



OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

14-ORP-0050

APR 17 2014

Clerk of the Pollution Control Hearings Board
Environmental Hearings Office
1111 Israel Road SW, Suite 301
Tumwater, Washington 98501

Dear Addressee:

NOTICE OF APPEAL AND MOTION TO STAY

Please find attached herewith for filing in the above-referenced matter, the original and two copies of the Appellant's Notice of Appeal and Certificate of Service. Thank you for your assistance.

A handwritten signature in black ink, appearing to read "Scott D. Stubblebine", is written over a horizontal line.

Scott D. Stubblebine
Assistant Chief Counsel
Office of River Protection

ORP:OCC

Attachment

cc w/attach:

A. Fitz, WAG

B. Ferguson, WAG

N.M. Menard/J.A. Hedges, Ecology (Richland)

Department of Ecology Enforcement Officer/Appeals Coordinator

1 Washington (RCW) and 43.21B RCW. This Notice of Appeal is timely, having been filed
2 within thirty (30) days of March 21, 2014, the date on which Respondent served Appellant with
3 the Administrative Order and thereby gave notice to Appellant of the action that gives rise to this
4 appeal.

5 **II. IDENTIFICATION, NAME AND ADDRESS OF APPELLANT**

6 Appellant is the United States Department of Energy. Appellant's address and legal
7 representatives are as follows:

8 Robert M. Carosino
9 Chief Counsel
10 Office of Chief Counsel
11 U.S. Department of Energy
12 Richland Operations Office
13 P.O. Box 550, MSIN A4-52
14 Richland, WA 99352
15 Telephone (509) 376-2024
16 Fax (509) 376-4590

Scott D. Stubblebine
Assistant Chief Counsel
U.S. Department of Energy
Office of River Protection
P.O. Box 450, MSIN H6-60
Richland, WA 99352
Telephone (509) 372-0479
Fax (509) 372-2784

13 Mark D. Silberstein
14 Attorney
15 Office of Chief Counsel
16 U.S. Department of Energy
17 Richland Operations Office
18 P.O. Box 550, MSIN A4-52
19 Richland, WA 99352
20 Telephone (509) 376-2380
21 Fax (509) 376-4590

18 **III. DECISION APPEALED**

19 For reasons set forth more fully in Section V below, Appellant seeks the Board's de novo
20 review, including, but not limited to, review of all underlying facts, of the terms of an
21 administrative order allegedly imposed pursuant to provisions of the Washington Hazardous
22 Waste Management Act ("HWMA"), 70.105.095 RCW, *et seq.*, as memorialized in
23 Administrative Order No. 10618 dated March 21, 2014. More specifically, Appellant seeks
24 review of Respondent's decision to issue the Order and impose the terms contained therein upon
25

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Office of River Protection
P. O. Box 450 MSIN H6-60
Richland, WA 99352
(509) 372-0479

1 Appellant. A copy of the Administrative Order is attached hereto as Exhibit A and incorporated
2 herein by reference. A copy of Ecology's letter correcting the docket number for the
3 Administrative Order dated April 1, 2014, is attached hereto as Exhibit B and incorporated by
4 reference. A copy of Energy's request to Ecology to Stay Administrative Order No. 10618 and
5 hold the matter in abeyance dated April 17, 2014, is attached hereto as Exhibit C and
6 incorporated by reference. A copy of Energy's Request for Clarification of Administrative Order
7 No. 10156 dated April 1, 2014, is attached hereto as Exhibit D and incorporated by reference. A
8 copy of Ecology's Response to Energy's Request for Clarification dated April 8, 2014, is
9 attached hereto as Exhibit E and incorporated by reference. For ease of reference, a copy of
10 Revision C of the Revised 241-AY-102 Pumping Plan (RPP-PLAN-55220, Rev. C) dated March
11 7, 2014, is attached hereto as Exhibit F and incorporated by reference.

12 IV. STATEMENT OF FACTS

13 Energy is the owner and an operator of the Hanford Facility located in southeastern
14 Washington State. The former production of defense nuclear materials at the Hanford Site, as
15 well as current environmental remediation and restoration activities and research and
16 development activities, have created, among other things, mixed waste -- a mixture of waste
17 classified as hazardous, under the Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901,
18 *et seq.* ("RCRA"), dangerous waste under the Washington Hazardous Waste Management Act,
19 70.105.005 Revised Code of Washington (RCW), *et seq.* ("HWMA"), and radioactive waste that
20 qualifies as source, special nuclear, and byproduct materials pursuant to the Atomic Energy Act,
21 42 U.S.C. §§ 2011, *et seq.* ("AEA").

22 The salient facts as known to Energy at this time are as follows:

- 23 1. Tank AY-102 (AY-102) is an approximate one million gallon (Mgal)
24 underground double-shell tank (DST) containing mixed radioactive and
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(509) 372-0479

1 hazardous waste located in the 241-AY Tank Farm (AY Farm). It was the
2 first DST constructed at Hanford, and was declared operational in 1971. The
3 tank consists of a primary carbon steel tank, 75 ft. in diameter, inside of a
4 secondary carbon steel liner, which is surrounded by a reinforced-concrete
5 shell. The primary steel tank rests atop an 8 in. insulating concrete slab,
6 separating it from the secondary steel liner, and providing for air circulation
7 channels under the primary tank bottom. An annular space of 2.5 ft. exists in
8 between the secondary liner and primary tank, allowing for visual
9 examination of the tank wall and secondary liner annular surfaces, and
10 ultrasonic inspections of the primary tank walls. Tank AY-102 has risers (i.e.
11 steel pipes) penetrating the dome that provide access for video cameras,
12 ultrasonic inspection devices, waste sampling devices, pumps, and other
13 equipment requiring access to either the primary tank interior or annular
14 space. Above AY-102 are six pits extending from grade to varying depths,
15 which house valves and pumps.

- 16 2. On August 7, 2012, visual inspections of the annulus between the primary and
17 secondary tank walls identified suspect waste material from the primary
18 containment tank. On August 8, 2012, Energy notified Ecology of the suspect
19 waste material.
- 20 3. A formal leak assessment was initiated on August 20, 2012. The leak
21 assessment team confirmed that the material discovered on the annulus floor
22 was the result of a leak from a breach in the bottom of the primary tank. The
23 probable cause was identified as accelerated corrosion due to high
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1 temperatures, and reduced containment margins resulting from fabrication
2 challenges during tank construction. This conclusion was communicated to
3 Ecology on October 22, 2012.

- 4 4. Energy and Ecology formed an Integrated Project Team (IPT), which met
5 between November 2012 and January 2013 to recommend a path forward for
6 AY-102.
- 7 5. On June 14, 2013, Energy submitted 241-AY-102 Pumping Plan, RPP-PLAN-
8 55220 Rev. A, to Ecology.
- 9 6. On January 9, 2014, Ecology provided ORP comments on RPP-PLAN-55220
10 Rev. A and recommended revision to the 241-AY-102 Pumping Plan.
- 11 7. Energy submitted the revised 241-AY-102 Pumping Plan, RPP-PLAN-55220,
12 Rev. C (Pumping Plan), to Ecology on March 7, 2014, to provide the
13 approach and planning schedule for removal of tank waste contained in
14 double-shell tank AY-102 at the earliest practicable time in accordance
15 Code of Federal Regulations (CFR) § 265.196².
- 16 8. Ecology issued its Administrative Order No. 10618 on March 21, 2014 and
17 identified 14 action items with which Energy must comply. Ecology alleges
18 that Energy has violated 40 C.F.R § 265.196 and asserts the following
19 violations:

- 20 • Violation 1 – Failure to stop the flow of hazardous waste into secondary
21 containment

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24 ² The requirements of 40 C.F.R. § 265.196 are incorporated by reference in Washington Administrative Code
(WAC) 173-303-400(3).

- 1 • Violation 2 – Failure to inspect the tank to determine the cause of the
- 2 release
- 3 • Violation 3 – Failure to remove, at the earliest practicable time, as much
- 4 of the waste as is necessary to prevent further release of hazardous
- 5 waste to the environment and to allow inspection and repair of the tank
- 6 to be performed
- 7 • Violation 4 – Failure to remove all released materials from the
- 8 secondary containment system within 24 hours or in as timely a manner
- 9 as is possible to prevent harm to human health and the environment

10 9. On April 1, 2014, Energy sent a letter to Ecology requesting clarification or
11 rescission of the Order.

12 10. On April 8, 2014, Ecology provided its response to Energy's Request for
13 Clarification.

14 11. To date, there has been no release to the environment from the leak associated
15 with tank AY-102.

16 **V. STATEMENT OF GROUNDS FOR RELIEF**

17 Energy contends that, under the facts and circumstances described above, the compliance
18 actions required by Ecology's Administrative Order including, but not limited to, the timeframes
19 to initiate and complete waste removal actions in Tank 241-AY-102, are impracticable,
20 unachievable and unreasonable, and therefore arbitrary and capricious and not in accordance
21 with the regulatory requirements of 40 C.F.R. § 265.196. As described earlier, tank AY-102 is
22 an approximate one million gallon underground double-shell tank (DST) containing mixed
23 radioactive and hazardous waste, the management of which requires extensive planning and
24 logistical consideration and numerous safety requirements.

1 The pertinent language of the release response requirements in 40 C.F.R. § 265.196 is the
2 timeframes associated with the respective waste removal actions. In short, if removal of waste
3 from the tank system or secondary containment system is not possible “*within 24 hours*”, then it
4 must be “*at the earliest practicable time*” and “*in as timely a manner as is possible to prevent*
5 *harm to human health and the environment*”, respectively.³

6 The very purpose of Appellant’s Pumping Plan is to provide the approach and planning
7 schedule for removal of tank waste contained in double shell tank AY-102, at the earliest
8 practicable time in accordance 40 C.F.R. § 265.196, and consistent with the safe handling
9 requirements of the nuclear materials contained in AY-102.

10 Energy also believes that the ambiguities and unclear statements and demands in Ecology’s
11 Administrative Order no.10618 are so pervasive and so significant so as to unlawfully preclude
12 full and complete understanding of the Order by Energy and its contractors. Moreover,
13 Ecology’s determination that a violation occurred was based on a series of inaccurate factual
14 findings and therefore the required compliance actions in the Administrative Order unlawfully
15 deny due process to Energy, are arbitrary and capricious, unreasonable, and not otherwise in
16 accordance with law.

17 Furthermore, where and insofar as the Administrative Order attempts to enter the field of
18 nuclear safety, and/or requires action that conflicts or is otherwise inconsistent with the safe
19 handling of nuclear materials, and/or would directly and substantially affect DOE’s decisions
20 regarding the handling of nuclear materials and/or associated radiological hazards, any such
21 attempt and/or action is preempted by federal law and is solely the province of the federal
22 government under the AEA; moreover, any such attempt, and/or action that is inconsistent with

23
24 ³ 40 C.F.R. § 265.196 (emphasis added).

1 the AEA is specifically prohibited by RCRA and not within RCRA's waiver of sovereign
2 immunity.⁴

3 VI. RELIEF SOUGHT

4 Appellant requests that the Board stay the Administrative Order and hold this matter in
5 abeyance pending potential further negotiations between the parties as to a mutually agreeable
6 settlement. In conjunction with this request to the Board, on April 17, 2014, Energy requested
7 that Ecology stay the Order, and hold the matter in abeyance, pending discussions as to a
8 potentially mutually agreeable path forward (*See Exhibit C*).

