLING AND ANALYSIS PLAN
RPP-7274	Current	1/31/2001	Engineering\Supporting Document	TANK 241-AY-102 GRAB SAMPLING AND ANALYSIS PLAN
RPP-7764	Historic	3/22/2001	Engineering\Supporting Document	YEAR 2001 VISUAL EXAMINATION OF TANK ANNULI AT TANKS 241-AY-101 AND 241-AZ-102
RPP-7764	Historic	3/29/2001	Engineering\Supporting Document	YEAR 2001 VISUAL EXAMINATION OF TANK ANNULI AT TANKS 241-AY-101 AND 241-AZ-102
RPP-7764	Current	3/8/2002	Engineering\Supporting Document	YEAR 2001 VISUAL EXAMINATION OF TANK ANNULI AT TANKS 241-AY-101 AND 241-AZ-102
RPP-7772	Current	3/15/2001	Engineering\Supporting Document	TANK 241-AY-102 GRAB SAMPLING AND ANALYSIS PLAN FOR POST CAUSTIC ADDITION
RPP-8173	Historic	6/18/2001	Engineering\Supporting Document	TECHNICAL BASIS FOR CAUSTIC ADDITIONS TO TANKS 241-AY-101, 241-AY-102 AND 241-AN-102
RPP-8173	Current	2/28/2002	Engineering\Supporting Document	TECHNICAL BASIS FOR CAUSTIC ADDITIONS TO TANKS 241-AY-101, 241-AY-102 AND 241-AN-102 AND 241-AN-107
RPP-8474	Historic	10/18/2001	Engineering\Supporting Document	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN
RPP-8474	Historic	11/29/2001	Engineering\Supporting Document	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN
RPP-8474	Historic	10/20/2001	Engineering\Supporting Document	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN
RPP-8474	Historic	10/30/2001	Engineering\Supporting Document	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN
RPP-8474	Historic	11/12/2001	Engineering\Supporting Document	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN
RPP-8474	Historic	11/29/2001	Engineering\Supporting Document	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN
RPP-8474	Historic	1/9/2002	Engineering\Supporting Document	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN
RPP-8474	Historic	1/17/2002	Engineering\Supporting Document	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN
RPP-8474	Historic	1/23/2002	Engineering\Supporting Document	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN
RPP-8474	Historic	2/4/2002	Engineering\Supporting Document	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN

RPP-8474	Historic	2/7/2002	Engineering\Supporting Document	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN
RPP-8474	Current	2/19/2002	Engineering\Supporting Document	241-AY-101 AND 241-AY-102 ANNULUS PRIMARY TANK CLEANING PLAN
RPP-8851	Historic	10/29/2001	Engineering\Supporting Document	EVALUATION OF ADDITION OF WATER FROM TANK 241-AY-101 AND TANK 241-AY-102 ANNULI PRIMARY TANK CLEANI
RPP-8851	Current	2/14/2002	Engineering\Supporting Document	EVALUATION OF ADDITION OF WATER FROM TANK 241-AY-101 AND TANK 241-AY-102 ANNULI PRIMARY TANK CLEANI
RPP-8867	Historic	11/7/2001	Engineering\Supporting Document	ENGINEERING TASK PLAN FOR THE ULTRASONIC INSPECTION OF HANFORD DOUBLE-SHELL TANKS 241-AP-108, 241-AY-
RPP-8867	Current	5/13/2002	Engineering\Supporting Document	ENGINEERING TASK PLAN FOR THE ULTRASONIC INSPECTION OF HANFORD DOUBLE-SHELL TANKS 241-AP-108, 241-AY-
RPP-8909	Current	9/27/2001	Engineering\Supporting Document	RESULTS OF RETRIEVAL TESTING OF SLUDGE FROM TANK 241-AY-102
RPP-8994	Historic	10/11/2001	Engineering\Supporting Document	OPERATIONAL ACCEPTANCE CHECKLIST CORROSION MITIGATION PROJECT TANK 241-AY-102 NITRATE ADDITION
RPP-8994	Current	12/3/2001	Engineering\Supporting Document	OPERATIONAL ACCEPTANCE CHECKLIST CORROSION MITIGATION PROJECT TANK 241-AY-102 NITRATE ADDITION
RPP-9114	Historic	11/8/2001	Engineering\Supporting Document	CALCULATION OF SODIUM NITRATE VOLUME TO BE ADDED TO TANK 241-AY-102
RPP-9114	Current	1/29/2002	Engineering\Supporting Document	CALCULATION OF SODIUM NITRATE VOLUME TO BE ADDED TO TANK 241-AY-102
RPP-9125	Current	10/30/2001	Engineering\Supporting Document	EVALUATION OF SODIUM NITRATE ADDITION WITH TANK 241-AY-102
