DOCUMENT INFORMATION

Please complete the following information when submitting a document to PDC.

Correspondence (CCN) No: 048826	**Rev: N/A**
Document No:	**Rev:**

Project Information (Check Applicable Box)

- ☐ Balance of Facilities
- ☒ Pretreatment
- ☐ HLW Vitrification
- ☐ LAW Vitrification
- ☐ Analytical
- ☐ External Interfaces
- ☐ Across all areas

Document is applicable to ALARA? ☐ Yes ☒ No

In general, any record that deals with Radiation, Radioactive Material, Occupational Dose, Dose Reduction, or Dose Rate are considered ALARA Records. (See 24590-WTP-GPP-SRAD-002, *Application of ALARA in the Design Process*, section 4.8 for additional guidance)

Additional Information for Correspondence

Subject Code(s) 4152

Action Item Information. (This section does not apply to Meeting Minutes.)

☒ No Action Item within the correspondence

☐ Action(s): (Give a brief description of actions in the following space [optional])

____

Due Date: ____________ (If no due date is indicated, a 2-week period will be assigned.)

Action Owed to: ____________

Actionee(s)

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Concurrence Sheet

CCN: 048826

Required Reviewers

Title	Name	Concurrence required (Check appropriately)	Initials	Date
Project Director	R. F. Naventi	☐		
Project Manager	J. P. Betts	☒	[signature]	1/10/03
Operations Manager	W. G. Poulson	☐		
Engineering Manager	R. J. Tosetti	☐		
Construction Manager	T. L. Horst	☐		
Business Manager	C. E. Rogers	☐		
Environmental & Nuclear Safety	F. Beranek	☒	[initials]	1/9/03
Contracts Manager	A. R. Veirup	☒	[initials]	1/5/03
Project QA Manager	G. T. Shell	☐		
HLW Area Project Manager	P. W. Schuetz	☐		
LAW Area Project Manager	W. Clements	☐		
Pretreatment Area Project Manager	R. E. Lawrence	☐		
BOF Area Project Manager	J. Q. Hicks	☐		
Lab Area Project Manager	P. J. Keuhlen	☐		
Process Technology	K. J. Rueter	☐		
Research and Technology	G. T. Wright	☐		
Commissioning	M. N. Brosee	☐		
Interface Management Manager	T. M. Brown	☐		
BNI Legal	D. M. Curtis	☐		

Additional Reviewers

Title	Name	Initials	Date
Radiological & Nuclear Safety Manager	D. A. Klein	DAK	1/9/03

W. R. Spezialetti — [signature] — 1/9/03

Print/Type Applicable Line Manager's Name — *Signature* — *Date*

B. Todd Allen — [signature] — 1/9/03

Print/Type Originator's Name — *Signature* — *Date*

U.S. Department of Energy
Office of River Protection
Mr. R. J. Schepens
Manager
P.O. Box 450, MSIN H6-60
Richland, Washington 99352

CCN: 048826

JAN 13 2003

Dear Mr. Schepens:

CONTRACT NO. DE-AC27-01RV14136 – CLOSEOUT COMMENTS/RESPONSES ON PRETREATMENT CONSTRUCTION AUTHORIZATION REQUEST

References:
1) CCN 048852, Letter, R. F. Naventi, BNI to R. J. Schepens, ORP, "Closeout Comment/Responses on Pretreatment Construction Authorization Request," dated December 26, 2002
2) CCN 040113, Letter, R. J. Schepens, ORP, to R. F. Naventi, BNI, "Questions on the Pretreatment (PT) Facility Construction Authorization Request (CAR)," 02-OSR-0397, dated August 21, 2002

The U.S. Department of Energy, Safety Regulation Division (OSR) provided Pretreatment (PT) Construction Authorization Request review comments to Bechtel National, Inc. in the referenced letters. Provided are three responses to these comments (Attachment 1). PT-PSAR-327 is being retransmitted to include two attachments not previously included. These responses have been reviewed with OSR staff members.

Attachment 2 is a revised list of the PT preliminary safety analysis report review question responses and dates or milestone when the included commitments will be completed. This attachment updates the list previously transmitted in Reference 2. Changes made to this list are: PT-PSAR-074 commitment revised to "First full revision of PSAR after CAR – June 2003"; PT-PSAR-053 deleted; and PT-PSAR-198 revised to "First full revision of PSAR after CAR – June 2003." These changes have been discussed with Mr. R. A. Gilbert of the OSR.

Please contact Mr. Bill Spezialetti at 371-5778 if you have any questions or comments.

Very truly yours,

R. F. Naventi
Project Director

BTA/es

Attachments: 1) Responses to Questions: PT-PSAR-322, PT-PSAR-324, and PT-PSAR-327
2) Revised List of the PT PSAR Review Question / Response Commitments

cc:

Allen, B. T. w/a	WTP	MS6-R1
Barr, R. C. w/a	OSR	H6-60
Barrett, M. K. w/o	ORP	H6-60
Beranek, F. w/o	WTP	MS6-P1
Betts, J. P. w/o	WTP	MS14-3C
DOE Correspondence Control w/a	ORP	H6-60
Ensign, K. R. w/o	ORP	H6-60
Erickson, L. w/o	ORP	H6-60
Gilbert, R. A. w/a	OSR	H6-60
Hamel, W. F. w/o	ORP	H6-60
Hanson, A. J. w/o	ORP	H6-60
Klein, D. A. w/o	WTP	MS6-P1
Naventi, R. F. w/o	WTP	MS14-3C
PDC w/a	WTP	MS5-K.1
Spezialetti, W. R. w/o	WTP	MS6-P1
Taylor, W. J. w/a	ORP	H6-60
Veirup, A. R. w/o	WTP	MS14-3B

Responses to Questions:

PT-PSAR-322
PT-PSAR-324
PT-PSAR-327

Office of Safety Regulation	OSR Review Team Questions for BNI
Question # PT-PSAR-322	**Date Opened:** 08/22/2002
Place "X" if answering "yes":	**Date to Contractor:**
Limited Rights Information? ___	**Date of Response: Revised 1/8/03**
Team Accepted? ___	**Date Closed:**
	Reviewer:

Cited Reference:

DOE/RL-96-0003, Section 4.3.2.A, requires the PSAR to contain the following:

Item 8: "Analysis of radiological, nuclear, and process hazards for the design."

Item 11: "Analysis of hazards-control features during all expected facility operating modes, off-normal conditions, and design basis internal and external events."

SRD Volume II, Safety Criterion: 3.3-1: "The facility shall be designed and operated in a manner that prevents nuclear criticality."