9 Appellant further requests stay of the Order due to the extensive ambiguity and lack of
10 clarity, both from a technical and terminology standpoint, which precludes full and complete
11 understanding by Energy of the Order. Despite Energy's request on April 1, 2014, Ecology has
12 failed to provide any clarification of the ambiguous and unclear terms and conditions pervasive
13 throughout the Order (*See Exhibits D & E*). Energy believes that compliance with the Order
14 under these circumstances places Energy at a significant disadvantage in both understanding the
15 Order and in formally responding to it, and subjects Energy to irreparable harm, based upon
16 potential arbitrary and capricious agency enforcement for failure to comply with the Order.
17 Therefore, the Order should be stayed until clarification is provided by Ecology of the
18 underlying facts and unclear statements and demands in the Order.

19 Should this matter need to be resolved at the hearing level, Energy respectfully requests
20 that the Board find the violations alleged in, and the compliance actions required by, the
21 Administrative Order are unsupported by the facts and applicable law, and are therefore
22 unwarranted or otherwise unjustified. Appellant further requests that the Board find that

23 ⁴ RCRA states that "[N]othing in [RCRA] shall be construed to apply to . . . any activity or substance which is
24 subject to the . . . Atomic Energy Act, except to the extent such application (or regulation) is not inconsistent with
25 the requirements of such Acts." 42 U.S.C. § 6905(a).

1 required actions in the Administrative Order are impracticable and unreasonable under the facts
2 and applicable law. Furthermore, Appellant requests that the Board find that imposition of the
3 Administrative Order under the applicable facts and law is unfounded and beyond the scope of
4 Ecology's authority under applicable law. Appellant requests that the Board vacate the
5 Administrative Order in its entirety and grant such other relief as may be just and appropriate.

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V. CERTIFICATIONS

In accordance with WAC 371-08-340(7), the signatures of the representatives of Appellant below constitute the signatories' certification that they have read the foregoing Notice of Appeal and that it is consistent with Civil Rule 11.

DATED this 17th day of April 2014.

By: 
Scott D. Stubblebine
Assistant Chief Counsel
U.S. Department of Energy
Office of River Protection
P.O. Box 450, MSIN H6-60
Richland, WA 99352
Telephone (509) 372-0479
Fax (509) 372-2784

By: 
Mark D. Silberstein
Attorney
Office of Chief Counsel
U.S. Department of Energy
Richland Operations Office
P.O. Box 550, MSIN A4-52
Richland, WA 99352
Telephone (509) 376-2380
Fax (509) 376-4590

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United States Department of Energy
Office of River Protection
P. O. Box 450 MSIN H6-60
Richland, WA 99352
(509) 372-0479

CERTIFICATE OF SERVICE

Pursuant to RCW 9A.72.085, I certify that on the 17th day of April 2014, I caused to be filed with the Clerk of the Pollution Control Hearings Board of the State of Washington, the original and two (2) copies of Appellant’s Notice of Appeal in the matter of Energy v. Ecology, and that a true copy of the foregoing was served upon the parties herein:

Washington State Department of Ecology
Appeals Processor
300 Desmond Drive SE
Lacey, WA 98503
 U.S. Mail
 Hand Delivery w/receipt
 Overnight Express
 Facsimile w/o Exhibits

Bob Ferguson
Attorney General, State of Washington
1125 Washington St. SE
Olympia, WA 98504-0100
 U.S. Mail
 Hand Delivery w/receipt
 Overnight Express
 Facsimile w/o Exhibits

Andrew Fitz
Assistant Attorney General
2425 Bristol Court SW, 2nd Floor
Olympia, WA 98504-117
 U.S. Mail
 Hand Delivery w/receipt
 Overnight Express
 Facsimile w/o Exhibits

Nina Menard, Jane A. Hedges
Washington State Department of Ecology
Nuclear Waste Program
3100 Port of Benton Blvd
Richland, WA 99354
 U.S. Mail
 Hand Delivery w/receipt
 Overnight Express
 Facsimile w/o Exhibits

the foregoing being the last known business address.

I certify under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct.

DATED this 17th day of April 2014 in Richland, Washington.


Cynthia Hildman

U.S. Department of Energy
Office of River Protection
PO Box 450, MSIN H6-60
Richland, WA 99352
(509) 372-0479

EXHIBIT A

**STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY**

IN THE MATTER OF AN) ADMINISTRATIVE ORDER
ADMINISTRATIVE ORDER) DOCKET #10156
AGAINST)

United States Department of Energy
Mr. Kevin Smith, Program Manager
Office of River Protection
PO Box 450, MSIN: H6-60
Richland, Washington 99352

Washington River Protection Solutions
Mr. L. David Olson, President & Project Manager
PO Box 850, MSIN: H6-04
Richland, Washington 99352

Order Docket #	10156
Site Location	The Hanford Site within Benton, Franklin, and Grant Counties of Washington
EPA ID	#WA 7890008967

The Washington State Department of Ecology (Ecology) issues this Administrative Order (Order) requiring the U.S. Department of Energy (USDOE) and Washington River Protection Solutions (WRPS) to comply with:

- Chapter 70.105 Revised Code of Washington (RCW) Hazardous Waste Management Act.
- Chapter 173-303 Washington Administrative Code (WAC) Dangerous Waste Regulations.
- Hanford Facility Dangerous Waste Permit, No. WAD WA7890008967 (Permit).

AUTHORITY

Ecology is authorized under RCW 70.105.095 to issue an administrative order requiring compliance upon determining that a person has violated, or is about to violate, any provision of Chapter 70.105 RCW.

RCW 70.105.130 authorizes Ecology to implement the federal Resource Conservation and Recovery Act (RCRA), and establish a permit system for owners or operators of facilities that treat, store, or dispose of dangerous waste. The permit system is established in the Dangerous Waste Regulations, Chapter 173-303 WAC.

Ecology issued Permit No. WAD WA7890008967 (Permit) for USDOE's Hanford Dangerous Waste Facility (Facility), effective August 1994. Revision 8c of the Permit currently applies to the operation of and corrective actions taken, or to be taken, at, this Facility.

Pursuant to Part I.A of the Permit, Revision 8c, the standards used to evaluate compliance for this enforcement are the interim status facility standards in WAC 173-303-400 and the regulations incorporated into the interim status standards by reference.

FACTUAL FINDINGS

Ecology's determination that a violation has occurred is based on the following facts:

1. Tank 241-AY-102 is one of two one-million gallon tanks in the 241-AY Tank Farm (AY Farm) located in the southeast portion of the 200 East Area of the Hanford Dangerous Waste Facility. The 241-AY-102 system includes:
 - Primary tank and secondary tank structure
 - Concrete shell, insulating pad (refractory), and foundation
 - Central pump pit
 - Sluice pits
 - Annulus pump pit
 - Leak detection pit (and well)
 - Air lift circulators
 - Monitoring and alarm systems

The primary steel tank rests inside the secondary steel tank and is supported by the refractory on the floor of the secondary tank. An annular space of 2.5 feet is formed between the primary tank and secondary tank.

2. In August 2012, an accumulation of material was discovered at two locations on the floor of the 241-AY-102 annulus that separates the primary tank from the secondary tank.
The accumulation of material was discovered during a routine video inspection. None of this material was present during the last visual inspection of the annulus, taken in 2006 - 2007. USDOE and WRPS conducted further investigation and sampling, and determined that the accumulated material was leaking from the primary tank.
3. On October 22, 2012, USDOE notified Ecology that Tank 241-AY-102 was leaking waste into the tank's secondary containment.

4. Hazardous and highly radioactive waste material cascaded from refractory slots to the floor of the annulus in two locations – near Riser 90 and near Riser 83. The flow near Riser 90 has shown no changes since the notification. The flow near Riser 83 shows a continuing leak. As of November 15, 2012, the amount of hazardous and radioactive waste material that has leaked from both areas was approximately 520 gallons.
5. On March 5, 2014, USDOE notified Ecology that a third leak had been discovered from Riser 77. The volume of this leak is unknown at this time.
6. Through a series of meetings and other interactions from October 2012 through the date of this Order, Ecology has given USDOE and WRPS opportunities to voluntarily comply with applicable regulations.

During this period, Ecology stated numerous times, both orally and in written form, that the leak response requirements at 40 CFR 265.196 [incorporated by reference into interim status standards at WAC 173-303-400(3)]¹ apply and must be complied with. In particular, 40 CFR 265.196(b) requires removal of waste from the primary tank and secondary containment of a leaking tank system.

7. By email on October 23, 2012, Ecology told USDOE and WRPS that waste removal must begin immediately, and requested a detailed schedule for completing such removal. USDOE was told to immediately notify Ecology if it did not intend to comply with the requirements.
8. By email on December 3, 2012, Ecology again reminded USDOE and WRPS of the requirements to immediately pump Tank 241-AY-102 or provide a schedule and justification for completing this at the earliest practicable time.
9. On January 15, 2013, WRPS, along with USDOE, presented three options for coming into compliance with 40 CFR 265.196:
 - (1) Closure pursuant to the requirements of 40 CFR 265.196(e).
 - (2) Repair and recertification pursuant to the requirements of 40 CFR 265.196(e) and (f).
 - (3) Obtaining a secondary containment variance pursuant to the provisions for this at 40 CFR 265.193 (g) and (h).

Ecology informed WRPS and USDOE that these options did not meet the tank leak response requirements in 40 CFR 265.196. In particular, none of these options addressed the requirement to, within 24 hours, or if that is demonstrably not possible, at the earliest practicable time, remove as much of the waste as necessary to allow for tank system inspection.

¹ For brevity purposes, for the remainder of the Order Ecology will only cite to 40 Code of Federal Regulations (CFR) 265.196. In all cases, however, the citation is to the federal regulation as it is incorporated by reference under WAC 173-303-400(3).

10. In multiple meetings and conversations since December 2012, Ecology requested that USDOE provide a response to the regulatory requirements and a plan to remove the waste from Tank 241-AY-102. Ecology reviewed and provided comments to USDOE on multiple versions of a draft letter intended to provide this information.
11. On May 6, 2013, USDOE provided a letter to Ecology that:
 - (1) Provided a regulatory basis for not pumping the tank within 24 hours.
 - (2) Indicated that the tank was not isolated from waste additions.
 - (3) Indicated that the ability of the secondary tank to maintain integrity, once waste entered it, was still under evaluation.
 - (4) Committed to provide to Ecology a pumping plan specific to Tank 241-AY-102 by June 14, 2013.
12. On May 24, 2013, Ecology issued a letter to USDOE and WRPS documenting its expectations for the June 14, 2013, pumping plan submittal. The letter conveyed the following expectations:
 - The pumping plan must provide a schedule for removing waste from the primary tank. [40 CFR 265.196(b)(1)]
 - The pumping plan must provide a schedule for removing waste from the secondary containment, demonstrating that such removal is in as timely a manner as is possible to prevent harm to human health and the environment. [40 CFR 265.196(b)(2)]
 - The pumping plan must provide a schedule for isolating the 241-AY-02A pit, which could provide a path to allow waste into Tank 241-AY-102.
 - The pumping plan must provide a schedule to revise the January 2006 evaluation of the integrity of the secondary containment.
 - The pumping plan must document technical challenges that may affect the schedule, separate from limitations on funding. Funding may not be a factor in determining “earliest practicable time” or “as timely as possible.” [40 CFR 265.196(b)]
 - The pumping plan must document readiness to pump, within a specific and reasonable timeframe, from both the primary tank and secondary containment, if the leak worsens.
 - An earlier-prepared Emergency Pumping Guide must be immediately revised because it did not fulfill the goal of allowing pumping of a double-shelled tank (DST) within 10 days if a leak occurred, determined through previous compliance actions to address 40 CFR 265.196(b).