RPP-9160	Current	11/12/2001	Engineering\Supporting Document	PRELIMINARY WASTE COMPATIBILITY ASSESSMENT OF 244-AR VAULT TANK 001 WASTE WITH TANK 241-AY-102 WAST
RPP-9497	Current	11/30/2001	Engineering\Supporting Document	YEAR 2001 VISUAL EXAMINATION OF TANK ANNULI AT TANKS 241-AY-102 AND 241-AZ-101
RPP-9948	Current	1/24/2002	Engineering\Supporting Document	TANK 241-AY-102 CORE SAMPLING AND ANALYSIS PLAN
RPP-ASMT-35619	Current	11/9/2007	Engineering\Supporting Document	EXPERT PANEL OVERSIGHT COMMITTEE ASSESSMENT OF FY 2007 CORROSION & STRESS CORROSION CRACKING SIMUL
RPP-ASMT-37199	Current	4/24/2008	Engineering\Supporting Document	LABORATORY ASSESSMENT OF CANDIDATE SECONDARY REFERENCE ELECTRODE MATERIALS FOR THE 241-AY-102 MUL
RPP-ASMT-53793	Current	11/7/2012	Engineering\Supporting Document	Tank 241-AY-102 Leak Assessment Report
RPP-ASMT-53794	Current	12/18/2012	Engineering\Supporting Document	Tank 241-AY-102 Leak Assessment Supporting Documentation: Miscellaneous Reports, Letters, Memoranda, and Data
RPP-ASMT-54634	Current	2/26/2013	Engineering\Supporting Document	PROPENSITY FOR CORROSION IN THE 241-AY-102 ANNULUS
RPP-CALC-25983	Current	5/12/2005	Engineering\Supporting Document	CAUSTIC ADDITION VOLUME REQUIRED TO MAINTAIN THE TANK 241-AY-102 DILUTE SURFACE SUPERNATANT LAYER W
RPP-CALC-26628	Current	6/30/2005	Engineering\Supporting Document	WASTE GROUP ASSIGNMENT OF DOUBLE-SHELL TANK 241-AY-102 FOR DILUTE CAUSTIC AND WASTE ADDITIONS
RPP-CALC-35476	Historic	6/19/2008	Engineering\Supporting Document	STRUCTURAL ANALYSIS OF AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM
RPP-CALC-35476	Current	3/25/2009	Engineering\Supporting Document	STRUCTURAL ANALYSIS OF AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM
RPP-CALC-41926	Current	8/25/2009	Engineering\Supporting Document	EVALUATION OF STEEL PLATE COVER OVER AY 102-WSTA RISER 082 DUE TO 90-TON CRANE AND IT OUTRIGGERS
RPP-CALC-49323	Current	6/21/2012	Engineering\Calculation	Structural Evaluation of the AY-102 SHMS Vapor Probe for Removal
RPP-CALC-49943	Current	6/20/2012	Engineering\Calculation	Structural Evaluation of the AY-102 Sludge Thermocouple for Removal
RPP-CALC-49945	Current	6/20/2012	Engineering\Calculation	Structural Evaluation of the AY-102 Multi-Probe Corrosion Monitoring System for Removal
RPP-CALC-49946	Current	6/21/2012	Engineering\Calculation	Structural Evaluation of the AY-102 MIT for Removal
RPP-CALC-50033	Current	6/27/2012	Engineering\Calculation	Structural Analysis of the Steam Coil Assembly positioned in AY-102 Tank
RPP-CALC-50035	Current	6/21/2012	Engineering\Calculation	Structural Evaluation of the AY-102 Profile Temperature Probe for Removal
RPP-CALC-50544	Current	6/21/2012	Engineering\Calculation	AY-102 Agitator Pump Assembly Lifting Evaluation
RPP-CALC-50972	Current	6/21/2012	Engineering\Calculation	Lifting Analysis of the AY-102 Lubricated Turbine APump
RPP-CALC-51144	Current	6/27/2012	Engineering\Calculation	Structural Analysis of the Air Lift Circulators positioned in AY-102 Tank
RPP-CALC-51848	Current	2/28/2012	Engineering\Calculation	Determination of Peak Sludge Temperature used in Tank AY-102 TTLFL Calculation
RPP-CALC-51958	Current	3/9/2012	Engineering\Calculation	Decreased Time to LFL in Tank 241-AY-102 due to Temperature Limit Exceeded
RPP-CALC-54015	Current	12/20/2012	Engineering\Calculation	AY-102 Annulus Pump Center of Gravity
RPP-CALC-54091	Current	12/18/2012	Engineering\Calculation	AY-102 Annulus Pump Hoisting Analysis - Double Pump
RPP-DATR-00034	Current	12/27/2012	Engineering\Supporting Document	AY-102 Reconfiguration for Annulus Pumping

RPP-ENV-53694	Current	9/27/2012	Engineering\Supporting Document	241-AY-102 In-Tank Upgrades Project Regulatory Analysis Plan