Cited Submittal Text:

PSAR, Volume I, Chapter 6, section 6.1, 1st sentence: "This chapter summarizes the results of the criticality evaluations documented in the WTP Criticality Safety Evaluation Report, 24590-WTP-RPP-NS-01-001 (CSER)"
Rev 0 of the WTP criticality safety evaluation report (24590-WTP-RPT-NS-01-001, Rev 0), section 4.3.2, 4th Paragraph, last sentence states, "The study concluded that criticality resulting from the addition of nitric acid was not credible for the tank waste to be received. (Further study of the waste forms in Tanks SY-101, AW-103, and AW-105 would be required before processing by the WTP.)"
The WTP criticality safety evaluation report (24590-WTP-RPT-NS-01-001, Rev 1), section 7.3.1, 6th sentence states, "The calculated maximum Pu loading in the precipitated solid of 0.033 gPu/100gwo (see Appendix B.1) is based on the bounding case of all Pu in the liquid phase precipitating into the solid form."

OSR Question:

a) What is the uncertainty in the normal chemistry of the precipitation process that could alter the total Pu concentration and the Mn/Pu ratio in the precipitated solids?
b) What is the composition of the precipitated solids and the corresponding minimum subcritical concentration of Pu in the precipitated solids?.

Explanation/Discussion (Optional)

These questions are related to open item #5 in the OSR's response to Rev 0 of the CSER submitted to BNI in December, 2001 (letter # 01-OSR-0484). Open item 5 has not been addressed in Rev 1 of the CSER.
(No impact to pits and tunnels, basemat, and schedule critical walls)

Contractor Response

The response to OSR Question PT-PSAR-324 provides analysis of the chemistry of the precipitation process and presents information on the composition of the precipitated solids. This analysis shows that only small masses of Puf will be precipitated and that sufficient Mn will be present so that the Puf/Mn loadings in the precipitate are safe by wide margins, even if the chemistry of the process varies. The revised criticality analysis for the precipitation process will be provided in a CSER revision by June 13, 2003. The revisions will include updating or eliminating the calculations presented in Appendix B. (Response by David Losey)

Disposition:

Office of Safety Regulation	**OSR Review Team Questions for BNI**
Question # PT-PSAR-324	**Date Opened:** 08/22/2002
Place "X" if answering "yes": Limited Rights Information? ___ Team Accepted? ___	**Date to Contractor:** **Date of Response: Revised 1/8/03** **Date Closed:** **Reviewer:**

Cited Reference:

DOE/RL-96-0003, Section 4.3.2.A, requires the PSAR to contain the following:

Item 8: "Analysis of radiological, nuclear, and process hazards for the design."

Item 11: "Analysis of hazards-control features during all expected facility operating modes, off-normal conditions, and design basis internal and external events."

SRD Volume II, Safety Criterion: 3.3-1: "The facility shall be designed and operated in a manner that prevents nuclear criticality."

Cited Submittal Text:

PSAR, Volume I, Chapter 6, section 6.1, 1st sentence: "This chapter summarizes the results of the criticality evaluations documented in the WTP Criticality Safety Evaluation Report, 24590-WTP-RPP-NS-01-001 (CSER)"
The WTP criticality safety evaluation report (24590-WTP-RPT-NS-01-001, Rev 1), section B.2, last sentence states, "the maximum Pu loading in the Sr/TRU solids is: (.033 gPu per 100g precipitated solids.)"
The WTP criticality safety evaluation report (24590-WTP-RPT-NS-01-001, Rev 1), section B.3, last sentence states, "expected Pu loading onto the ultrafilters= 0.085 gPu/100gsolids."

OSR Question:

Why is the calculated value of Pu loading in the precipitated solids inconsistent between sections B.2 & B.3 cited above?

Subsequent OSR Question:

The response incorrectly states the Pu/Solids=.011 g/kg in section B.3. It is the Pu/(Solids+Liquids) mass ratio. Also, it is unclear why the solids precipitated from the waste sample would not contain elements other than Sr & TRU from the precipitation process in the same manner as the actual process stream. In any case, it appears that the experimental data from the waste sample is not consistent with the flowsheet wrt Pu concentration in the precipitated solids and one or the other should be deleted from the CSER.

Explanation/Discussion (Optional)

The experimental data used to calculate the precipitate Pu loading in section 3.2 appears to be inconsistent with the flowsheet data used to calculate the same loading in section 3.3.
(No impact to pits and tunnels, basemat, and schedule critical walls)

Contractor Response

For the envelope C stream, Appendix B of the CSER provides:
- in Section B.2, a calculation that uses the maximum Puf concentration of 0.013 g/L in the WTP feed and sample data to compute the maximum Puf/Sr-TRU solids loading as 0.33 g/kg.
- in Section B.3.2, a maximum Puf/solids loading of only 0.011 g/kg.

The difference in these two loading results is that the Section B.2 result is based on sample data while the Section B.3.2 result is based on flowsheet data. Another difference is that the Section B.2 result is for the Puf/Sr-TRU solids loading, rather than the Puf/solids loading. This Puf/Sr-TRU solids loading does not credit Mn, Fe, and other non-TRU absorber nuclides that would lower the 0.33 g/kg loading to be closer to the 0.011 g/kg of Section B.3.2. (Response by Robert Miles)

An analysis of the criticality safety for the precipitation process is attached via Hyperlink Connection #1 below (hard copy attached). An upgraded analysis of the criticality safety for the ultrafiltration process is addressed with question PT-PSAR-

323.

The revised criticality analyses for the precipitation and ultrafiltration processes will be provided in a CSER revision by June 13, 2003. The revised analysis will replace Appendices B.2 and B.3 from the CSER to eliminate the various inconsistencies in the analysis.

In addition to revising the CSER, changes to the PT PSAR are needed to establish consistency between the two documents. The PT PSAR will be revised at the next PSAR update to:
- indicate in chapter 3 that the SIPD does not provide analysis of criticality hazards and that the CSER does not identify any credible criticality accidents so no criticality accident scenarios are analyzed in chapter 3 for dose consequences.
- improve the chapter 6 discussion in the general information volume for consistency with the current CSER.

(Response by David Losey)

Disposition:

Hyperlink Connection #1:

\\WTPS0018\ES&HInfo\PT-PSAR-324 Attach_1_precip c.pdf

Hyperlink Connection #2:

Hyperlink Connection #3:

Criticality Safety of the Precipitation Process

In the planned WTP processing, only the LAW in Envelope C is to be precipitated[1]. The Envelope C LAW is in only two batches of supernate that are stored only in the AN-102 and AN-107 tanks. The Envelope C LAW holds high concentrations of radioactivity, which are reduced by precipitation so that the ILAW will be within contract specification[2]. The precipitation will remove radioactive nuclides of strontium-90 (^{90}Sr) and TRU.

The Sr-TRU precipitation process is part of the ultrafiltration system[3] and the precipitation is done in the ultrafilter preparation vessels (UFP-VSL-00001A/B) in batches of up to 183 kiloliters (kL). The ultrafilter preparation vessels are vertical cylindrical tanks with 20' diameters and elliptical bottoms. The vessels have pulse jet mixers that will normally keep any precipitated and entrained solids suspended. Following precipitation, the Envelope C waste is processed through the ultrafilters where the precipitated solids are separated from the LAW liquid.