Ecology conveyed this expectation because USDOE had documented its belief that the earlier Emergency Pumping Guide does not apply to a leak from the bottom of a tank.

13. On June 14, 2013, USDOE delivered the "241-AY-102 Pumping Plan," RPP-PLAN-55220, Rev. A, (Pumping Plan) to Ecology. Through this Pumping Plan and its accompanying letter, USDOE:
 - Declined to remove any waste from the primary tank unless conditions change, stating that "removal of waste from the primary tank is not practicable, nor is it necessary to prevent release to the environment."
 - Laid out a schedule of approximately 19 months for "planning, procurement and installation of the out-of-tank equipment that will be needed to allow for pumping of the solids in the primary tank."
 - Declined to schedule installation of in-tank pumping equipment necessary for solids removal during the 19 months of planning, procurement, and installation of equipment.
 - Indicated that waste removal, if initiated, would take 14 months to complete, after which the tank would be evaluated for repair or closure.
 - Expressly assumed that "the secondary containment will remain intact until waste from tank AY-102 can be removed and the 'repair or close' decision made."
 - Commits to completing a study on the structural integrity of secondary containment by April 2014.
14. The impact of the waste in the Tank 241-AY-102 annulus on the integrity of the secondary liner is unknown at this time.
15. USDOE has taken no action to mitigate the leak into the secondary containment. As of the date of this Order, USDOE has taken no action to prevent the flow of dangerous waste into Tank 241-AY-102 or stop the flow of waste into its secondary containment.
16. The Defense Nuclear Facilities Safety Board (DNFSB) reviewed USDOE report RPP-RPT-53901, Rev. 2, "Management of Supernatant Level in Tank 241-AY-102." On October 24, 2013, the DNFSB released a staff issue report on the subject of "Integrity Implications of Decanting Liquid from Hanford Tank 241-AY-102."

The report recommends:

- Continued visual inspection of the tank annulus and close monitoring for variations in the waste temperature.
- Monitor for signs of increased leakage and blockage of the insulating refractory slots that distribute cooling air to the tank bottom.
- Develop a more rigorous multi-dimensional, transient thermal analysis model to aid in understanding the safety significance of any observed changes in tank conditions subsequent to decanting.

17. On January 9, 2014, Ecology issued a letter to USDOE and WRPS with comments on the 241-AY-102 Pumping Plan, Rev. A (RPP-PLAN-55220). Ecology found the Pumping Plan unacceptable because the plan expressly declined to meet USDOE's and WRPS's regulatory obligation to remove the waste from Tank AY-102 at the earliest practicable time. Ecology's letter requested a workable plan for pumping waste from Tank AY-102 no later than February 15, 2014
18. On February 4, 2014, USDOE issued a letter to Ecology asking for an extension for submittal of the revised 241-AY-102 Pumping Plan to March 7, 2014
19. On February 11, 2014, Ecology issued a letter to USDOE approving the extension to March 7, 2014.
20. On March 7 USDOE submitted Rev C of the Revised 241-AY-102 Pumping Plan (revised Pumping Plan). The plan announces that it "has been revised to proceed with the planning, engineering and design, procurement, and installation of out of tank equipment." However, it does not contain a plan for conducting these activities. Its only schedule is an estimated timeframe of approximately two years for conducting only the preparatory activities.

The revised Pumping Plan indicates this estimated timeframe may be subject to change for various reasons. The plan does not attempt to show that this two-year timeframe satisfies the requirement of "earliest practicable time." It does not provide any plan or schedule for actually removing the waste from Tank 241-AY-102.

DETERMINATION OF VIOLATIONS

Ecology has determined that the following violations have occurred based on the facts provided above.

Violation 1 - Failure to stop the flow of hazardous waste into secondary containment

40 CFR 265.196(a) requires the owner or operator of the tank to immediately stop the flow of hazardous waste into the secondary containment system.

As of the date of this Order, USDOE and WRPS have not stopped the flow of waste into the secondary containment of 241-AY-102.

Violation 2 - Failure to inspect the tank to determine the cause of the release

40 CFR 265.196(a) requires the owner or operator of the tank to inspect the tank to determine the cause of the release.

As of the date of this Order, USDOE and WRPS have not inspected the tank to determine the cause of the release. USDOE states in the revised Pumping Plan that Tank 241-AY-102 will have to be emptied to determine the cause of the release. USDOE has not emptied the tank and has submitted a plan according to which waste removal will not be authorized, nor a removal schedule determined, before March 4, 2016. The revised plan does not demonstrate that an initial pumping date sometime after March 4, 2016 is the earliest practicable time to begin waste removal.

Violation 3 - Failure to remove, at the earliest practicable time, as much of the waste as is necessary to prevent further release of hazardous waste to the environment and to allow inspection and repair of the tank to be performed.

Where the release is from the tank system, as it is here, 40 CFR 265.196 (b) provides that "the owner or operator must, within 24 hours after detection of the leak or, if the owner or operator demonstrates that that is not possible, at the earliest practicable time remove as much of the waste as is necessary to prevent further release of hazardous waste to the environment and to allow inspection and repair of the tank system to be performed."

As of the date of this Order, USDOE and WRPS have failed to remove, or take any actions to begin removing, as much of the waste as is necessary to prevent further release to the environment and to allow for inspection and repair of the tank system to be performed.

USDOE states in its revised Pumping Plan that removing the contents of the tank will not be authorized before March 4, 2016. USDOE has not demonstrated that March 4, 2016, or later would be the "earliest practicable time" to begin removing the waste.

Violation 4 - Failure to remove all released materials from the secondary containment system within 24 hours or in as timely a manner as is possible to prevent harm to human health and the environment

40 CFR 40 CFR 265.196 (b)(2) requires that, if the release was to a secondary containment system, all released materials must be removed within 24 hours or in as timely a manner as is possible to prevent harm to human health and the environment.

As of the date of this Order, USDOE and WRPS have failed to remove any of the released materials from the secondary containment. The revised plan indicates that the released materials will be removed only after waste is removed from the primary tank.

ORDER TO COMPLY

Based on the factual findings and the determinations of violations, as stated above, IT IS ORDERED THAT USDOE and WRPS take the actions described below.

Immediately upon receipt of this Order and continuously thereafter USDOE and WRPS must:

1. Provide to Ecology, upon publication, the results of any modeling that USDOE or WRPS conducts in accordance with recommendations of the DNFSB staff report, "Integrity Implications of Decanting Liquid from Hanford Tank 241-AY-102" (October 24, 2013).
2. Complete isolation of Tank 241-AY-102 by August 15, 2014.
3. After the 241-AY-02A pump pit has been isolated, and no later than September 1, 2014, begin pumping the supernatant from Tank 241-AY-102. Remove all supernatant, except as necessary to maintain the minimum height of supernatant above the maximum solids level prescribed in RPP-RPT-53901 (prescribing 96 inches above solids level), or as prescribed in other USDOE documents regulating safety in Tank 241-AY-102.
4. Complete installation of sludge removal equipment and initiate waste removal in Tank 241-AY-102 no later than December 1, 2015. This will include all activities that USDOE will need to complete for authorization to initiate and complete all waste transfers.
5. Complete waste removal to a level sufficient for inspection to determine the cause of the leaks, no later than December 1, 2016.
6. Immediately inform Ecology of any safety issues that arise after pumping has begun and provide a detailed description of the specific safety issue. If the solution to an immediate concern is to cease pumping, provide a recovery plan within 30 days. The recovery plan must include a schedule for correcting and restarting pumping at the earliest practicable time.
7. Within 60 days of the effective date of this Order, submit to Ecology for approval:
 - a. Monitoring plans for annulus inspection, waste temperature monitoring and annulus ventilation monitoring including a schedule for calibration of the continuous air monitor (CAM) and Enraf-Nonius Series 854 (ENRAF). The monitoring plans must provide clear, immediate actions for maintaining annulus ventilation.
 - b. A contingency plan for safely managing any worsening conditions indicated by inspections and monitoring. Such indications include suspected increased leak rate or blockage on the ventilation channels causing increases in waste temperatures.

Any other new issues not identified in the contingency plan such as those that arise as a result of construction or waste transfer activities, must be identified and evaluated, with a recovery plan and schedule provided to Ecology within 30 days.

8. Within 90 days of the effective date of this Order, submit a report that evaluates the integrity of the secondary containment system including, but not limited to, the impacts of the waste that is currently in the annulus.
9. Within 120 days of the effective date of this Order, submit a detailed waste retrieval work plan to Ecology for removing the remaining waste from Tank 241-AY-102. The waste retrieval work plan shall include, but is not limited to, detailed descriptions of:
 - a. The engineering design and the steps taken to procure equipment, including those steps already undertaken, with a schedule for the procurement of each piece of equipment, showing that these activities either have been or will be completed at the earliest practicable time.
 - b. The steps necessary for installation of all needed out-of-tank equipment and in-tank equipment for removing the waste from Tank 241-AY-102.
 - c. The number and schedule of 242-A Evaporator runs, including support activities needed.
 - d. The schedule for installation and start-up of equipment needed to support transfers to other DSTs.
10. Officially submit all supporting documentation that justifies the schedule for the above requirements.
11. To address the potential leak to the environment, sample the liquid from the Tank 241-AY-102 annulus leak detection pit monthly, starting within five days of the effective date of this Order. At a minimum, using inductively coupled plasma/mass spectrometry (ICP/MS), analyze this sample for metals, radionuclides, and pH, and report the results to Ecology within 15 days of taking the sample.
12. Conduct monthly video inspections of the entire annulus and weekly video inspections on the current leaks and weekly video inspections of any future leaks into the annulus.
13. Provide Ecology with monthly reports on the results of the visual and video annulus inspections, annulus ventilation performance and status, CAM readings, ENRAF readings, CAM and ENRAF calibration results, sample analysis results, waste heat monitoring results, including any interpretations and conclusions based on the results.
14. Officially submit to Ecology, within 10 working days of the effective date of the Order, copies of:
 - a. All documents listed in the revised Pumping Plan, Attachment A, that were not previously officially submitted to Ecology
 - b. All Technical Safety Requirements and all Safety Basis evaluations used to determine the requirements to control flammable gas levels and impacts to operational limits for waste storage (OSD-T-151-00007), as referenced in the revised Pumping Plan, Section 1.1, that were not previously officially submitted to Ecology

EFFECTIVE DATE

This Order is to be considered effective 30 days from the day of issuance.

ELIGIBILITY FOR PAPERWORK VIOLATION WAIVER AND OPPORTUNITY TO CORRECT

Under RCW 34.05.110, small businesses are eligible for a waiver of a first-time paperwork violation and an opportunity to correct other violations.

Ecology has determined the requirements of RCW 34.05.110 do not apply to the violation(s) described in this Order because you are not a small business as defined in RCW 34.05.110 (9).

FAILURE TO COMPLY WITH THIS ORDER

Failure to comply with this Order may result in the issuance of civil penalties or other actions, whether administrative or judicial, to enforce the terms of this Order.