RPP-OE-52015	Current	3/14/2012	Engineering\Supporting Document	AY-101 and AY-102 VTA Exhauster Fan Bearing
RPP-PLAN-24601	Current	2/5/2007	Engineering\Supporting Document	FISCAL YEAR 2007 TEST PLAN FOR EVALUATING THE CORROSIVITY OF 241-AY-102 DOUBLE-SHELL TANK WASTE
RPP-PLAN-24604	Current	1/4/2008	Engineering\Supporting Document	TEST PLAN FOR EVALUATING SECONDARY REFERENCE ELECTRODE MATERIALS FOR THE 241-AN-102 AND THE 241-AY-1
RPP-PLAN-32016	Historic	12/13/2006	Engineering\Supporting Document	RADIOLOGICAL MONITORING PLAN FOR 241-AY-102 TO 241-AN-106 WASTE TRANSFER
RPP-PLAN-32016	Current	12/18/2006	Engineering\Supporting Document	RADIOLOGICAL MONITORING PLAN FOR 241-AY-102 TO 241-AN-106 WASTE TRANSFER
RPP-PLAN-32016	Historic	12/14/2006	Engineering\Supporting Document	RADIOLOGICAL MONITORING PLAN FOR 241-AY-102 TO 241-AN-106 WASTE TRANSFER
RPP-PLAN-32195	Current	12/20/2006	Engineering\Supporting Document	RADIOLOGICAL MONITORING PLAN FOR 241-AY-102 TO 241-AW-102 WASTE TRANSFER
RPP-PLAN-32235	Current	1/5/2007	Engineering\Supporting Document	RADIOLOGICAL MONITORING PLAN FOR 241-AP-101 TO 241-AY-102 WASTE TRANSFER
RPP-PLAN-34379	Historic	7/19/2007	Engineering\Supporting Document	ELECTROCHEMICAL CORROSION REPORT FOR TANKS 241-AW-103, 241-AZ-102, 241-AN-106, 241-AN-107, 241-AY-101,
RPP-PLAN-34379	Current	11/12/2007	Engineering\Supporting Document	ELECTROCHEMICAL CORROSION TEST PLAN FOR TANKS 241-AW-103, 241-AZ-102, 241-AN-106, 241-AN-107, 241-AY-1C
RPP-PLAN-35593	Current	12/3/2007	Engineering\Supporting Document	TANK 241-AY-102A LEAK DETECTION PIT GRAB SAMPLING AND ANALYSIS PLAN
RPP-PLAN-35914	Current	6/19/2008	Engineering\Supporting Document	TEST PLAN FOR 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM
RPP-PLAN-36639	Historic	2/14/2008	Engineering\Supporting Document	RADIOLOGICAL MONITORING PLAN FOR PUMPING 241-AY-102 LEAK DETECTOR PIT TO 241-AY-01A PIT
RPP-PLAN-36639	Historic	7/20/2009	Engineering\Supporting Document	RADIOLOGICAL MONITORING PLAN FOR PUMPING 241-AY-102 LEAK DETECTOR PIT TO 241-AY-01A PIT
RPP-PLAN-36639	Current	11/6/2009	Engineering\Supporting Document	RADIOLOGICAL MONITORING PLAN FOR PUMPING 241-AY-102 LEAK DETECTOR PIT TO 241-AY-01A PIT
RPP-PLAN-45270	Historic	2/15/2012	Engineering\Supporting Document	Test Plan for Evaluating the Possibility of Erosion-Corrosion During Mixer Pump Operation in 241-AY-102
RPP-PLAN-45270	Historic	2/15/2012	Engineering\Supporting Document	Test Plan for Evaluating the Possibility of Erosion-Corrosion During Mixer Pump Operation in 241-AY-102
RPP-PLAN-45270	Current	2/21/2012	Engineering\Supporting Document	Test Plan for Evaluating the Possibility of Erosion-Corrosion During Mixer Pump Operation in 241-AY-102
RPP-PLAN-53086	Current	11/2/2012	Engineering\Supporting Document	Waste Feed Delivery AY-102 Technology Maturation Mixing Sampling Demonstration Risk and Opportunity Manageme
RPP-PLAN-53352	Current	9/20/2012	Engineering\Supporting Document	Tank 241-AY-102 Annulus Sampling and Analysis Plan
RPP-PLAN-53364	Current	8/28/2012	Engineering\Supporting Document	2012 GRAB SAMPLING AND ANALYSIS PLAN FOR THE 241-AY-102A TANK ANNULUS LEAK-DETECTION PIT
RPP-PLAN-53393	Current	10/3/2012	Engineering\Supporting Document	Waste Feed Delivery AY-102 Technology Maturation Mixing/Sampling Demonstration Project Execution Plan
RPP-PLAN-54083	Current	11/26/2012	Engineering\Supporting Document	FY2013 GRAB SAMPLING AND ANALYSIS PLAN FOR THE 241 AY-102A TANK ANNULUS LEAK-DETECTION PIT
RPP-PLAN-54466	Current	1/28/2013	Engineering\Supporting Document	INDEPENDENT QUALIFIED REGISTERED PROFESSIONAL ENGINEER INSPECTION PLAN FOR AY-102 EMERGENCY PUMPIN
RPP-RPT-25744	Current	6/28/2005	Engineering\Supporting Document	PROJECT W-314 AY102-VTA-YYC-200 INSTRUMENTATION ACCEPTANCE TEST REPORT
RPP-RPT-25778	Current	4/21/2005	Engineering\Supporting Document	ANALYSIS FOR CONTINUING CORE SAMPLING OF TANK 241-AY-102 RISER 058