Table 1 provides summary data extracted from the Best Basis Inventory[4] (BBI) that describe the contents of the AN-102 and AN-107 tanks that hold the Envelope C LAW. The table shows that the Envelope C supernate holds relatively small Pu_f masses within large supernate volumes. The Pu_f mass is the sum of the Pu and ^{233}U masses, as defined in the CSER, Rev 2. In addition to supernate, the AN-102 and AN-107 tanks also hold saltcake, but this saltcake will not be part of the Envelope C transfer. The WTP contract[2] in Specification 7 allows that the Envelope C LAW may contain only up to 2 $^w/_o$ entrained solids, but typically the transfers will not contain more than 1 $^w/_o$ entrained solids. Much of the Pu_f within the Envelope C transfers will be held within the entrained solids and this Pu_f mass is not included in Table 1. Since precipitation is done in the ultrafilter preparation vessels that hold only ~183 kL, for the AN-107 waste the data in Table 1 show that, on average, only:

$$3{,}490 \text{ g of } Pu_f \times 183 \text{ kL} / 3{,}200 \text{ kL} = 200 \text{ g of } Pu_f$$

will be precipitated with each precipitation batch. This 200 g average of Pu_f mass precipitated with each batch, is only approximate, as other factors, such as the Na adjustment in the feed evaporator will cause the estimate to vary. Nonetheless, the data show that relatively small Pu_f masses are to be precipitated. The Pu_f precipitations from the AN-102 waste will be far lower than for the AN-107 waste. Since even under ideal conditions it takes at least 450 g of optimally moderated ^{239}Pu for criticality, it is concluded that criticality due to precipitating the TRU from the AN-102 and AN-107 waste is very improbable due to the small Pu_f masses involved.

Table 1 AN-102 and AN-107 Tank Contents

Parameter		AN-102	AN-107
Supernate Volume		3,600 kL	3,200 kL
Saltcake Volume		500 kL	900 kL
^{239}Pu Mass in Supernate		290 g	3,140 g
Pu_f Mass in Supernate		313 g	3,490 g
^{235}U / ^{T}U Loading		7.0 g/kg	7.0 g/kg
Supernate TRU Mass	**^{237}Np**	**94.3%**	5.8%
	^{233}U	0.2%	4.2%
	^{238}Pu	0.0%	0.0%
	^{239}Pu	3.4%	**70.4%**
	^{240}Pu	0.2%	3.4%
	^{241}Pu	0.0%	0.1%
	^{241}Am	2.0%	16.0%
Supernate TRU Activity	^{237}Np	0.9%	0.0%
	^{233}U	0.0%	0.1%
	^{238}Pu	0.1%	0.2%
	^{239}Pu	2.8%	6.5%
	^{240}Pu	0.5%	1.2%
	^{241}Pu	4.7%	10.6%
	^{241}Am	**91.0%**	**81.5%**

Table 1 shows that the ^{235}U / ^{T}U loading in the Envelope C is only 7.0 g/kg which compares to the CSL of 9.3 g/kg from the CSER, Rev 2. Thus, the ^{235}U / ^{T}U loading of the waste is low enough that there is no

1 ORP-11242, *River Protection Project System Plan*, Rev 0, August 2002.

2 DOE-ORP 2000. *Design, Construction, and Commissioning of the Hanford Tank Waste Treatment and Immobilization Plant*, Contract Number DE-AC27-01RV14136 - Part 1, Modification No. M019, Section C.

3 24590-PTF-3YD-UFP-00001, Rev 0, *System Description for Ultrafiltration Process System*

4 TWINS/BBI Data, available at the Internet address:
http://twins.pnl.gov:8001/data/getLookupFields3.exe?table=tcd.dbo.v_best_basis_summary&whatsnew=Best+Basis+Inventory

potential for ^{235}U to contribute to a criticality. The distributions of TRU mass and activity are shown in the lower part of Table 1. The TRU mass distribution shows that ^{233}U is present in minor amounts. Processing options are being considered that might mix Envelope C LAW and Envelope D HLW, such as mixing AN-102 supernate with the C-104 solids. In such situations the ^{233}U content of the liquid might increase slightly, but this would be of little consequence. Table 1 shows that in the AN-102 and AN-107 supernate, the ^{241}Am accounts for most of the TRU activity, but ^{239}Pu or ^{237}Np accounts for most of the TRU mass. This is because ^{241}Am has a specific activity that is ~55 times higher than that of ^{239}Pu and ~4,900 times higher than that of ^{237}Np.

Table 2 lists the reagents proposed for the precipitate process and details the purpose of the reagent addition. The table also lists the molarity of the reagent additions for the current baseline and optimized precipitate processes[5]. The optimized process offers the potential for accomplishing the precipitation using less chemicals which would therefore reduce the amount of reagent waste that must ultimately be disposed as ILAW or IHLW. For the baseline precipitation using 0.05M permanganate, the mass of Mn at an atomic weight of 54.9 that is needed for the precipitation in the ultrafilter preparation vessels is calculated as:

$$0.05 \text{ g-mole/L} \times 54.9 \text{ g/g-mole for Mn} \times 183 \text{ kL} \times 1000 \text{ L/kL} \times 0.001 \text{ kg/g} = \sim 500 \text{ kg of Mn}$$

Table 2 Purpose and Quantities of Reagent Additions

Reagent	Reagent Added to...	Baseline Addition	Optimized Addition
sodium hydroxide, NaOH	first adjust the OH^- ion concentration and hence the pH of the stream. This addition affects the solubility of some species, such as Al.	1M	None
strontium nitrate, $Sr(NO_3)_2$	provide excess stable Sr to supersaturate the stream and in turn precipitate some radioactive ^{90}Sr as strontium carbonate ($SrCO_3$).	0.075M	0.02M
sodium permanganate, $Na(MnNO_4)$	precipitate the TRU/Pu by oxidizing the organic complexants that hold the TRU/Pu in solution. The $Sr(NO_3)_2$ is also an oxidizer, but it does not cause TRU/Pu precipitation[6].	0.05M	0.02M

The Envelope C LAW requires precipitation because of holding complexant concentrate waste. These complexants are organics, such as citrate, glycolate, Ethylenedinitrilotetraacetic acid (EDTA), and Nitrilotriacetic acid (NTA), which were added in various separations processes. These complexants cause more Sr-TRU to be held within the supernate of AN-102 and AN-107 than for other tanks and give the supernate a gooey consistency that creates difficulties filtering the waste in the ultrafilters. An effect and purpose of the sodium permanganate precipitation is to make the Envelope C LAW more filterable.