YOUR RIGHT TO APPEAL

You have a right to appeal this Order to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do both of the following within 30 days of the date of receipt of this Order:

- File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

• ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, Washington 98503	Department of Ecology Attn: Appeals Processing Desk PO Box 47608 Olympia WA 98504-7608
Pollution Control Hearings Board 1111 Israel Road SW, Suite 301 Tumwater, Washington 98501	Pollution Control Hearings Board PO Box 40903 Olympia WA 98504-0903

CONTACT INFORMATION

Please direct all questions about this Order to:

Nina M. Menard, Acting Section Manager
Department of Ecology
Nuclear Waste Program
3100 Port of Benton Boulevard
Richland, Washington 99354
(509) 372-7972
Nina.Menard@ecy.wa.gov

MORE INFORMATION

- **Pollution Control Hearings Board**
www.cho.wa.gov/Boards_PCHB.aspx
- **Chapter 43.21B RCW - Environmental and Land Use Hearings Office – Pollution Control Hearings Board**
<http://apps.leg.wa.gov/RCW/default.aspx?cite=43.21B>
- **Chapter 371-08 WAC – Practice and Procedure**
<http://apps.leg.wa.gov/wac/default.aspx?cite=371-08>
- **Chapter 34.05 RCW – Administrative Procedure Act**
<http://apps.leg.wa.gov/RCW/default.aspx?cite=34.05>
- **Chapter 70.105 RCW – Hazardous Waste Management**
<http://apps.leg.wa.gov/rcw/default.aspx?cite=70.105>
- **Chapter 173-303 WAC – Dangerous Waste Regulations**
<http://apps.leg.wa.gov/wac/default.aspx?cite=173-303>

SIGNATURE


Maia D. Bellon
Director


Date

EXHIBIT B



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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April 1, 2014

Mr. Kevin W. Smith, Program Manager
Office of River Protection
United States Department of Energy
PO Box 450, MSIN: H6-60
Richland, Washington 99352

Mr. L. David Olson
President & Project Manager
Washington River Protection Solutions
PO Box 850, MSIN: H6-04
Richland, Washington 99352

Re: Corrected Docket Number for Administrative Order for the Hanford Site,
EPA/State ID # WA7890008967

Dear Mr. Smith and Mr. Olson:

On March 21, 2014, the Department of Ecology issued an Administrative Order to the United States Department of Energy, Office of River Protection. The Order Docket Number on the Administrative Order was listed as 10156. However, upon review of our records, it was discovered that the number assigned was a duplicate. **The correct docket number assigned to the March 21, 2014, Administrative Order is Docket 10618.**

The purpose of this letter is to amend the above-referenced Administrative Order as issued on March 21, 2014, by changing the docket number to correctly reflect Order Docket Number 10618. You should clearly reference Order Docket Number 10618 on all future matters regarding this Administrative Order.

Please accept my apologies for this administrative error. If you have additional questions, please do not hesitate to contact Jane Hedges, Nuclear Waste Program Manager, at (509) 372-7905 or jane.hedges@ecy.wa.gov.

Sincerely,

Maia D. Bellon
Director



EXHIBIT C



OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

APR 17 2014

14-ORP-0049

Ms. Jane A. Hedges, Program Manager
Nuclear Waste Program
Washington State
Department of Ecology
3100 Port of Benton Boulevard
Richland, Washington 99354

Ms. Nina M. Menard, Acting Section Manager
Washington State Department of Ecology
Nuclear Waste Program
3100 Port of Benton Boulevard
Richland, Washington 99354

Addressees:

RESPONSE TO ADMINISTRATIVE ORDER NO. 10618

- References:
1. Washington State, Department of Ecology, Administrative Order Docket No. 10156, dated March 21, 2014.
 2. ORP letter from K.W. Smith to N.M. Menard, "Clarification of Administrative Order No. 10156," 14-ORP-0043, dated April 1, 2014.
 3. Ecology letter from N.M. Menard to K.W. Smith, ORP and L.D. Olson, WRPS, "Response to U.S. Department of Energy and Washington River Protection Solutions Letters Requesting 'Clarification of Administrative Order no. 10156,' dated April 1, 2014 (Corrected Docket #10168)," 14-NWP-061, dated, April 8, 2014.

I'm writing this letter in response to your recent issuance of Administrative Order No. 10618 (hereinafter, "the Order") as a supplement to my letter dated April 1, 2014 requesting the Department of Ecology to provide certain clarifications of the Order. I encourage the Washington State Department of Ecology to stay the Order, and hold it in abeyance in conjunction with a similar request to stay an administrative appeal to the Pollution Control Hearings Board which we expect to file. We are making this request because we believe it is in the best interests of both sides to self-mediate a potentially mutually-agreeable path forward.

I fully believe that our organizations can work through these matters in a collaborative manner that will save time, preserve or improve our working relationship, and efficiently manage precious resources that would be better used in other more comprehensive pending matters that will affect our long-term future.

APR 17 2014

Addressees
14-ORP-0049

-2-

I sincerely solicit your response in the hopes of establishing a positive, collaborative, and mutually respectful forum from which we move forward. If you have any questions or would like to discuss this in more detail, please contact me or Mr. Tom Fletcher at (509) 376-3434.



Kevin W. Smith
Manager *FOL*

ORP:MDS

cc: M.D. Bellon, Ecology

EXHIBIT D



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

14-ORP-0043

APR 01 2014

Ms. Nina M. Menard, Acting Section Manager
Washington State Department of Ecology
Nuclear Waste Program
3100 Port of Benton Boulevard
Richland, Washington 99354

Ms. Menard:

CLARIFICATION OF ADMINISTRATIVE ORDER NO. 10156

The U.S. Department of Energy, Office of River Protection (hereinafter "Energy") is seeking clarification of the above referenced administrative order (Order) issued by the Washington State Department of Ecology (Ecology) on March 21, 2014. Due to extensive ambiguity and lack of clarity, both from a technical and terminology standpoint, Energy hereby respectfully requests that Ecology either rescind or provide clarification of the above-referenced Order. Furthermore, due to the pendency of a likely administrative appeal of this Order, Energy respectfully requests that Ecology either rescind this Order or provide its clarification of this Order not later than April 8, 2014.

Energy hereby requests that Ecology clarify the following provisions of the Order:

Effective Date & Orders to Comply

- Please clarify the effective date of the Order. The effective date of the Order reads, "This Order is to be considered effective 30 days from the day of issuance." (Order, pg. 10). Furthermore, please clarify all instances in the Order where an action is required by a specified time period using the phrase "within [x] days of the effective date of this Order."
- The terms used to describe specified submittal dates differ and are therefore unclear. The terms vary from "within [x] days" to "within [x] working days" and as stated above, "within [x] days of the effective date of this Order." Please clarify the variation among these phrases and whether such variation was intentional. Furthermore, please clarify whether it is Ecology's intent to use calendar days or working days consistently throughout the Order.
- Action item no. 2 states, "Complete isolation of tank 241-AY-102 by August 15, 2014." Please clarify what is meant by "complete isolation."
- Action item no. 3 states, "After the 241-AY-02A pump pit has been isolated...." Please clarify what is meant by "isolated" as used in this statement.

- Action item no. 5 states, "Complete waste removal to a level sufficient for inspection...." Please clarify what is meant by "a level sufficient for inspection." Furthermore, action item no. 5 uses the term "leaks." This term does not accurately reflect the accumulation of waste in the AY-102 annulus. A single slow leak would expect to result in multiple waste accumulation sites around the annulus as it flows through the ventilation channels under the primary tank. The quantity of leak sites under the tank is indeterminate based upon the location, although it is possible to estimate the overall leak rate based upon the slow spread of waste accumulation in the annulus. Please clarify.
- Action item no. 6 uses the terms "immediate" and "immediately." Please clarify the definition of these terms as used in this action item and in each case where these terms are used throughout the Order. Please also clarify whether the required action in item no. 6 refers to the transfer of supernatant or the transfer of solids or both the transfer of supernatant and solids. Please also clarify what Ecology means by its use of the terms "safety issues" and "safety issue" as stated in action item no. 6. Furthermore, action item no. 6 states, "If the solution to an immediate concern is to cease pumping, provide a recovery plan within 30 days." Please clarify the timeframe following the cessation of pumping that would require a recovery plan. Please also clarify what is meant by "recovery plan."
- Please clarify what is meant by "annulus ventilation monitoring" as stated in action item no. 7(a).
- Action item no. 7(b) requires the submission of "a contingency plan for safely managing any worsening conditions indicated by inspections and monitoring." Please clarify what Ecology means by, "Any other new issues not identified in the contingency plan...." Please also clarify what is meant by "contingency plan." Furthermore, Ecology states, "...recovery plan and schedule provided to Ecology within 30 days." Please clarify what event triggers the start of "within 30 days."
- Action item no. 8 requires submission of "...a report that evaluates the integrity of the secondary containment system...." Please clarify the anticipated contents of such report. Furthermore, please clarify what is meant and/or anticipated by the phrase, "but not limited to."
- Action item no. 9 requires submission of a "...detailed waste retrieval work plan...." Please clarify what is meant by a "detailed waste retrieval work plan" and what is required to fulfill this requirement. Please also clarify what is meant by the phrase, "but not limited to."
- Action item no. 10 on Ecology's list of required actions reads, "Officially submit all supporting documentation that justifies the schedule for the above requirements." Please clarify what "officially submit" means as stated in action item no. 10 and as used throughout the Order. Furthermore, does this mean "officially submit" all supporting documentation that justifies the schedule for the requirements in action item no. 9, or rather, action items 1 through 9? Please also clarify when such submissions would be due.

APR 01 2014

- Please clarify whether the inspections required in action item no. 12 are expected to occur during active retrieval operations. Furthermore, action item no. 12 uses the term, "leaks." This term does not accurately reflect the accumulation of waste in the AY-102 annulus. A single slow leak would expect to result in multiple waste accumulation sites around the annulus as it flows through the ventilation channels under the primary tank. The quantity of leak sites under the tank is indeterminate based upon the location, although it is possible to estimate the overall leak rate based upon the slow spread of waste accumulation in the annulus. Please clarify.
- Please clarify exactly what information and level of detail is expected to be included in the monthly reports for AY-102 as required by action item no. 13. Furthermore, please clarify when such reporting is expected to start.
- Again, please clarify what "officially submit" and "officially submitted" means as used throughout the Order and specifically as used in action item no. 14.

Factual Findings

- Factual finding no. 4 refers to material found in the annulus as, "hazardous and highly radioactive waste material." The use of the term "highly radioactive waste" is not formally defined. Please clarify.
- Factual finding no. 5 states, "On March 5, 2014, USDOE notified Ecology that a third leak had been discovered from Riser 77. The volume of this leak is unknown at this time." This statement is inaccurate. The exact number of leaks is indeterminate based upon the location, although the overall leak rate can be estimated based upon the slow spread of waste accumulation in the annulus. A third area of accumulated material was observed near riser 77. Please clarify.

Determination of Violations

- Violation no. 3 states, "As of the date of this Order, USDOE and WRPS have failed to remove, or take any actions to begin removing, as much waste as is necessary to prevent further release to the environment and to allow for inspection and repair of the tank system to be performed." As of the date of the Order, there has been no release to the environment. Please describe what constitutes a "release to the environment" as stated in violation no. 3.

This request for clarification shall not limit the rights of Energy to deny, dispute, or appeal the findings and violations stated within the original administrative order to Ecology, the Pollution Control Hearings Board, or any other administrative agency, court, or legislative body.

Energy believes that the ambiguities and unclear statements and demands in the Administrative Order are so pervasive and so significant so as to preclude full and complete understanding by Energy and its contractors of this Order. Energy asserts that the pervasive ambiguities and unclear statements and demands in Administrative Order No. 10156 place Energy at a significant

Ms. Nina M. Menard
14-ORP-0043

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APR 01 2014

disadvantage in both understanding this Order and in formally responding to it and, therefore, that the Order unlawfully denies due process to Energy, is arbitrary and capricious, unreasonable, and not otherwise in accordance with law.