RPP-RPT-25975	Current	6/10/2005	Engineering\Supporting Document	FEED CONTROL LIST CHANGE EVALUATION CONSOLIDATING TANK 241-AP-101 SUPERNATE WITH TANK 241-AY-102 SO
RPP-RPT-26075	Current	5/19/2005	Engineering\Supporting Document	EVALUATION OF CAUSTIC ADDITION TO TANK 241-AY-102 & WASTE COMPATIBILITY ASSESSMENT OF 241-AZ-151 CON
RPP-RPT-26478	Current	7/6/2005	Engineering\Supporting Document	EVALUATION OF CAUSTIC ADDITION TO TANK 241-AY-102
RPP-RPT-31789	Current	11/21/2006	Engineering\Supporting Document	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AY-102 WASTE WITH TANK 241-AN-106 WASTE
RPP-RPT-31932	Current	4/5/2007	Engineering\Supporting Document	INTERIM REPORT HANFORD TANKS AY-102 AND AP-101: EFFECT OF CHEMISTRY AND OTHER VARIABLES ON CORROSIO
RPP-RPT-32137	Current	6/4/2007	Engineering\Supporting Document	ULTRASONIC INSPECTION RESULTS FOR DOUBLE-SHELL TANK 241-AY-102-FY2007
RPP-RPT-32169	Current	12/19/2006	Engineering\Supporting Document	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AY-102 WASTE WITH TANK 241-AW-102 WASTE
RPP-RPT-32256	Historic	1/5/2007	Engineering\Supporting Document	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AP-101 WASTE WITH TANK 241-AY-102 WASTE
RPP-RPT-32256	Current	1/10/2007	Engineering\Supporting Document	WASTE COMPATIBILITY ASSESSMENT OF TANK 241-AP-101 WASTE WITH TANK 241-AY-102 WASTE
RPP-RPT-33273	Current	5/8/2007	Engineering\Supporting Document	241-AY-101/102 ANNULUS MOISTURE INTRUSION ANALYSIS
RPP-RPT-33284	Current	9/25/2007	Engineering\Supporting Document	HANFORD TANKS AY102 AND AP101 EFFECT OF CHEMISTRY AND OTHER VARIABLES ON CORROSION AND STRESS CORR
RPP-RPT-34697	Current	8/22/2007	Engineering\Supporting Document	ELECTROCHEMICAL CORROSION REPORT FOR TANKS 241-AW-103 - 241-AZ-102 - 241-AN-106 - 241-AN-107 - 241-AY-1C

RPP-RPT-35924	Historic	6/19/2008	Engineering\Supporting Document	FACTORY ACCEPTANCE TEST PROCEDURE FOR THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM
RPP-RPT-35924	Current	2/3/2009	Engineering\Supporting Document	FACTORY ACCEPTANCE TEST PROCEDURE FOR THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM
RPP-RPT-35925	Historic	6/19/2008	Engineering\Supporting Document	REQUIREMENTS VERIFICATION REPORT FOR TANK 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM
RPP-RPT-35925	Current	5/22/2009	Engineering\Supporting Document	REQUIREMENTS VERIFICATION REPORT FOR TANK 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM
RPP-RPT-36150	Current	1/24/2008	Engineering\Supporting Document	FINAL REPORT FOR THE 241-AY-102A LEAK DETECTION PIT GRAB SAMPLES IN SUPPORT OF THE WASTE COMPATIBILITY
RPP-RPT-36249	Current	1/18/2008	Engineering\Supporting Document	COMPATIBILITY ASSESSMENT OF 241-AZ-301 CONDENSATE, AY-102A LDP LIQUID AND CHEMICAL ADDITIONS TO TANK
RPP-RPT-37131	Historic	6/19/2008	Engineering\Supporting Document	CONSTRUCTION ACCEPTANCE AND PROCESS TEST REQUIREMENTS FOR THE 241-AY-102 MULTI-PROBE CORROSION MC
RPP-RPT-37131	Current	2/13/2009	Engineering\Supporting Document	CONSTRUCTION ACCEPTANCE AND PROCESS TEST REQUIREMENTS FOR THE 241-AY-102 MULTI-PROBE CORROSION MC
RPP-RPT-37135	Historic	6/19/2008	Engineering\Supporting Document	RECOMMENDATIONS FOR HANDLING AND STORAGE OF THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYS
RPP-RPT-37135	Current	3/2/2009	Engineering\Supporting Document	RECOMMENDATIONS FOR HANDLING AND STORAGE OF THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYS
RPP-RPT-39019	Current	10/1/2008	Engineering\Supporting Document	PROCESS HAZARD ANALYSIS PERFORMED FOR THE TANK 241-AY-102 CORROSION PROBE INSTALLATION AND OPERATI(
RPP-RPT-39538	Changing	4/2/2009	Engineering\Supporting Document	241-AY-102 MPCMS C-RING COUPON PHOTOGRAPHS