Table 3 details the affects of adding insufficient or excess amounts of the reagents. In general, the reagents provide neutron absorbers, such as Mn and Na, that further decrease the reactivity of the minor amounts of Pu_f in the waste. The table indicates that insufficient or excess additions of the NaOH and $Sr(NO_3)_2$ reagents have only limited affect on the TRU/Pu precipitation. The permanganate addition precipitates the TRU/Pu_f and the amount of permanganate required for the precipitation has been determined by laboratory experiments[5,6,7]. As indicated in Table 3, if insufficient permanganate is added, then proportionally less Pu_f will precipitate. The Pu_f/Mn loadings in the precipitate will remain relatively constant and safe for any conditions with insufficient permanganate.

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5 RPP-WPT-RPT-029, Rev 0, *Optimization of Sr/TRU Removal Conditions with Samples of AN-102 Tank Waste.*

6 WTP-RPT-044, Rev 0, *Combined Entrained Solids and Sr/TRU Removal from AN-102/C-104 Waste Blend*, December, 2002.

7 BNFL-RPT-027, Rev 0, *Combined Entrained Solids and Sr/TRU Removal from AN-107 Diluted Feed*, PNWD-3035

Table 3 Reactivity Affects of Reagent Additions

Reagent	Reactivity Affect of Adding	
	Insufficient Reagent is ...	Excess Reagent is ...
NaOH	Limited because lab analyses show that the NaOH has essentially no affect on the TRU/Pu precipitation[6]. However, the NaOH helps maintain some materials, such as Al, in solution. If insufficient NaOH is added, the Al may subsequently precipitate, which would provide more absorption for the TRU/Pu in the precipitate, which is safer. However, the Al is not credited as an absorber for Pu_f in the criticality analysis.	Limited because lab analyses show that the NaOH has essentially no affect on the TRU/Pu precipitation[6]. The stream will have a high OH^- concentration, which alone does not cause TRU precipitation. Excess NaOH would provide additional Na which would safely reduce the reactivity of the Pu_f. However, the Na is not credited as an absorber for Pu_f in the criticality analysis.
$Sr(NO_3)_2$	Limited because the precipitation of the TRU/Pu is not affected by the $Sr(NO_3)_2$ reagent. With insufficient $Sr(NO_3)_2$ less Sr will precipitate, which will provide less absorption for the precipitate Pu_f. However, the Sr is not credited as an absorber for Pu_f in the criticality analysis.	Limited because the precipitation of the TRU/Pu is not affected by the $Sr(NO_3)_2$ reagent and the TRU/Pu will remain in solution. The liquid and the precipitate will have excess Sr which will provide more absorption for the precipitated Pu. However, this Sr is not credited as an absorber for Pu_f in the criticality analysis.
$Na(MnO_4)$	Limited because proportionally less TRU/Pu and Mn will precipitate. Some TRU/Pu may remain complexed in the solution and therefore subcritical because the Pu_f concentration in the solution remains below the SSL.	Limited because the stream will have excess $Na(MnO_4)$ after the TRU/Pu precipitates. The excess Mn will conservatively lower the Pu_f/metals loading in the precipitated solids.

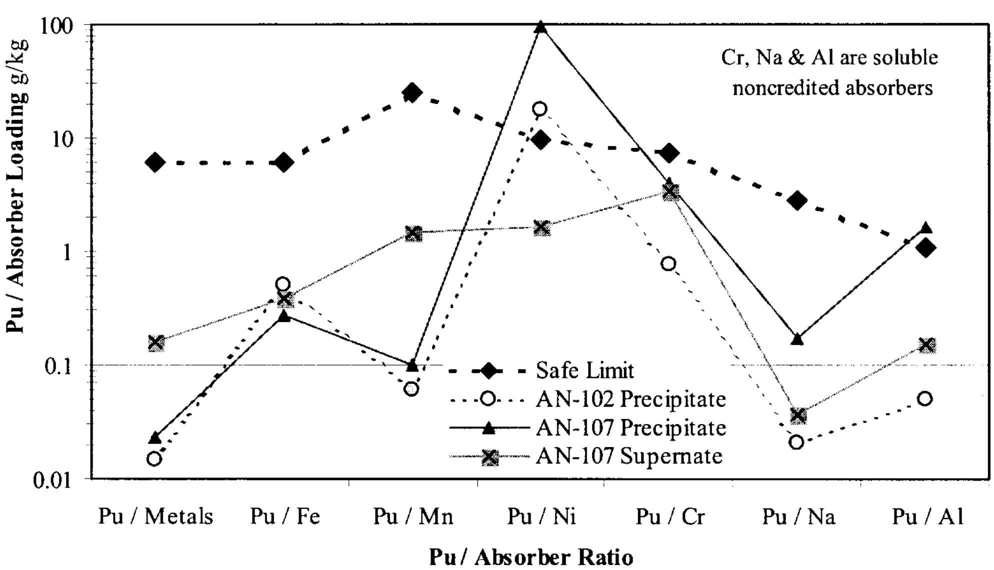

Figure 1 Pu / Absorber Loadings from Lab Experiments

Figure 1 plots Pu / absorber loadings extracted from the results of laboratory experiments[6,7]. The precipitation of the AN-107 waste used the baseline reagent addition from Table 2 with 0.05M permanganate, while the precipitation of the AN-102 waste used the optimized reagent addition from Table 2 with 0.02M permanganate. These lab experiments did not measure the ^{233}U contents, so the figure is based on the Pu, rather than the Pu_f masses, but Table 1 shows that the contribution to Pu_f from ^{233}U is small. Figure 1 shows that the precipitated waste has numerous absorbers, which ensure subcriticality. The safe limits in Figure 1 for the absorber metals, Fe, Mn and Ni, are derived from the CSLs documented in CSER, Rev 2, whereas the safe limits for Cr, Na, and Al were extracted from another reference[8]. Figure 1 shows that sufficient Cr, Na, and Al are present to each individually maintain the precipitate safe in nearly every case. However, these absorbers are not credited in the criticality analysis because they can be partially washed out during ultrafiltration.

Comparing the AN-107 results in Figure 1 shows that the precipitation causes the Pu / Mn loadings to go from being 10% of the safe limit in the supernate to being only ~½% of the safe limit in the precipitate. The precipitation of the AN-107 waste used the baseline reagent addition shown in Table 2 with 0.05M permanganate. The AN-102 results also show that the Pu / Mn loading is low enough to provide a very wide margin of subcriticality. Thus, the permanganate addition creates a wide margin of safety based upon the Pu / Mn loading in the experiments with waste from both tanks.

The precipitated Pu and Mn are chemically bound in the precipitate and the Mn is in an insoluble form. The Mn in the precipitate is oxidized primarily as Mn^{4+}, but laboratory evidence also shows some of the Birnessite mineral form that contains both Mn^{3+} and Mn^{4+}. The Mn^{4+} and Mn^{3+} will be insoluble in the ultrafiltration wash and leach processing, so there is no potential for increasing the Pu / Mn loading following precipitation. Specific concerns have been identified for DWPF at the Savannah River Site with the potential for separating the Mn^{2+} form from Pu, during acid dissolution. However, because the Envelope C precipitate will hold only Mn^{4+} and Mn^{3+}, these concerns with Mn^{2+} and acids are not present in the WTP precipitate processing.