It is therefore Energy's recommendation that based upon the significant ambiguity and lack of clarity in the Order, that Ecology either rescind or provide clarification of the above-referenced Order. Energy recommends that the parties meet and discuss such order prior to any reissuance as this Order may have significant impacts on ongoing tank farm activities.



Kevin W. Smith
Manager

ORP:OCC

cc:
M.D. Bellon, Ecology

EXHIBIT E



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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April 8, 2014

14-NWP-061

Mr. Kevin W. Smith, Program Manager
Office of River Protection
United States Department of Energy
P.O. Box 450, MSIN: H6-60
Richland, Washington 99352

Mr. L. David Olson
President & Project Manager
Washington River Protection Solutions
P.O. Box 850, MSIN: H6-04
Richland, Washington 99352

Re: Response to U.S. Department of Energy and Washington River Protection Solutions Letters
Requesting "Clarification of Administrative Order No. 10156," dated April 1, 2014
(Corrected Docket #10168)

Dear Mr. Smith and Mr. Olson:

On March 21, 2014, the Department of Ecology (Ecology) issued an administrative order requiring the United States Department of Energy and Washington River Protection Solutions to conduct activities related to removing waste from double-shell tank 241-AY-102, so that the tank may be inspected to determine the cause of leakage into its annulus.

Ecology received a letter from each of you seeking clarification of that order (see references). Both letters suggest that several of the terms used in Ecology's order are so ambiguous and unclear that you are unable to understand the order's requirements. Those terms included "effective 30 days from the day of issuance," "within 10 working days," "a level sufficient for inspection," "leaks," "immediately," "safety issues," "contingency plan," "but not limited to," and "officially submit."

You requested that Ecology either provide clarification of these terms within a week or rescind its order. In reply, Ecology respectfully declines both options. We are confident that the order is unambiguous and clear as it stands.

Sincerely,

Nina M. Menard
Action Cleanup Section Manager
Nuclear Waste Program

References:

1. Letter 14-ORP-0043, dated April 1, 2014, from K. W. Smith, USDOE-ORP, to J. A. Hedges, Ecology, "Clarification of Administrative Order No. 10156"
2. Letter WRPS-LC-2014-00074, dated April 1, 2014, from L. D. Olson, WRPS, to J. A. Hedges, Ecology "Clarification of Administrative Order No. 10156"

cc: Maia D. Bellon, Ecology



EXHIBIT F



OFFICE OF RIVER PROTECTION

P.O. Box 450, MSIN H6-60
Richland, Washington 99352

14-TF-0021

MAR 07 2016

Ms. Jane A. Hedges, Program Manager
Nuclear Waste Program
Washington State
Department of Ecology
3100 Port of Benton Boulevard
Richland, Washington 99354

Ms. Hedges:

SUBMITTAL OF THE REVISED 241-AY-102 PUMPING PLAN

Reference: Ecology letter J.A. Hedges to K.W. Smith, ORP and L.D. Olson, WRPS, "Removing Waste from Double-Shell Tank 241-AY-102 – Ecology's Comments on Letter 13-TF-0049, and the attached *241-AY-102 Pumping Plan*, RPP-PLAN-55220," 14-NWP-001, dated January 9, 2014.

The U.S. Department of Energy, Office of River Protection (ORP) is submitting the attached RPP-PLAN-55220, Rev. C, *241-AY-102 Pumping Plan* (Plan) to the Washington State Department of Ecology (Ecology) in response to Ecology's January 9, 2014, letter (Reference). This letter and the attached Plan have been formally coordinated with Washington River Protection Solutions LLC (WRPS) President L. Dave Olson.

ORP and WRPS are committed to working with Ecology to address the path forward for AY-102. We are executing Plan commitments and have been safely reducing the supernate level in AY-102, primarily through evaporation. The supernate level in AY-102 has already declined approximately 18 inches, or about 50,000 gallons, since August 2012.

This Plan implements the current risk-informed and risk-managed approach of acquiring the equipment for sludge removal and initiating supernate pumping when the waste retrieval and transfer system is ready to remove solids. This approach couples the risks of increased leak rate, increased waste temperature and increased flammable gas generation with the capability to remove both the supernate and the sludge from AY-102. The enclosed Plan has been revised to proceed with the planning, engineering and design, procurement, and installation of out-of-tank equipment. Following completion of the out-of-tank equipment installation, ORP will conduct a status readiness review to determine the timing of the in-tank equipment installation and waste removal.

Jane A. Hedges
14-TF-0021

-2-

MAR 07 2014

ORP is requesting an opportunity to brief you and your staff on the Rev. C Plan during the week of March 10, 2014. Erik Olds, ORP Chief of Staff will contact you to arrange a briefing at your convenience.



Kevin W. Smith
Manager

TF:GDT

Attachment

cc w/attach:

M. Bellon, Ecology

R. Albright, EPA

K. Kelly, EPA

D. Faulk, EPA

K. Niles, ODOE

W.C. Clark, WRPS

L.D. Olson, WRPS

Environmental Portal, LMSI

Administrative Record, DST

WRPS Correspondence

ATTACHMENT

14-TF-0021

REVISED 241-AY-102 PUMPING PLAN

241-AY-102 Pumping Plan

Author Name:
G. J. McCallum
Washington River Protection Solutions LLC
Richland, WA 99352
U.S. Department of Energy Contract DE-AC27-08RV14800

EDT/ECN: DRF UC:
Cost Center: Charge Code:
B&R Code: Total Pages: 27 29 JDA 3/7/14

Key Words: 241-AY-102, Plan, Pumping

Abstract: This Pumping Plan addresses the approach and planning schedule for removal of the AY-102 primary tank supernatant and solid waste on a timeline as soon as is practicable.

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 Jenis D. Aerdal at 3:55 pm, Mar 07, 2014

Release Approval

Date



Release Stamp

Approved For Public Release

RPP-PLAN-55220, Rev. C

241-AY-102 Pumping Plan

G. J. McCallum
Washington River Protection Solutions

Date Published
(March 2014)

Prepared for the U.S. Department of Energy
Office of River Protection



Post Office Box 850
Richland, Washington 99352

Contractor for the U.S. Department of Energy
Contract No. DE-AC27-08RV14800

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RPP-PLAN-55220, REV. C

Abbreviations and Acronyms

AN-101	DST 241-AN-101
AN-106	DST 241-AN-106
AP-101	DST 241-AP-101
AP-104	DST 241-AP-104
AW-102	DST 241-AW-102
AW-105	DST 241-AW-105
AY-101	DST 241-AY-101
AY-102	DST 241-AY-102
AZ-101	DST 241-AZ-101
AZ-102	DST 241-AZ-102
AY-02A pit	241-AY-02A pit
C-101	SST 241-C-101
C-106	SST 241-C-106
C-112	SST 241-C-112
CFR	Code of Federal Regulations
Cs ¹³⁷	Cesium 137
DNFSB	Defense Nuclear Facilities Safety Board
DOE	United States Department of Energy
DST	Double-Shell Tank
ECN	Engineering Change Notice
EPG	Double Shell Tank Emergency Pumping Guide
ERSS	Extended Reach Sluicer System
HIHTL	Hose-In-Hose Transfer Line
HLW	High-Level Waste
IQRPE	Independent Qualified Registered Professional Engineer
LDP	Leak Detection Pit
NACE	National Association of Corrosion Engineers
ORP	Office of River Protection
OSD	Operating Specification Document
OUO	Official Use Only
Plan	241-AY-102 Pumping Plan [RPP-PLAN-55220]
RPP	River Protection Project
Sr ⁹⁰	Strontium 90
SST	Single-Shell Tank
TWINS	Tank Waste Inventory Network System
WAC	Washington Administrative Code
WCA	Waste Compatibility Assessment
WFD	Waste Feed Delivery
WRPS	Washington River Protection Solutions
WRS	Waste Retrieval and Transfer System
WTP	Waste Treatment and Immobilization Plant

Units

Gal	Gallons
Kgal	Thousand Gallon
Mgal	Million Gallon

1.0 PURPOSE

The purpose of this Pumping Plan (Plan) is to provide the approach and planning schedule for removal of tank waste contained in double shell tank (DST) 241-AY-102 (AY-102), on a timeline as soon as is practicable. The AY-102 Recovery Project was commissioned in August 2013 to be prepared for pumping waste from AY-102. Based on evaluation of tank integrity studies, enhanced monitoring data, Leak Detection Pit (LDP) robotic inspection, and potential changes affecting safety basis assumptions, the strategy of the initial Pumping Plan has been revised to include all activities required for DOE to authorize waste removal from AY-102.

The AY-102 waste removal effort is interdependent with the actions necessary to retrieve the next nine tanks and the *Framework Initiative* at both a funding and operational level. This plan assumes that any simultaneous operational activities are successfully de-conflicted, and that no new risks are identified. The Department of Energy is committed to safely managing the Tank Farms to protect the safety of the public, the workers, and the environment.

1.1 241-AY-102 WASTE REMOVAL

The pumping plan execution strategy has been revised to proceed with the planning, engineering and design, procurement, and installation of out of tank equipment. This revision is based on input from the Washington Department of Ecology (Ecology) on January 9, 2014 (External letter 14-NWP-001 "Removing Waste from Double-Shell Tank 241-AY-102 – Ecology's comments on Letter 13-TF-0049, and the attached *241-AY-102 Pumping Plan*, RPP-PLAN-55220" [14-NWP-001 – Letter]), and the results of extent of condition evaluations of tank integrity and operational impacts and risks associated with AY-102 waste storage. Following completion of the out-of-tank equipment installation, DOE will conduct a status review to determine the timing of the in-tank equipment installation and authorization of AY-102 waste removal.

The rationale for delaying removal of waste supernatant until transfer of solid waste from AY-102 is based on Safety Basis requirements to control flammable gas levels and impacts to operational limits for waste storage (OSD-T-151-00007, *Operating Specifications for the Double-Shell Storage Tanks*).

1.2 BACKGROUND OF TANK CONDITIONS

Tank AY-102 is a one million gallon (Mgal) DST located in the 241-AY Tank Farm (AY Farm). It was the first DST constructed at Hanford, and was declared operational in 1971 with a service life of 40 years. The tank consists of a primary carbon steel tank, 75 ft. in diameter, inside of a secondary carbon steel liner, which is surrounded by a reinforced-concrete shell. The primary steel tank rests atop an 8 in. insulating concrete slab, separating it from the secondary steel liner, and providing for air circulation/leak detection channels under the primary tank bottom plate. An annular space of 2.5 ft. exists in between the secondary liner and primary tank, allowing for visual examination of the tank wall and secondary liner annular surfaces, and ultrasonic volumetric inspections of the primary tank walls and secondary liners. Tank AY-102 has risers penetrating the dome that provide access for video cameras, ultrasonic inspection devices, waste sampling devices, mixer pumps, and other equipment requiring access to either the primary tank

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interior or annular space. Above AY-102 are six pits extending from grade to varying depths, which house valves and pumps.