RPP-RPT-40633	Current	5/21/2009	Engineering\Supporting Document	FACTORY ACCEPTANCE TEST REPORT FOR THE 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM
RPP-RPT-40661	Historic	5/7/2009	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: INITIAL OPERATION WEEKLY REPORT
RPP-RPT-40661	Historic	5/22/2009	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 2 REPORT
RPP-RPT-40661	Historic	6/2/2009	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 3 REPORT
RPP-RPT-40661	Historic	6/2/2009	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 4 REPORT
RPP-RPT-40661	Historic	6/2/2009	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 5 REPORT
RPP-RPT-40661	Historic	6/2/2009	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 6 REPORT
RPP-RPT-40661	Historic	8/18/2009	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 7 REPORT
RPP-RPT-40661	Historic	8/18/2009	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 8 REPORT
RPP-RPT-40661	Historic	8/18/2009	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 9 REPORT
RPP-RPT-40661	Historic	8/18/2009	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 10 REPORT
RPP-RPT-40661	Historic	8/18/2009	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 11 REPORT
RPP-RPT-40661	Historic	8/18/2009	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEK 12 REPORT
RPP-RPT-40661	Historic	8/18/2009	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEKS 13 AND 14 REPORT
RPP-RPT-40661	Historic	9/11/2009	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEKS 15 AND 16 REPORT
RPP-RPT-40661	Historic	9/11/2009	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEKS 17 AND 18 REPORT
RPP-RPT-40661	Historic	12/18/2009	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEKS 19 AND 20 REPORT
RPP-RPT-40661	Historic	1/12/2010	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEKS 21 AND 22 REPORT
RPP-RPT-40661	Historic	7/14/2010	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEKS 23 AND 24 REPORT
RPP-RPT-40661	Historic	7/15/2010	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: WEEKS 25 THROUGH 31 REPORT
RPP-RPT-40661	Historic	7/15/2010	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: NOVEMBER 2009 MONTHLY REPORT
RPP-RPT-40661	Historic	7/15/2010	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: DECEMBER 2009 MONTHLY REPORT
RPP-RPT-40661	Historic	11/19/2010	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: JANUARY 2010 MONTHLY REPORT
RPP-RPT-40661	Historic	11/19/2010	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: FEBRUARY 2010 MONTHLY REPORT
RPP-RPT-40661	Historic	10/13/2011	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: MARCH 2010 MONTHLY REPORT
RPP-RPT-40661	Historic	10/17/2011	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: APRIL 2010 MONTHLY REPORT
RPP-RPT-40661	Historic	10/18/2011	Engineering\Supporting Document	241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM: MAY, JUNE, JULY 2010 QUARTERLY REPORT

RPP-RPT-40661	Historic	12/14/2011	Engineering\Supporting Document	241-AY-102 Multi-Probe Corrosion Monitoring System: August, September, October 2010 Quarterly Report
RPP-RPT-40661	Historic	12/20/2011	Engineering\Supporting Document	241-AY-102 Multi-Probe Corrosion Monitoring System: November & December 2010, January 2011 Quarterly Report
RPP-RPT-40661	Historic	12/20/2011	Engineering\Supporting Document	241-AY-102 Multi-Probe Corrosion Monitoring System: February, March & April 2011 Quarterly Report
RPP-RPT-40661	Current	12/20/2011	Engineering\Supporting Document	241-AY-102 Multi-Probe Corrosion Monitoring System: May, June & July 2011 Quarterly Report
RPP-RPT-40867	Current	4/24/2009	Engineering\Supporting Document	CONSTRUCTION ACCEPTANCE AND PROCESS TEST REPORT FOR THE 241-AY-102 MULTI-PROBE CORROSION MONITORII