Results in Figure 1 show that the Pu / Fe loadings are nearly the same in the supernate and the precipitate, so it is concluded that the Fe precipitates along with the Pu. The results for the Pu / Ni do not provide the same conclusion. The permanganate does not precipitate the Ni, so the Pu / Ni loading increases in the precipitate compared to the supernate. Figure 1 shows that the Pu / absorber loadings for Cr, Na and Al are also generally below safe limits. The feed supernate contains so little Pu that the precipitate will contain many absorbers that limit the reactivity of the Pu, even if all Pu precipitates using minimal reagents. The Pu / solids loading in the precipitate will be less than in the entrained solids that enter with the supernate and less than in the HLW batches, so that, in general, the precipitate is more safely subcritical than the entrained solids or the HLW solids.

The conclusion of this analysis is that the potential for criticality during the precipitation of the Envelope C LAW is incredible. This is because each precipitated LAW batch will hold less than a critical mass of Pu_f and this mass will be spread over a large volume of the vessel and diluted with many absorbers. Additionally, the Pu_f / Mn loading of the precipitate will be far below safe limits because of the permanganate addition, so that the Pu_f / metals loading is ensured to be far below the CSL established in the CSER.

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[8] RPT-W375-TE00044, Rev 0, *Addition of Nitric Acid and Sodium Hydroxide to Hanford Tank Waste*

Office of Safety Regulation	OSR Review Team Questions for BNI
Question # PT-PSAR-327	**Date Opened:** 08/22/2002
Place "X" if answering "yes":	**Date to Contractor:**
Limited Rights Information? ___	**Date of Response:**
Team Accepted? ___	**Date Closed:**
	Reviewer:

Cited Reference:

SRD Safety Criterion 4.1-1 states: "The facility design shall provide for the prevention and mitigation of the risks associated with radiological and chemical material inventories and energy sources. The facility design shall include consideration of normal operation (including startup, testing and maintenance), anticipated operational occurrences, external events, and accident conditions.
Prevention shall be the preferred means of achieving safety.
Defense-in-depth shall be applied commensurate with the hazard to provide multiple physical and administrative barriers against undue radiation and chemical exposure to the public and workers."

Cited Submittal Text:

PT-PSAR, Rev E, Volume II, Section 3 and 24590-PTF-ESH-02-0002, Rev 0, Design Basis Event Selection for the Pretreatment Facility Preliminary Safety Analysis Report, (DBE Report)
A comparison between the information in the PSAR safety analysis (Chapter 3) and the SIPD events (CSD) and associated controls (SCR) in the DBE report yields the following set of events that appear in the DBE report, but do not appear to have been evaluated in the PSAR: (see attached table via hyperlink #1)

OSR Question:

1. What are the reasons for the DBE event combinations (SCR/CSD) not being evaluated in the safety analysis?
2. Why are these two CSD events identified as DBEs (PFLP/N0076, PFRP/N0076) not in the PSAR?
3. How does the fact that these DBE events (SCR and CSD combinations) were not evaluated in the safety analysis impact the evaluation of the controls and how are these impacts dealt with?
4. How is it assured that all controls are adequately assessed when some events in the DBE document are not currently used in the safety analysis to assess controls?
5. What is the process for assuring that the set of DBEs evaluated in the PSAR is appropriate and complete?

Explanation/Discussion (Optional)

Because the DBE selection is based, in part, on the control strategy to be evaluated in the PSAR, and the safety analysis evaluates the effectiveness of the controls and identifies their applicability, these differences raise questions about the completeness of the safety analysis and the basis for evaluation and selection of controls.
(Impact to pits and tunnels, basemat, and schedule critical walls)

Contractor Response

Based on conversations with the reviewer, this response addresses the general issue of consistency among the DBE selection report, the DBE calculations, and the PSAR; and specifically, with respect to the PT pits and tunnels

The Project acknowledges the general issue of consistency identified by the reviewer in the PT DBE selection report and the PT PSAR, and commits to revising these documents and the PT DBE calculations for consistency and completeness by the next update of the PT PSAR.

Also, as noted by the reviewer, the following DBE event (CSD) combinations with pits and tunnels-affecting SCRs were not evaluated in the safety analysis:

SCR	CSD
QMECH/N0007	PFRP/N0024
	PFRP/N0025
QSTR/N0001	PFRP/N0020
	PFRP/N0023
	PFRP/N0024

QVENT/N0002 PFRP/N0020

The CSDs describe potential liquid spill events in either the FRP black cell or in the PT hot cell. The SCRs describe controls based on the hot cell drain system, the secondary confinement function of the cell structure, and the cascade air flow function of the C5V system.

PSAR section 3.4.1.2 addresses these potential accident scenarios in the evaluations of CSDs PFRP/N0025 and 26, respectively. The control strategies identified in the PSAR for these scenarios include QMECH/N0007, QSTR/N0001, and QVENT/N0002, as appropriate; and others pertaining to vessel and piping integrity, and C5V filtration.

The Project considers the evaluations of CSDs PFRP/N0025 and 26, as representative DBEs for liquid spill events, to be sufficient for establishing the related design requirements of the ITS SSCs associated with these SCRs. CSDs PFRP/N00020, 23, and 24 were considered to be represented events. The remainder of the SCR DBE pairs are addressed in the attached table. In conjunction with the general commitment to improve the consistency of the safety documents, the DBE selection report will be updated to clearly identify the representative and represented CSDs. (Response by John Hinckley)

Disposition:

Hyperlink Connection #1:

\\WTPS0018\ES&HInfo\Attachment 1 to PT-PSAR-327table.pdf

Hyperlink Connection #2:

\\WTPS0018\ES&HInfo\PT-PSAR-327 Table.pdf

Hyperlink Connection #3:

Attachment #1 to PT-PSAR-327:

SCR/CSD Combinations not addressed in the PT PSAR

Control Strategy	DBE ID Number	Type of Accident	Analyzed Accident Type	Where Addressed	Comments
BPIPN/N0010	BFRP/N0005	LCC	Liquid spill/spray	PTF-W14T-00024	
QMECH/N0009	PC5V/N0007	Fire		PTF-W14T-00023	
QVENT/N0001	PCXP/N0006	Fire	Cs IX Overheating	PTF-W14T-00027	Identified as DiD
QPVV/N0001	PCXP/N0006	Fire	Cs IX Overheating	PTF-W14T-00027	Identified as DiD
QINST/N0008	PCXP/N0009	Explosion	Cs IX Chemical Reactions	PTF-W14T-00030	
QINST/N0013	PCXP/N0013	Explosion	Cs IX Chemical Reactions	PTF-W14T-00030	
QPVV/N0001	PCXP/N0027	Fire	Cs IX Overheating	PTF-W14T-00027	Identified as DiD
QVENT/N0001	PCXP/N0027	Fire	Cs IX Overheating	PTF-W14T-00027	Identified as DiD
QVENT/N0001	PFEP/N0033	Explosion	Hydrogen Deflagration	PTF-H01T-00002	Not credited would be DiD
QPVV/N0001	PFLP/N0076	LCC	Pressurized Release	PTF-ZOC-10-00002	Should be PHLP
QPIPN/N0001	PFRP/N0020	LCC	Pressurized Release	PTF-ZOC-10-00002	
QSTR/N0001	PFRP/N0020	LCC	Pressurized Release	PTF-ZOC-10-00002	
QPVV/N0001	PFRP/N0020	LCC	Pressurized Release	PTF-ZOC-10-00002	
QLAO/N0001	PFRP/N0020	LCC	Pressurized Release	PTF-ZOC-10-00002	Addressed for event PHLP/N0076
QVENT/N0001	PFRP/N0020	LCC	Pressurized Release	PTF-ZOC-10-00002	
QPIPN/N0001	PFRP/N0023	Liquid Spill		PTF-W14T-00024	
QVENT/N0001	PFRP/N0023	Liquid Spill		PTF-W14T-00024	
QVENT/N0001	PFRP/N0024	Liquid Spill		PTF-W14T-00024	
QVENT/N0001	PFRP/N0038	Explosion	Hydrogen Deflagration	PTF-H01T-00002	Not credited would be DiD
QVENT/N0001	PFRP/N0076	LCC	Pressurized Release	PTF-ZOC-10-00002	
QLAO/N0001	PHLP/N0033	Boiling		PTF-H10T-00002	Not credited would be DiD

QMECH/N0001	PPIH/N0027	Direct Radiation		PTF-Z0C-10-00003	PPIH/N0002 was addressed in the calc and evaluated inner shield doors
QINST/N0019	PRWH/N0001	Direct Radiation			Not in SIPD
QMECH/N0009	PRWH/N0044	Fire		PTF-W14T-00023	
QLAO/N0001	PTCP/N0011	Liquid Spill		PTF-W14T-00024	

Attachment to PT-PSAR-327:

SCR/CSD Combinations not evaluated in the PT PSAR

Control Strategy	DBE ID Number	Type of Accident
BPIPN/N0010	BFRP/N0005	Loss of Contamination Control (LCC)
QMECH/N0009	PC5V/N0007	Fire
QVENT/N0002	PCXP/N0006	Fire
QVENT/N0001	PCXP/N0006	Fire
QPVV/N0001	PCXP/N0006	Fire
QINST/N0008	PCXP/N0009	Explosion
QVENT/N0002	PCXP/N0013	Explosion
QINST/N0013	PCXP/N0013	Explosion
QPVV/N0001	PCXP/N0027	Fire
QVENT/N0001	PCXP/N0027	Fire
QVENT/N0002	PCXP/N0027	Fire
QVENT/N0001	PFEP/N0033	Explosion
QPVV/N0001	PFLP/N0076	LCC
QPIPN/N0001	PFRP/N0020	LCC
QSTR/N0001	PFRP/N0020	LCC
QPVV/N0001	PFRP/N0020	LCC
QLAO/N0001	PFRP/N0020	LCC
QVENT/N0002	PFRP/N0020	LCC
QVENT/N0001	PFRP/N0020	LCC
QPIPN/N0001	PFRP/N0023	Liquid Spill
QVENT/N0002	PFRP/N0023	Liquid Spill
QSTR/N0001	PFRP/N0023	Liquid Spill
QVENT/N0001	PFRP/N0023	Liquid Spill
QVENT/N0001	PFRP/N0024	Liquid Spill
QSTR/N0001	PFRP/N0024	Liquid Spill
QMECH/N0007	PFRP/N0024	Liquid Spill
QVENT/N0002	PFRP/N0024	Liquid Spill
QMECH/N0007	PFRP/N0025	Liquid Spill
QVENT/N0001	PFRP/N0038	Explosion
QVENT/N0001	PFRP/N0076	LCC
QLAO/N0001	PHLP/N0033	Boiling
QMECH/N0001	PPIH/N0027	Direct Radiation
QINST/N0019	PRWH/N0001	Direct Radiation
QMECH/N0009	PRWH/N0044	Fire
QLAO/N0001	PTCP/N0011	Liquid Spill

Hazards (CSD events) Found in the DBE Selection Document Only

Hazard ID Number	Public/ Worker
PFLP/N0076	Public
PFRP/N0076	Public - Explosion

Revised List of PT PSAR Question/Response Commitments

Question	Action Date
PT-PSAR-001	First full revision of PSAR after CAR – June 2003
PT-PSAR-003	First full revision of PSAR after CAR – June 2003
PT-PSAR-004	RRC SSCs will be identified in the first full revision of PSAR after CAR – June 2003 rather than by 12/31/02.
PT-PSAR-005	First full revision of PSAR after CAR – June 2003
PT-PSAR-008	First full revision of PSAR after CAR – June 2003
PT-PSAR-011	First full revision of PSAR after CAR – June 2003
PT-PSAR-013	First full revision of PSAR after CAR – June 2003
PT-PSAR-015	First full revision of PSAR after CAR – June 2003
PT-PSAR-016	First full revision of PSAR after CAR – June 2003
PT-PSAR-017	First full revision of PSAR after CAR – June 2003
PT-PSAR-020	First full revision of PSAR after CAR – June 2003
PT-PSAR-023	First full revision of PSAR after CAR – June 2003
PT-PSAR-024	First full revision of PSAR after CAR – June 2003
PT-PSAR-025	First full revision of PSAR after CAR – June 2003
PT-PSAR-026	First full revision of PSAR after CAR – June 2003
PT-PSAR-027	First full revision of PSAR after CAR – June 2003
PT-PSAR-028	First full revision of PSAR after CAR – June 2003
PT-PSAR-029	First full revision of PSAR after CAR – June 2003
PT-PSAR-030	First full revision of PSAR after CAR – June 2003
PT-PSAR-032	First full revision of PSAR after CAR – June 2003
PT-PSAR-033	First full revision of PSAR after CAR – June 2003
PT-PSAR-034	First full revision of PSAR after CAR – June 2003
PT-PSAR-035	First full revision of PSAR after CAR – June 2003
PT-PSAR-036	First full revision of PSAR after CAR – June 2003
PT-PSAR-037	First full revision of PSAR after CAR – June 2003
PT-PSAR-038	First full revision of PSAR after CAR – June 2003
PT-PSAR-039	First full revision of PSAR after CAR – June 2003
PT-PSAR-040	First full revision of PSAR after CAR – June 2003
PT-PSAR-041	First full revision of PSAR after CAR – June 2003
PT-PSAR-042	First full revision of PSAR after CAR – June 2003
PT-PSAR-043	First full revision of PSAR after CAR – June 2003
PT-PSAR-044	First full revision of PSAR after CAR – June 2003
PT-PSAR-045	First full revision of PSAR after CAR – June 2003
PT-PSAR-046	First full revision of PSAR after CAR – June 2003
PT-PSAR-047	First full revision of PSAR after CAR – June 2003
PT-PSAR-048	First full revision of PSAR after CAR – June 2003
PT-PSAR-049	First full revision of PSAR after CAR – June 2003
PT-PSAR-050	First full revision of PSAR after CAR – June 2003
PT-PSAR-051	First full revision of PSAR after CAR – June 2003
PT-PSAR-052	First full revision of PSAR after CAR – June 2003
PT-PSAR-054	First full revision of PSAR after CAR – June 2003
PT-PSAR-055	First full revision of PSAR after CAR – June 2003