Between 1977 and 2007, the tank received a variety of solid and supernatant wastes. In 1998-99, the tank received high-heat sludge from single-shell tank (SST) 241-C-106, using the supernatant in Tank AY-102 as the sluicing medium (RPP-19919, *Campaign Report for the Retrieval of Waste Heel from Tank 241-C-106*). From July 2002 until October 2005, Tank AY-102 received dilute non-complexed condensate transfers from Catch Tank AZ-151. In April 2003, waste from the Tank C-106 retrieval decant operation was added to Tank AY-102 (RPP-19919). In December 2006, supernatant was pumped out of Tank AY-102 to Tanks 241-AW-102 and 241-AN-106. The last transfer of waste occurred in January 2007, when supernatant from Tank 241-AP-101 was added to Tank AY-102. The waste in Tank AY-102 was subsequently selected to be used as the high-level waste (HLW) hot commissioning feed for the initial hot runs of the Waste Treatment and Immobilization Plant (WTP). In May 2012, the tank contained 702 Kgal of supernatant, 119 Kgal of sludge solids, and 32 Kgal of sludge interstitial liquid (TWINS).

In August 2012, visual inspections of the annulus between the primary and secondary tank walls identified suspect waste material from the primary containment tank. A formal leak assessment team confirmed that the material discovered on the annulus floor was the result of a leak from a breach in the bottom of the primary tank. The probable cause was identified as accelerated corrosion due to high temperatures, and reduced containment margins resulting from fabrication challenges during tank construction. The conclusions are documented in RPP-ASMT-53793, *Tank 241-AY-102 Leak Assessment Report*, and RPP-RPT-54817, *241-AY-101 Tank Construction Extent of Condition Review for Tank Integrity*. Based on the results of the leak assessment, and recommendations of the leak assessment team, AY-102 was declared an Assumed Leaker - Primary Tank in October 2012. At that time, there was no evidence of a leak outside of the secondary containment of AY-102. As of August 2012, the liquid level in Tank AY-102 was approximately 308 in. and slowly declining due to evaporation. In October 2013, the tank liquid level was 294 inches, and the tank contained 658 Kgal of supernatant and 151 Kgal of sludge waste (HNF-EP-0182, Rev. 307, *Waste Tank Summary Report For Month Ending October 31, 2013*).

Following issuance of the Pumping Plan in June 2013, elevated radiation readings were detected in the transfer hose and around the transfer pump used to pump water from the Tank AY-102 Leak Detection Pit (LDP). As a result, a detailed engineering evaluation was performed to determine the cause for the elevated readings and to identify whether the AY-102 secondary tank liner was compromised. Sample analysis of LDP water and forensic evaluations of tank integrity concluded that tank waste from the annulus had not entered the LDP. The results are documented in report RPP-RPT-55939, *Tank 241-AY-102 Secondary Liner Integrity Investigation Results*. As a measure of due diligence, robotic technology was selected to perform inspections of the tank annulus and the LDP drain lines to confirm AY-102 secondary liner integrity.

The additional scope for robotic inspections and enhanced monitoring was subsequently added to the 241-AY-102 Pumping Plan and 241-AY-102 Recovery Project activities. Details of

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completed project activities supporting waste transfer operations are provided in Attachment A, Completed AY-102 Project Activities.

2.0 241-AY-102 WASTE REMOVAL

This section provides a summary of the waste conditions, equipment performance, and waste management operations required for removal of AY-102 waste, including a summary of preparations for removal of supernatant from the primary tank, isolation of the 241-AY-02A pit (AY-02A pit) drain line from the DST system, removal of solid material from the primary tank, and removal of waste from the AY-102 annulus. The risks affecting project execution to meet schedule milestones are summarized in Section 4.0.

The substantial inventory of Cesium 137 (Cs^{137}) and Strontium 90 (Sr^{90}) contained in the AY-102 waste requires additional controls to maintain the safety basis and licensing requirements of RPP-13033, Rev. 5-C, *Tank Farms Documented Safety Analysis*. Specifically, the heat load and temperature of the waste has been identified as key attributes affecting the generation rates of flammable gas. Controls required to protect the Safety Basis assumptions (e.g., tank ventilation [LCO 3.1] and flammable gas monitoring [LCO 3.7]) will be considered in the retrieval and transfer system design, the tank modifications, and process flow sheet studies for safe transfer and storage of the waste.

2.1 REMOVAL OF SUPERNATANT FROM 241-AY-102

2.1.1 Preparation for Transfer of Supernatant

The following actions supporting transfer of supernate from the primary tank and emergency transfer of supernatant from the tank annulus have been completed:

- A supernate transfer pump is installed in the primary tank and is available to transfer supernate when required.
- An emergency annulus supernate transfer pump has been selected and staged for installation in the annulus, if required. The waste transfer specific procedures, associated transfer specific training, and Waste Compatibility Assessment (WCA) documentation have been completed to ensure that the annulus supernate waste transfer will comply with specific administrative control, safety, regulatory, programmatic, and operational decision rules related to waste chemistry and waste properties.
- DST 241-AP-104 (AP-104) has been selected as the supernate receiver tank, and existing and available transfer equipment (pump, jumpers, transfer line, etc.) required to support transfer have been identified. Selection of this receiver tank included identification of a compliant waste transfer route.
- An additional tank and alternative transfer route from AY-102 to DST 241-AW-105 (AW-105) is in the process of being authorized to provide waste storage space if required.

2.1.2 Management of Supernate Levels

During normal tank waste storage operations, tank waste levels are maintained within limits documented in approved operating specifications (OSD-T-151-00007). Waste operating specifications provide limits that protect the function of tank systems, structures and components (SSCs) and protect assumptions supporting the Safety Basis.

In consideration for the risks associated with primary tank leak, an evaluation was performed to establish a range of supernate levels that would maintain approved operating specifications. The evaluation resulted in a minimum height of 48 inches of supernatant above the maximum solids level. The recommended supernate level is consistent with the approved operating specifications for DST waste storage (OSD-T-151-00007). The results of the evaluation are documented in RPP-RPT-53901, *Management of Supernatant Level in Tank 241-AY-102*.

Although pumping of supernate prior to being ready to remove the solid waste is technically feasible, it is not yet recommended for a number of reasons, to include:

- To date, the leaked tank waste material is assessed to be contained within the inner annulus (see Attachment B).
- Potential causes for the failure of the AY-102 primary tank have been identified, but the actual cause remains indeterminate. Therefore, any action to remove supernate could affect the condition of the leak mechanism, with some risk of increasing the leak rate.
- Lowering supernate levels reduces the available heat transfer volume (or mass) from the sludge, resulting in a potential increase in the supernate temperature. The reaction kinetics for corrosion and gas generation increase exponentially with temperature, resulting in accelerated corrosion and generation of flammable gas. These mechanisms could have a negative impact on leak rate of waste into the annulus.

To understand the potential impacts of a supernate level adjustment, and to address questions raised by the DNFSB about the risk of a consequent higher leak rate (external letter ["Safety and Integrity Implications of Decanting Liquid from Hanford Tank 241-AY-102"] from Peter S. Winokur to Ernest Moniz, November 1, 2013), Washington River Protection Solutions (WRPS) commissioned a multi-dimensional, transient Thermal Analysis of AY-102 waste storage, as recommended by the DNFSB. The analysis will investigate the relationship between supernate height, heat transfer mechanics, and transient effects from primary and secondary ventilation outages. The results of the analysis, scheduled for completion in May 2014, will provide input to the waste retrieval system design and safety analysis evaluations.

In summary, unless conditions significantly worsen, the recommendation is to not pump supernate at this time, and to start supernate transfer when the waste retrieval and transfer system is ready to remove solids.

2.2 ISOLATION OF AY-02A PIT DRAIN LINE

The existing configuration of the AY-02A pit drain lines provides a path for liquids entering the pits to be routed/drained into the AY-102 primary tank. The drain lines are an essential element of the secondary containment associated with the AY-02 pits. They are intended to remain operational until completion of the waste removal from AY-102, to support equipment flushing and rinsing operations needed to decontaminate equipment being removed from the tank or pits. During these operations, liquids may be introduced back into AY-102 through these drains.

Currently, the only path that would allow the introduction of liquids external to AY-102 is liquid transferred to and from 241-AY-101, transiting through the AY-02A pit, and connected to the AZ valve pit and the DST transfer system.

To prevent any external waste addition to AY-102, administrative and engineered controls will be implemented for the purpose of isolating liquid entries into the AY-02A pit:

- Prior to an AY-101 waste transfer, the drain blocker in the AY-02A pit will be functionally tested for operability, and a camera will be inserted into the AY-02A pit to provide continuous monitoring of the transfer route. The jumper used for this transfer has been certified by an Independent Qualified Registered Professional Engineer (IQRPE). The protective coatings in the AY-02A pit are maintained per National Association of Corrosion Engineers (NACE) requirements. A drip-wise leak during the AY-101 waste transfer will be a shutdown criterion for these waste transfers in the near-term, and will prevent the potential for additional waste liquids entering the primary tank of AY-102 until the situation is investigated and resolved. An additional physical parameter that provides a hydraulic advantage for preventing additional liquids entering AY-102 is that the AY-02A pit is the high point in the transfer from AY-101 to the AZ valve pit. Hence, free liquid in the lines will drain away from the AY-02A pit if a transfer was shut down.
- Engineered controls have been planned and will be implemented through modifications of the AY-02A pit and drain line, executed when the AY-102 retrieval and transfer system equipment is being installed. Modifications to the pit will include removing all excess equipment, sealing penetrations, and adding a new sump pump and jumper that will allow liquids to be removed from AY-02A and sent back to AY-101, should a leak have occurred. The new pit and jumper configuration would still allow supernate transfers to occur out of AY-102, and would not preclude removal of solid materials via sluicing.

2.3 REMOVAL OF SOLID WASTE FROM 241-AY-102

The Plan acknowledges that transfer of AY-102 waste to another DST will impact the current System Plan (ORP 11242, *River Protection Project System Plan*, 2011), which identifies waste currently stored in AY-102 as the first Low-Activity and High-Level waste feeds for Waste Treatment Plant (WTP) hot commissioning. Because the waste from AY-102 will be transferred prior to serving the Waste Feed Delivery (WFD) activities, it is understood that additional characterization and conditioning of the new/different hot commissioning waste will be required prior to feeding the waste to the WTP. While it is desirable to maintain the AY-102 characterization data, it is not practical to prevent commingling with the current DST volume status, and thus it was not a consideration in the development of this plan.

The project will proceed with planning and the activities necessary for removal of the solid waste and supernate in AY-102. Planning and associated activities include:

- design
- procurement
- field work package preparation and approval for all work packages required to remove equipment
- modify existing tank infrastructure
- installation of the entire retrieval system
- installation of the retrieval system control trailer and electrical equipment
- installation of the valve box(s) and associated jumpers
- excavation and installation of the Hose-In-Hose Transfer Lines (HIHTLs)
- installation of electrical conduit and associated wiring
- installation of the sluicers in AY-102
- supernatant/slurry pumps in AY-102 and the receiver tanks
- slurry distributors in the receiver tanks
- final HIHTL and wire terminations
- testing and readiness activities to commence pumping operations and transfer waste from AY-102.

In consideration of ending volumes, heat load, and future DST space considerations, the current process strategy is to split the sludge contents of AY-102 between DSTs 241-AZ-101 (AZ-101) and 241-AZ-102 (AZ-102). The preparations required to support removal of waste from AY-102 include multiple DST to DST transfers and evaporator campaigns. For example, the conditioning/dilution of AZ-101 supernate for use as the sluicing medium in AY-102 will require approximately thirteen DST decants/transfers between AZ, AW, and AP Tank Farms prior to retrieval operations. These AZ-101 conditioning/dilution activities/transfers require evaporator campaigns to maintain DST storage space. Also, the AY-102 retrieval process is modeled to require DST transfers to provide the proper initial conditions in AY-102, AZ-101, and AZ-102, to enable the modified sluicing retrieval operations with appropriate initial supernate levels in

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both the feed tank and the receiver tank. These waste transfers and evaporator campaigns will need to be sequenced to support the ongoing planned tank retrievals. As a result, the process strategy may be revised based on further process flow studies and thermal analyses to confirm the current process strategy or identify other appropriate tanks.