RPP-RPT-41204	Current	7/8/2009	Engineering\Supporting Document	TANK 241-AY-101 AND TANK 241-AY-102 MULTI-PROBE CORROSION MONITORING SYSTEM PROJECT LESSONS LEARNEI
RPP-RPT-42920	Current	10/12/2009	Engineering\Supporting Document	2009 AUTO-TCR FOR TANK 241-AY-102
RPP-RPT-44462	Current	3/24/2010	Engineering\Supporting Document	MULTI-PROBE CORROSION MONITORING SYSTEM DESIGN DIFFERENCES BETWEEN 241-AW-104 AND 241-AN-107, 241-
RPP-RPT-44630	Historic	2/3/2010	Engineering\Supporting Document	DERIVATION OF BEST-BASIS INVENTORY FOR TANK 241-AY-102
RPP-RPT-44630	Historic	2/15/2011	Engineering\Supporting Document	DERIVATION OF BEST-BASIS INVENTORY FOR TANK 241-AY-102
RPP-RPT-44630	Historic	9/21/2011	Engineering\Supporting Document	DERIVATION OF BEST-BASIS INVENTORY FOR TANK 241-AY-102 AS OF JULY 1, 2011
RPP-RPT-44630	Historic	3/22/2012	Engineering\Supporting Document	Derivation of Best-Basis Inventory for Tank 241-AY-102 as of January 1, 2012
RPP-RPT-44630	Historic	10/1/2012	Engineering\Supporting Document	Derivation of Best-Basis Inventory for Tank 241-AY-102 as of July 1, 2012
RPP-RPT-44630	Current	3/27/2013	Engineering\Supporting Document	Derivation of Best-Basis Inventory for Tank 241-AY-102 as of January 1, 2013
RPP-RPT-46020	Historic	6/16/2010	Engineering\Supporting Document	TANK 241-AY-102 WASTE FEED DELIVERY FLOWSHEET
RPP-RPT-46020	Current	9/28/2010	Engineering\Supporting Document	TANK 241-AY-102 WASTE FEED DELIVERY FLOWSHEET
RPP-RPT-46355	Current	5/20/2010	Engineering\Supporting Document	A COMPARATIVE EVALUATION OF TANK AY-102 WASTES FOR WTP HOT COMMISSIONING
RPP-RPT-53044	Current	8/8/2012	Engineering\Supporting Document	Strategy and Technical Basis for Managing Flammable Gases During Tank 241-AY-102 Mixer Pump Testing
RPP-RPT-53425	Current	3/6/2013	Engineering\Supporting Document	Waste Feed Delivery Projects AY-102 In-Tank Upgrades (T3W11) Project Closeout Report
RPP-RPT-53511	Current	10/8/2012	Engineering\Supporting Document	FINAL REPORT FOR TANK 241-AY-102 ANNULUS SOLID SAMPLE TAKEN IN AUGUST, 2012
RPP-RPT-53805	Current	11/5/2012	Engineering\Supporting Document	FINAL REPORT FOR TANK 241-AY-102 ANNULUS LEAK DETECTION PIT 2012 LIQUID GRAB SAMPLES IN SUPPORT OF WA!
RPP-RPT-53901	Current	11/27/2012	Engineering\Supporting Document	Management of Supernatant Level After Hypothetical Decant of 241-AY-102
RPP-RPT-54071	Current	12/10/2012	Engineering\Supporting Document	FINAL REPORT FOR TANK 241-AY-102 ANNULUS
RPP-RPT-54099	Current	12/19/2012	Engineering\Supporting Document	Evaluation of the Corrosion Threat of the Waste in the Tank 241-AY-102 Annulus
RPP-RPT-54251	Current	2/6/2013	Engineering\Supporting Document	Final Report for Tank 241-AY-102A Annulus Leak-Detection Pit Liquid Grab Samples, December 2012
RPP-RPT-54322	Current	2/28/2013	Engineering\Supporting Document	Alternatives Evaluation for Tank 241-AY-102 Waste Retrieval
RPP-RPT-54701	Current	3/27/2013	Engineering\Supporting Document	VENTILATION OPTIONS TO INCREASE DRYING/CRUST FORMATION ON AY-102 WASTE LEAK
RPP-SPEC-35429	Historic	11/5/2007	Engineering\Specification	PROCUREMENT SPECIFICATION FOR AY-102 CORROSION PROBE ASSEMBLY
RPP-SPEC-35429	Current	1/31/2008	Engineering\Specification	PROCUREMENT SPECIFICATION FOR AY-102 CORROSION PROBE ASSEMBLY
RPP-SPEC-52846	Current	1/28/2013	Engineering\Supporting Document	Fabrication Specification For Double-Shell Tank 241-AY-102 Independent Cooling Module Skid
RPP-STE-00043	Current	11/14/2012	Engineering\Supporting Document	Performance and Functional Requirements Evaluation of a Simulated Trunnion Bar for the AY-102 Annulus Pump Pit
RPP-STE-00045	########	Global	Approved	AY-102 Annulus Pump Pit Riser Plug Gauge 11-1/2",Engineering\Supporting Document"
RPP-TE-52991	Current	7/27/2012	Engineering\Supporting Document	Use of spray wand in C-102 to wash abandoned pipe in Riser #8.