Question	Action Date
PT-PSAR-056	First full revision of PSAR after CAR – June 2003
PT-PSAR-057	First full revision of PSAR after CAR – June 2003
PT-PSAR-059	First full revision of PSAR after CAR – June 2003
PT-PSAR-060	First full revision of PSAR after CAR – June 2003
PT-PSAR-066	Will be included in FSAR
PT-PSAR-067	Will be included in FSAR
PT-PSAR-072	First full revision of PSAR after CAR – June 2003
PT-PSAR-073	Annual PSAR update following conclusion of ISM III
PT-PSAR-074	First full revision of PSAR after CAR – June 2003
PT-PSAR-075	Will be included in FSAR
PT-PSAR-076	Will be included in FSAR
PT-PSAR-078	Complete – included in CSER revision submitted September 2002
PT-PSAR-079	Complete – included in CSER revision submitted September 2002
PT-PSAR-080	CSER revision to be provided June 13, 2003
PT-PSAR-081	CSER revision to be provided June 13, 2003
PT-PSAR-082	Complete – included in CSER revision submitted September 2002
PT-PSAR-083	Complete – included in CSER revision submitted September 2002
PT-PSAR-085	CSER revision to be provided June 13, 2003
PT-PSAR-086	CSER revision to be provided June 13, 2003
PT-PSAR-088	Complete – included in CSER revision submitted September 2002
PT-PSAR-090	CSER revision to be provided June 13, 2003
PT-PSAR-091	First full revision of PSAR after CAR – June 2003
PT-PSAR-092	First full revision of PSAR after CAR – June 2003
PT-PSAR-093	First full revision of PSAR after CAR – June 2003
PT-PSAR-094	First full revision of PSAR after CAR – June 2003
PT-PSAR-095	First full revision of PSAR after CAR – June 2003
PT-PSAR-096	First full revision of PSAR after CAR – June 2003
PT-PSAR-097	First full revision of PSAR after CAR – June 2003
PT-PSAR-098	First full revision of PSAR after CAR – June 2003
PT-PSAR-099	First full revision of PSAR after CAR – June 2003
PT-PSAR-100	First full revision of PSAR after CAR – June 2003
PT-PSAR-101	First full revision of PSAR after CAR – June 2003
PT-PSAR-102	First full revision of PSAR after CAR – June 2003
PT-PSAR-105	Annual PSAR update following conclusion of ISM III
PT-PSAR-108	First full revision of PSAR after CAR – June 2003
PT-PSAR-109	First full revision of PSAR after CAR – June 2003
PT-PSAR-111	First full revision of PSAR after CAR – June 2003
PT-PSAR-112	First full revision of PSAR after CAR – June 2003
PT-PSAR-113	First full revision of PSAR after CAR – June 2003
PT-PSAR-114	First full revision of PSAR after CAR – June 2003
PT-PSAR-115	First full revision of PSAR after CAR – June 2003
PT-PSAR-117	First full revision of PSAR after CAR – June 2003
PT-PSAR-118	First full revision of PSAR after CAR – June 2003
PT-PSAR-119	First full revision of PSAR after CAR – June 2003

Question	Action Date
PT-PSAR-120	First full revision of PSAR after CAR – June 2003
PT-PSAR-121	Complete – combined seismic PRA has been provided to the OSR
PT-PSAR-122	First full revision of PSAR after CAR – June 2003
PT-PSAR-123	First full revision of PSAR after CAR – June 2003
PT-PSAR-124	First full revision of PSAR after CAR – June 2003
PT-PSAR-125	First full revision of PSAR after CAR – June 2003
PT-PSAR-126	First full revision of PSAR after CAR – June 2003
PT-PSAR-127	First full revision of PSAR after CAR – June 2003
PT-PSAR-128	First full revision of PSAR after CAR – June 2003
PT-PSAR-130	First full revision of PSAR after CAR – June 2003
PT-PSAR-132	First full revision of PSAR after CAR – June 2003
PT-PSAR-133	First full revision of PSAR after CAR – June 2003
PT-PSAR-136	First full revision of PSAR after CAR – June 2003
PT-PSAR-137	Annual PSAR update following conclusion of ISM III
PT-PSAR-138	Will be included in FSAR
PT-PSAR-142	First full revision of PSAR after CAR – June 2003
PT-PSAR-143	Will be included with OAR
PT-PSAR-144	Will be included in FSAR
PT-PSAR-145	First full revision of PSAR after CAR – June 2003
PT-PSAR-146	First full revision of PSAR after CAR – June 2003
PT-PSAR-149	First full revision of PSAR after CAR – June 2003
PT-PSAR-150	First full revision of PSAR after CAR – June 2003
PT-PSAR-152	First full revision of PSAR after CAR – June 2003
PT-PSAR-153	First full revision of PSAR after CAR – June 2003
PT-PSAR-156	First full revision of PSAR after CAR – June 2003
PT-PSAR-157	First full revision of PSAR after CAR – June 2003
PT-PSAR-163	First full revision of PSAR after CAR – June 2003
PT-PSAR-164	First full revision of PSAR after CAR – June 2003
PT-PSAR-165	First full revision of PSAR after CAR – June 2003
PT-PSAR-166	First full revision of PSAR after CAR – June 2003
PT-PSAR-167	First full revision of PSAR after CAR – June 2003
PT-PSAR-168	First full revision of PSAR after CAR – June 2003
PT-PSAR-169	First full revision of PSAR after CAR – June 2003
PT-PSAR-170	First full revision of PSAR after CAR – June 2003
PT-PSAR-171	First full revision of PSAR after CAR – June 2003
PT-PSAR-172	First full revision of PSAR after CAR – June 2003
PT-PSAR-173	First full revision of PSAR after CAR – June 2003
PT-PSAR-174	First full revision of PSAR after CAR – June 2003
PT-PSAR-175	First full revision of PSAR after CAR – June 2003
PT-PSAR-176	First full revision of PSAR after CAR – June 2003
PT-PSAR-177	First full revision of PSAR after CAR – June 2003
PT-PSAR-178	Annual PSAR update following conclusion of ISM III
PT-PSAR-179	First full revision of PSAR after CAR – June 2003
PT-PSAR-180	First full revision of PSAR after CAR – June 2003