HIHTLs used to transfer waste will be installed to be consistent with RPP-12711, *Temporary Waste Transfer Line Management Program Plan*. HIHTLs will be routed to/from AY-102 and the receiving tanks through valve boxes, to allow transfer routes to be established to the designated DST receiver tanks. Primary equipment in the receiving tanks will include a supernatant pump, slurry distributor, valve box(s), and the requisite jumpers, monitoring systems, and other ancillary equipment required for retrieval operations. Valve box preparation will include cleaning and inspections by a qualified NACE inspector to ensure the condition of the pit coatings are compliant with applicable NACE standards. If required, pit coatings will be repaired and re-inspected by a qualified NACE inspector for acceptance of repaired work.

The Extended Reach Sluicer System (ERSS) selected for removal of AY-102 solid waste was evaluated in October, 2013, against the following criteria:

- Technological maturity and ability to effectively mobilize solids within Tank AY-102 while maneuvering around obstacles.
- Risks involving the reliability of the system, system maintainability including in-tank components, and the availability of system components.
- The time required to design, fabricate, test, and deliver a field deployable system, including field construction/preparation work required for installation of the system (e.g., pump removal, excavation, power supply installation)
- Total cost of the project including installation design, system design, fabrication and testing, and field construction and preparation.

ERSSs have been successfully deployed for bulk retrieval of tanks 241-C-112 and 241-C-101, as well as hard heel retrieval of 241-C-112. The ERSS includes a boom that extends and retracts from the support mast to increase the effectiveness of breaking up solid waste in a tank. The sluicer is a remote-controlled, high-volume jetting system equipped with an articulating nozzle that provides for elevation and transverse coverage to remove waste. The combination of the boom extension and the nozzle functions of the ERSS provide capability for sluicing behind objects within the reach of the boom. The selection process and conclusions are documented in RPP-RPT-56094, *Alternatives Evaluation for Tank 241-AY-102 Modified Sluicing System*.

Major steps during the retrieval process will include:

1. Pump AY-102 supernate to minimum level above sludge. This is the starting point for sluicing operations.
2. Transfer half of the AY-102 sludge content to the first receiver tank.
3. Adjust transfer route to the second receiver tank.
4. Complete transfer of solid material waste from AY-102 to the second receiver tank.
5. Determine quantity of residual sludge in the tank and whether additional removal is required in order to evaluate AY-102 for repair or closure.

2.4 CORROSION TESTING OF ANNULUS WASTE, AND REMOVAL OF WASTE FROM 241-AY-102 ANNULUS

Removal of residual waste from the annulus is planned to occur after waste is removed from the primary AY-102 tank, to allow the *repair or close* decision to be made in accordance with Title 10, *Code of Federal Regulations*, Part 265.196(e), "Hazardous Waste Spill Reports" (10 CFR 265.196(e)). Removal of waste from the annulus at this time may increase the leak rate from the primary tank, and may compromise or damage the refractory underneath the primary tank. Therefore, it is not advisable to remove annulus waste until the waste has been removed from the primary tank. Plans for cleaning the waste from the annulus will be deferred until completion of waste transfer from the primary tank. An evaluation and determination of cleaning alternatives for both a *repair and return to service* approach and a *closure* approach will be developed following completion of annulus liner corrosion testing and refractory testing.

The following provides a summary of testing performed to date and challenges for removing existing waste from the annulus. Two key technical challenges requiring resolution prior to initiating waste removal from the annulus under current conditions include:

- Corrosion Testing: Testing of the waste in contact with the annulus liner to estimate the rate of corrosion and thus available waste removal options. The ongoing annulus corrosion testing will assist in estimating the susceptibility of the secondary liner to corrosion, and assist in selecting the best waste removal technology.
 - Testing will confirm the thermodynamic waste evaporation model used to determine the expected pH shift in the waste during drying, due to carbon dioxide absorbance. Understanding the pH shift of the waste, during and after drying is one critical factor in determining the waste's propensity to corrode the annulus liner.
 - Testing (Cyclic Potentiodynamic Polarization and Slow Strain Rate) will directly measure the corrosion propensity of the liner in contact with the waste. This testing conducted on steel coupons of similar vintage as the annulus liner will provide a specific corrosion rate for the analysis.

- Waste Removal Method: As noted in the AY-102 Leak Assessment Report (RPP-ASMT-53793), some of the radioactive constituents were absorbed into the thermal refractory below the primary tank liner. Testing will be required to determine the most effective methods to remove (e.g., flushing or chemical leaching) waste from the refractory, while ensuring that the overall structural integrity of the tank is protected (i.e., removal of the radioactive material does not significantly damage the thermal refractory).

As noted previously, removal of the waste from the AY-102 annulus under current conditions is not recommended until after completion of waste removal from the primary tank. The following rationale presents the potential consequence of annulus waste removal:

- The waste currently contained within the AY-102 annulus consists of wet salts created during the drying of the supernate and interstitial liquids in the presence of air. This material, in its current state, restricts waste flow into the annulus as observed in the annulus along the perimeter of the tank. Liquid additions to the annulus, to facilitate waste removal from the annulus, would dissolve the wet salts and potentially increase leakage into the annulus from the primary tank. In addition, there is no pumpable liquid in the annulus at this time to prime the annulus pump for removal of the annulus material.

The appropriate removal method cannot be determined until waste in the primary tank has been removed. Should repair of tank AY-102 prove to be impractical and closure is selected, then more aggressive waste removal actions (e.g., caustic or dilute acids) may be required to clean the tank to a point to allow its closure in accordance with WAC 173-303-610 (*Washington Administrative Code* [WAC] 173-303, "Dangerous Waste Regulations," Section 173-303-610, "Closure and post-closure"), as required by the Hanford Federal Facility Agreement and Consent Order, Action Plan, Section 5.3.

2.5 SECONDARY TANK SHELL INTEGRITY

In October, 2012, The WRPS Executive Safety Review Board determined that waste had leaked into the annulus of Tank AY-102 based on information documented in RPP-ASMT-53793. Although an extensive review of Tank AY-102 was conducted and increased inspection and monitoring of the tank was implemented, the precise cause and location of the leak could not be determined.

In parallel with the leak in the primary tank, the AY-102 leak detection pit (LDP) was accumulating water through the drain system outside the secondary liner. The liquid collecting in the LDP was suspected to be from water intrusion. The rate of water accumulating in the LDP at 2 to 3 gal per day required the LDP to be pumped routinely to comply with operating specifications (OSD-T-151-00007).

On June 20, 2013, during routine pumping of the Tank AY-102 LDP, an abnormal radiation dose rate was noted on the transfer hose and elevated surface contamination readings were found on the transfer pump once it was removed from the LDP. These two field readings caused concern that tank waste from a secondary liner breach might be leaking into the LDP. As a result, WRPS

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investigated the integrity of the liner and concluded that a leak from the liner into the LDP had not occurred (RPP-RPT-55939). The investigation results recommended inspection of the LDP drain lines as a confirmatory action.

On November 20, 2013, the AY-102 Recovery Project inspected the 6 inch diameter drain line that collects liquid outside AY-102 secondary containment and discharges to the leak detection pit sump. To perform the inspection, a custom robotic inspection crawler was designed, built, and deployed down the LDP and into the 6 inch leak detection pit drain line to within two feet of the tank center. Examination of the robotic inspection video identified sediment and debris believed to originate from construction activities and corrosion products. No material was identified in the inspection video that looked like the tank waste material seen in previous Tank AY-102 annulus video inspections (no greenish or yellowish deposits or dark fluids, dried salt deposits or crystalline material). Upon removal from the LDP, field measurements of contamination levels on the crawler were consistent with past values seen on LDP pumping equipment. Laboratory analysis of contamination residues obtained from the crawlers did not find material consistent with tank waste. In summary, the inspection results provided no indication that the secondary liner of the tank had been breached, and along with previous evaluations and analyses, confirmed the integrity of the secondary tank liner.

3.0 PROJECT SCHEDULE SUMMARY

The schedule summarized in Table 4-1 provides an updated estimate of start and finish dates for the activities planned to enable removal of waste from AY-102, as soon as practicably achievable.

Table 3-1. AY-102 Retrieval Schedule Activities

Non-Intrusive Activities	Start Date	Finish Date
Critical Decision DOE Authorize Restart of AY-102 Recovery Project	2/18/2014 (completed)	
Waste Retrieval and Transfer System Engineering and Design	4/15/2014	5/12/2015
Initiate Long Lead Procurements	8/28/2014	
AY-102 Waste Retrieval and Transfer System (WRS) Equipment Procurement	8/28/2014	9/11/2015
AY-102 and Receiver Tanks Pits and Risers Examinations and Equipment Removal	4/29/2014	9/11/2015
Installation of Out-of-Tank Equipment	8/26/2015	11/6/2015
Intrusive Activities	Start Date	Finish Date
DOE Status Review to Authorize In-Tank Equipment Installation	NET 3/11/2015	
AY-02A pit Drain Line Isolation	NET 6/25/2015	NET 10/15/2015
WRS Construction Complete		NET 2/4/2016
Authorize Initiation of Pumping of AY-102 Waste		NET 3/4/2016

* NET : Not Earlier Than

4.0 PROJECT RISK

Technical challenges, funding, or other uncertainties could have a negative influence on project execution, schedule durations, and end dates indicated in the previous section. However, project uncertainties and related risks are identified early in the project, and mitigation strategies are developed and managed to reduce probability of occurrence, and impacts to cost and schedule.

The major risks that have been identified to potentially result in project delays are summarized in the following list (non-inclusive):

- Funding required to support project execution schedule
- Staff and subcontracted support remobilization causes delays
- Concurrent tank retrieval projects interferences, with conflicting regulatory milestones, and staff and subcontracted support limitations, resulting in competing priorities
- Unplanned impacts or unanticipated issues with other DSTs introduce competing priorities
- Pre-selected retrieval and transfer equipment is incompatible with higher waste temperatures, resulting in additional engineering work, and delays in early procurements
- Equipment vendor issues delay procurement activities
- Pre-selected receiver tank(s) changes, resulting in re-design and re-planning
- DST to DST transfers, and evaporator campaigns needed to free up DST tank space, not executed on time
- External review and approval of permit modifications are not completed on time, delaying start of construction and operations
- Changes in AY-102 leak rates

5.0 REFERENCES

1. "Safety and Integrity Implications of Decanting Liquid from Hanford Tank 241-AY-102" (external letter from Peter S. Winokur, Ph.D., Defense Nuclear Facilities Safety Board [DNFSB], to Ernest J. Moniz, Secretary of Energy–U. S. Department of Energy, November 1, 2013).
2. 14-NWP-001 "Removing Waste from Double-Shell Tank 241-AY-102 – Ecology's comments on Letter 13-TF-0049, and the attached *241-AY-102 Pumping Plan*, RPP-PLAN-55220" (external Letter from Jane A. Hedges, Ecology, to Kevin W. Smith, ORP, and L. David Olson, WRPS, January 9, 2014).
3. 10 CFR 265.196(e), "Hazardous Waste Spill Reports" [incorporated by reference at Washington Administrative Code (WAC) 173 303-400(3) (a), "Interim status facility standards"], *Code of Federal Regulations*.
4. HNF-EP-0182, January 8, 2014, *Waste Tank Summary Report For Month Ending October 31, 2013*, Rev. 307, Washington River Protection Solutions, Richland, Washington.
5. ORP-11242, Rev 6, *River Protection Project System Plan*, October 2011, U. S. Department of Energy, Office of River Protection, Richland Washington.
6. OSD-T-151-00007, Rev. 12, *Operating Specifications for the Double-Shell Storage Tanks*, July 23, 2013, Washington River Protection Solutions, Richland, Washington.
7. RPP-12711, September 2, 2008, *Temporary Waste Transfer Line Management Program Plan*, Rev. 5, CH2M Hill Hanford Group, Richland, Washington.
8. RPP-13033, January 30, 2014, *Tank Farms Documented Safety Analysis*, Rev. 5-C, Washington River Protection Solutions, Richland, Washington.
9. RPP-19919, February 12, 2004, *Campaign Report for the Retrieval of Waste Heel from Tank 241-C-106*, Rev. 0, CH2M Hill Hanford Group, Richland, Washington.
10. RPP-ASMT-53793, November 7, 2012, *Tank 241-AY-102 Leak Assessment Report*, Rev. 0, Washington River Protection Solutions, Richland, Washington.
11. RPP-RPT-53901, September 30, 2013, *Management of Supernatant Level in Tank 241-AY-102*, Rev. 2, Washington River Protection Solutions, Richland, Washington.