SD-WM-OTP-012	Current	1/28/1983	Engineering\Supporting Document	OPERABILITY TEST PROCEDURE FOR AY-101 & AY-102 STEAM COILS
SVF-1208	Current	9/27/2006	Engineering\Supporting Document	SPREADSHEET VERIFICATION RECORDS FOR SPREADSHEET AY102 LIQUID2.XLS
SVF-1229	Current	10/24/2006	Engineering\Supporting Document	SPREADSHEET VERIFICATION RECORDS FOR SPREADSHEET RESULTS CAUSTIC DEMAND AY102 DEMAND.XLS
SVF-1279	Current	2/7/2007	Engineering\Supporting Document	SPREADSHEET VERIFICATION RECORDS FOR SPREADSHEET FOR UPDATE OF AY102 WASH FACTORS FY07 Q2.XLS
SVF-1342	Current	7/5/2007	Engineering\Supporting Document	SPREADSHEET VERIFICATION RECORDS FOR SPREADSHEET AY 102 FY07 Q3 SUPERNATANT PK VECTOR.XLS
SVF-1873	Current	6/16/2010	Engineering\Supporting Document	AY-102 FLOWSHEET INVENTORY ESTIMATE.XLSX

SVF-1874	Current	6/16/2010	Engineering\Supporting Document	AY-102 FLOWSHEET INPUT DATA.XLSX
SVF-1875	Current	6/16/2010	Engineering\Supporting Document	AY-102 FLOWSHEET MATERIAL BALANCE
TOC-ENV-NOT-2011-0012	Current	10/25/2011	Engineering\Supporting Document	ENVIRONMENTAL NOTIFICATION FOR 241-AY-102 ANNULUS ENRAF 152 RAINWATER INTRUSION ON 10-13-11
TOC-ENV-NOT-2012-0023	Current	12/5/2012	Engineering\Supporting Document	Environmental Operational Activities Notification for planned maintenance on 241-AY-101, 241-AY-102, 241-AZ-101 &
TOC-ENV-NOT-2012-0032	Current	1/22/2013	Engineering\Supporting Document	Environmental Operational for exceeding 90-day repair wndow for 241-SY-102 on 4/16/12
TOC-ENV-NOT-2012-0053	Current	1/23/2013	Engineering\Supporting Document	Environmental Notification for AY-102-WSTA-LTD-150 DST Annulus ENRAF approaching greater than 90-day Out Of Ser
TWR-2103	Historic	1/15/1998	Engineering\Supporting Document	TWRS RETRIEVAL LEVEL 1 LOGIC WASTE FEED DELIVERY HIGH-LEVEL WASTE FIFTH THROUGH NINTH FEED BATCHES, TH
TWR-2103	Historic	9/30/1999	Engineering\Supporting Document	RPP RETRIEVAL LEVEL 1 LOGIC WASTE FEED DELIVERY HLW FEED BATCHES TANK 241-AY-102
TWR-2103	Current	4/20/2000	Engineering\Supporting Document	RPP RETRIEVAL LEVEL 1 LOGIC WASTE FEED DELIVERY HLW FEED BATCHES TANK 241-AY-102
W211-AY02-C-012	Current	8/22/2006	Engineering\Supporting Document	PROJECT W-211 CALCULATION DOME LOADING TANK 241-AY-102
W211-AY02-P-003	Current	3/9/2006	Engineering\Supporting Document	PROJECT W-211 AY-102 IN-TANK RECIRCULATION FLOW CONTROL VALVE SIZING
W211-AY02-P-007	Current	3/9/2006	Engineering\Supporting Document	PROJECT W-211 AY-102 3 PW-404 HEAT TRACE SIZING"
W211-AY02-P-011	Current	8/22/2006	Engineering\Supporting Document	PROJECT W-211 CALCULATION DESIGN OF 241-AY-102 LIFTING ATTACHMENT FOR TRANSFER PUMP RISER ASSEMBLY
W211-AY02-P-015	Current	3/9/2006	Engineering\Supporting Document	PROJECT W-211 TANK 241-AY-102 MIXER PUMP RISER EXTENSION-LIFTING ATTACHMENT ANALYSIS
W-211-AY2-ATP-003	Current	12/28/2004	Engineering\Supporting Document	PROJECT W-211, 241-AY-102 NITROGEN SUPPLY & LOSS OF UPS POWER & PLC CABINET TEMP MONITORING
W-211-AY2-ATP-004	Current	12/28/2004	Engineering\Supporting Document	PROJECT W-211, 241-AY-102 MIXER PUMP MOTORS AND ASSOCIATED EQUIPMENT
W-211-AY2-ATP-005	Current	12/28/2004	Engineering\Supporting Document	PROJECT W-211, 241-AY-102 TRANSFER PUMP TEMPERATURE ELEMENT, MANUAL TRANSFER SWITCH, AND ASSOCIATE
W-211-AY2-C1	Changing	12/28/2004	Engineering\Specification	CONSTRUCTION SPECIFICATION PROCESS WATER LINE (PW-404) INSTALLATION INITIAL TANK RETRIEVAL SYSTEMS PRO.