Question	Action Date
PT-PSAR-181	First full revision of PSAR after CAR – June 2003
PT-PSAR-183	First full revision of PSAR after CAR – June 2003
PT-PSAR-184	First full revision of PSAR after CAR – June 2003
PT-PSAR-185	First full revision of PSAR after CAR – June 2003
PT-PSAR-186	First full revision of PSAR after CAR – June 2003
PT-PSAR-187	First full revision of PSAR after CAR – June 2003
PT-PSAR-188	First full revision of PSAR after CAR – June 2003
PT-PSAR-189	First full revision of PSAR after CAR – June 2003
PT-PSAR-191	First full revision of PSAR after CAR – June 2003
PT-PSAR-192	First full revision of PSAR after CAR – June 2003
PT-PSAR-193	First full revision of PSAR after CAR – June 2003
PT-PSAR-194	First full revision of PSAR after CAR – June 2003
PT-PSAR-195	First full revision of PSAR after CAR – June 2003
PT-PSAR-196	First full revision of PSAR after CAR – June 2003
PT-PSAR-198	First full revision of PSAR after CAR – June 2003.
PT-PSAR-199	First full revision of PSAR after CAR – June 2003
PT-PSAR-204	First full revision of PSAR after CAR – June 2003
PT-PSAR-205	First full revision of PSAR after CAR – June 2003
PT-PSAR-209	First full revision of PSAR after CAR – June 2003
PT-PSAR-211	First full revision of PSAR after CAR – June 2003
PT-PSAR-212	First full revision of PSAR after CAR – June 2003
PT-PSAR-215	First full revision of PSAR after CAR – June 2003
PT-PSAR-216	First full revision of PSAR after CAR – June 2003
PT-PSAR-217	First full revision of PSAR after CAR – June 2003
PT-PSAR-218	First full revision of PSAR after CAR – June 2003
PT-PSAR-219	First full revision of PSAR after CAR – June 2003
PT-PSAR-220	Aircraft crash calculation prior to CAR. PSAR update June 2003
PT-PSAR-221	First full revision of PSAR after CAR – June 2003
PT-PSAR-222	First full revision of PSAR after CAR – June 2003
PT-PSAR-223	First full revision of PSAR after CAR – June 2003
PT-PSAR-224	Complete
PT-PSAR-225	Complete
PT-PSAR-226	Complete
PT-PSAR-227	Complete
PT-PSAR-229	First full revision of PSAR after CAR – June 2003
PT-PSAR-230	First full revision of PSAR after CAR – June 2003
PT-PSAR-231	Complete
PT-PSAR-233	First full revision of PSAR after CAR – June 2003
PT-PSAR-236	Complete
PT-PSAR-237	First full revision of PSAR after CAR – June 2003
PT-PSAR-239	First full revision of PSAR after CAR – June 2003
PT-PSAR-240	First full revision of PSAR after CAR – June 2003
PT-PSAR-241	RRC SSCs will be identified in the first full revision of PSAR after CAR – June 2003 rather than by 12/31/02.

Question	Action Date
PT-PSAR-242	RRC SSCs will be identified in the first full revision of PSAR after CAR – June 2003 rather than by 12/31/02.
PT-PSAR-246	First full revision of PSAR after CAR – June 2003
PT-PSAR-249	First full revision of PSAR after CAR – June 2003
PT-PSAR-254	Complete
PT-PSAR-255	Complete
PT-PSAR-256	First full revision of PSAR after CAR – June 2003. Hazards topography to be included in annual update following completion of ISM III. PFHA to be updated at next revision.
PT-PSAR-257	First full revision of PSAR after CAR – June 2003
PT-PSAR-258	First full revision of PSAR after CAR – June 2003
PT-PSAR-259	First full revision of PSAR after CAR – June 2003
PT-PSAR-263	First full revision of PSAR after CAR – June 2003
PT-PSAR-269	Annual PSAR update following conclusion of ISM III
PT-PSAR-270	First full revision of PSAR after CAR – June 2003
PT-PSAR-271	First full revision of PSAR after CAR – June 2003
PT-PSAR-275	First full revision of PSAR after CAR – June 2003
PT-PSAR-276	Annual PSAR update following conclusion of ISM III
PT-PSAR-278	Annual PSAR update following conclusion of ISM III
PT-PSAR-279	Annual PSAR update following conclusion of ISM III
PT-PSAR-285	First full revision of PSAR after CAR – June 2003
PT-PSAR-286	First full revision of PSAR after CAR – June 2003
PT-PSAR-287	First full revision of PSAR after CAR – June 2003
PT-PSAR-288	First full revision of PSAR after CAR – June 2003
PT-PSAR-289	First full revision of PSAR after CAR – June 2003. Common cause events will be addressed in annual PSAR update following conclusion of ISM III
PT-PSAR-290	First full revision of PSAR after CAR – June 2003.
PT-PSAR-293	First full revision of PSAR after CAR – June 2003.
PT-PSAR-294	Will be included in FSAR
PT-PSAR-296	First full revision of PSAR after CAR – June 2003.
PT-PSAR-297	Vent & drain line will be evaluated prior to bulge procurement
PT-PSAR-299	Vent & drain line will be evaluated prior to bulge procurement
PT-PSAR-305	Will be included in FSAR
PT-PSAR-306	First full revision of PSAR after CAR – June 2003.
PT-PSAR-307	First full revision of PSAR after CAR – June 2003.
PT-PSAR-308	First full revision of PSAR after CAR – June 2003.
PT-PSAR-310	First full revision of PSAR after CAR – June 2003.
PT-PSAR-318	CSER revision to be provided June 13, 2003
PT-PSAR-319	CSER revision to be provided June 13, 2003
PT-PSAR-321	CSER revision to be provided June 13, 2003
PT-PSAR-323	CSER revision to be provided June 13, 2003
PT-PSAR-324	CSER revision to be provided June 13, 2003
PT-PSAR-325	First full revision of PSAR after CAR – June 2003.
PT-PSAR-327	First full revision of PSAR after CAR – June 2003.
PT-PSAR-331	First full revision of PSAR after CAR – June 2003.

Question	Action Date
PT-PSAR-332	First full revision of PSAR after CAR – June 2003.
PT-PSAR-333	First full revision of PSAR after CAR – June 2003.
PT-PSAR-334	First full revision of PSAR after CAR – June 2003.
PT-PSAR-335	First full revision of PSAR after CAR – June 2003.
PT-PSAR-336	First full revision of PSAR after CAR – June 2003.
PT-PSAR-337	First full revision of PSAR after CAR – June 2003.
PT-PSAR-338	First full revision of PSAR after CAR – June 2003.
PT-PSAR-339	First full revision of PSAR after CAR – June 2003.