W-211-AY2-C2	Changing	12/28/2004	Engineering\Specification	CONSTRUCTION SPECIFICATION AY-102 CONSTRUCTION INITIAL TANK RETRIEVAL SYSTEMS PROJECT W-211 TANK 241-/
W-314-P27	Historic	2/14/2001	Engineering\Specification	PROCUREMENT SPECIFICATION MPS RELAY ENCLOSURE A244-WT-ENCL-102 200E WTS DESIGN PACKAGE
WHC-SD-L102-FDC-001	Changing	1/29/1993	Engineering\Supporting Document	PRIMARY HIGHWAY ROUTE - NORTH OF WYE BARRICADE, PROJECT 95L-EWL-102,FUNCTIONAL DESIGN CRITERIA
WHC-SD-W320-DA-001	Current	12/14/1994	Engineering\Supporting Document	STRUCTURAL ANALYSIS OF THE EQUIPMENT REMOVAL SYSTEM FOR TANKS 241C106 AND 241AY102
WHC-SD-W320-EIP-001	Changing	7/26/1996	Engineering\Supporting Document	TANK 241-AY-102,IMMERSIBLE PUMP P-0621- WINCH ASSEMBLY W-0621, ASSEMBLY AND INSTALLATION INSTRUCTIOI
WHC-SD-W320-TI-003	Current	3/26/1996	Engineering\Supporting Document	AN ANALYSIS OF ENERGY AND TEMPERATURE EFFECTS FOR TANK 241-AY-102
WHC-SD-WM-DP-077	Current	12/1/1994	Engineering\Supporting Document	45-DAY SAFETY SCREENING FOR TANK 241-B-102 AUGER SAMPLES, RISER 1
WHC-SD-WM-DP-100	Current	5/17/1995	Engineering\Supporting Document	90-DAY FINAL REPORT FOR TANK 241-AX-102, AUGER SAMPLES, 95-AUG-006 AND 95-AUG-007
WHC-SD-WM-DP-136	Current	7/25/1995	Engineering\Supporting Document	45 DAY SAFETY SCREEN RESULTS AND FINAL REPORT FOR TANK 241-A-102 AUGER SAMPLER 95-AUG-033
WHC-SD-WM-DP-149	Historic	11/15/1995	Engineering\Supporting Document	60-DAY WASTE COMPATIBILITY SAFETY ISSUE AND FINAL RESULTS FOR TANK 241-AW-102, GRAB SAMPLES 2AW-95-1, 2
WHC-SD-WM-DP-149	Current	3/11/1998	Engineering\Supporting Document	60-DAY WASTE COMPATIBILITY SAFETY ISSUE AND FINAL RESULTS FOR TANK 241-AW-102, GRAB SAMPLES 2AW-95-1, 2
WHC-SD-WM-DP-150	Current	11/16/1995	Engineering\Supporting Document	60-DAY WASTE COMPATIBILITY SAFETY ISSUE AND FINAL RESULTS FOR TANK 241-AY-102, GRAB SAMPLES 2AY-95-1, 2A
WHC-SD-WM-DP-159	Current	12/11/1995	Engineering\Supporting Document	60-DAY WASTE COMPATIBILITY SAFETY ISSUE AND FINAL RESULTS FOR TANK 241-SY-102, GRAB SAMPLES 2SY-95-1 ANI
WHC-SD-WM-ER-454	Historic	8/28/1997	Engineering\Supporting Document	TANK CHARACTERIZATION REPORT FOR DOUBLE SHELL TANK 241-AY-102
WHC-SD-WM-ER-454	Historic	9/28/1998	Engineering\Supporting Document	TANK CHARACTERIZATION REPORT FOR DOUBLE-SHELL TANK 241-AY-102
WHC-SD-WM-ER-454	Current	6/4/1999	Engineering\Supporting Document	TANK CHARACTERIZATION REPORT FOR DOUBLE-SHELL TANK 241-AY-102
WHC-SD-WM-ER-534	Current	2/1/1996	Engineering\Supporting Document	THERMAL HYDRAULIC EVALUATION OF CONSOLIDATING TANK C-106 WASTE INTOTANK AY-102
WHC-SD-WM-ES-290	Historic	8/24/1994	Engineering\Supporting Document	CHEMICAL COMPATIBILITY OF TANK WASTES IN 241-C-106 - 241-AY-101 AND241-AY-102
WHC-SD-WM-ES-290	Current	9/28/1998	Engineering\Supporting Document	CHEMICAL COMPATIBILITY OF TANK WASTES IN 241-C-106 - 241-AY-101 AND241-AY-102
WHC-SD-WM-TI-578	Current	8/10/1994	Engineering\Supporting Document	101-AY, 102-AY, & 106-C DATA COMPENDIUM
WHC-SD-WM-TP-204	Current	6/6/1994	Engineering\Supporting Document	TANK 241-AY-102 TANK CHARACTERIZATION PLAN