REFERENCES (cont.)

12. RPP-RPT-54817, August 26, 2013, *241-AY-101 Tank Construction Extent of Condition Review for Tank Integrity*, Rev. 0, Washington River Protection Solutions, Richland, Washington.
13. RPP-RPT-55939, September 10, 2013, *Tank 241-AY-102 Secondary Liner Integrity Investigation Results*, Rev. 0, Washington River Protection Solutions, Richland, Washington.
14. RPP-RPT-56094, November 25, 2013, *Alternatives Evaluation for Tank 241-AY-102 Modified Sluicing System*, Rev. 0, Washington River Protection Solutions, Richland, Washington.
15. WAC 173-303, "Dangerous Waste Regulations" *Washington Administrative Code*, Section 173-303-610, "Closure and post-closure," as amended.

Attachment A. Summary of Completed AY-102 Recovery Project Activities

Principal Deliverables

(Sheet 1 of 3)

Reference	Document title
AY-102 Recovery - Project Management	
RPP-PLAN-56413	AY-102 Recovery Project Execution Plan
Activity 1: AY-102 Enhanced Tank Monitoring	
	AY-102 Video of Riser 83 Annulus Weekly Working Log
	DST AY-102 Monthly Status Report
	Weekly Video Analysis of Riser 83
Activity 2: AY-102 Annulus and Leak Detection Pit Drain Line Inspection	
RPP- ASTM-55798	Alternatives Evaluation for Tank 241-AY-102 Robotic Inspection
RPP-PLAN-56400	Environmental Analysis associated with the Leak Detection Pit inspection
RPP-RPT-56464	LDP drain Line Inspection report
Activity 3: DST Structural and Leak Integrity Program Review	
RPP-AMST-56329	September 2013 Workshop 1 Leak Assessment
RPP-RPT-55981	241-AW Tank Farm Construction Extent of Condition Review for Tank Integrity
RPP-RPT-55982	241-AN Tank Farm Construction Extent of Condition Review for Tank Integrity
RPP-RPT-55983	241-AP Tank Farm Construction Extent of Condition Review for Tank Integrity
Activity 4: Annulus Corrosion Monitoring and Testing	
RPP-ASMT-54634	Propensity for Corrosion in the 241-AY-102 Annulus
RPP-ASMT-55871	Propensity for Corrosion in the 241-AY-102 Annulus
RPP-RPT-56141	FY2013 DNV DST and SST Corrosion and Stress Corrosion Cracking Testing Report

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Attachment A - Summary of Completed AY-102 Recovery Project Activities (cont.)

Principal Deliverables

(Sheet 2 of 3)

Reference	Document title
Activity 5: AY-102 Waste Retrieval and Transfer System Engineering and Design	
RPP-ENV-56398	AY-102 Retrieval Project Non-Radioactive Air Permitting Strategy (DRAFT)
REQ 261792 R0	STATEMENT OF WORK, AY-102 Recovery Project Design Support, Phase 1
SOLICITATION NO. 261792	AY-102 RECOVERY PROJECT DESIGN SUPPORT - Draft Work Plan
REQ 261792 R1	STATEMENT OF WORK, AY-102 Recovery Project Design Support, Phase 1 FY14
SOLICITATION NO. 261792	AY-102 RECOVERY PROJECT DESIGN SUPPORT - Draft Work Plan Rev B
RPP-RPT-56094	Alternatives Evaluation for Tank 241-AY-102 Modified Sluicing System
IOM-11272013A	AY-102 WASTE RETRIEVAL - PRELIMINARY DESIGN VERIFICATION PLAN
IOM-11192013	AY-102 WASTE RETRIEVAL SYSTEM - PROCUREMENT PLAN - OUO
IOM-11272013	AY-102 WASTE RETRIEVAL - PRELIMINARY PROCESS PARAMETERS
IOM-11252013	AY-102 WASTE RETRIEVAL - PRELIMINARY PUMP AND SLURRY DISTRIBUTOR DESIGN DATA

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Attachment A - Summary of Completed AY-102 Recovery Project Activities (cont.)

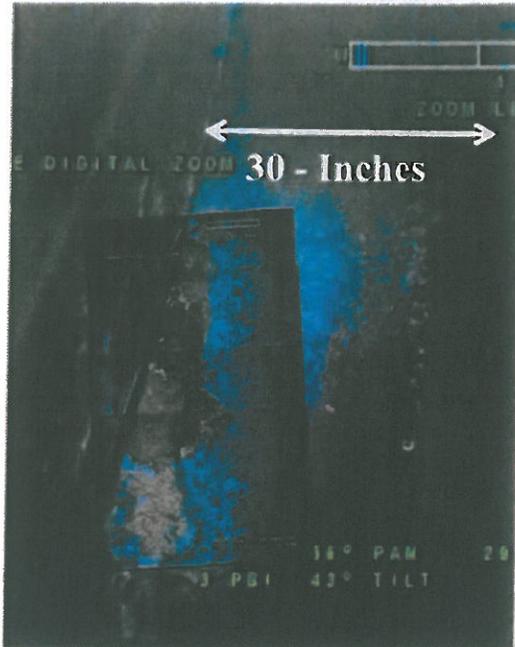
Principal Deliverables

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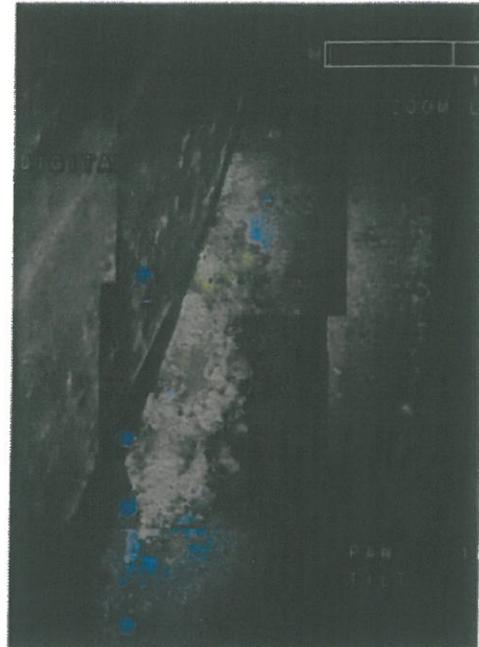
Reference	Document title
Activity 6: SN-265 Line Readiness for Supernatant Transfer from AY-102 to AW-105	
RPP-TE-56207	Overpressure protection technical evaluation (AY-102 to AW-105)
TFC-WO-12-5092	Pneumatic test on the SN-265 secondary encasement line
TFC-WO-12-5408	AW-05A pit coating inspection according to NACE standards
RPP-RPT-56412	SN-265 in-service IQRPE assessment
ECN-13-001197	SN-265 ECN for routing board
RPP-TE-56093	Thermocouple placement technical evaluation (AW-B-A-102 to AW-105)
TO-040-790	AW Farm waste transfer system temperature surveillance procedure
RPP-TE-56280	Leak path technical evaluation (AY-102 to AW-105)
RPP-RPT-52823	Buried Piping Report
RPP-RPT-53847	Waste Compatibility Assessment
RPP-CALC-56185 RPP-CALC-56186 RPP-TE-56207	Overpressure protection technical analysis
RPP-CALC-56520	High Point Column Separation Engineering Report
TO-232-001	Leak Check Procedure Preparation and Leak Path Screen
TO-230-370	AY-102 to AW-105 Transfer Procedure

Attachment B. Evolution of the visual observations of the waste leaked in the annulus

Video inspection from Riser 83



9/29/2012



6/12/2013



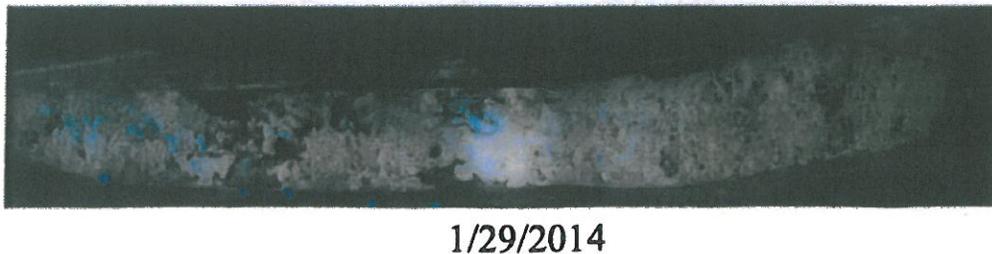
12/23/2013



2/7/2014

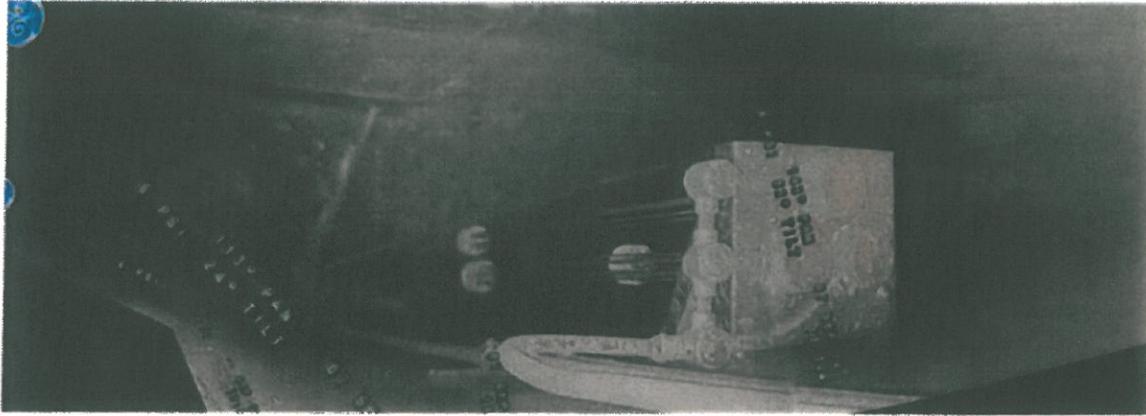
Attachment B. Evolution of the visual observations of the waste leaked in the annulus
(cont.)

Video inspection from Riser 87

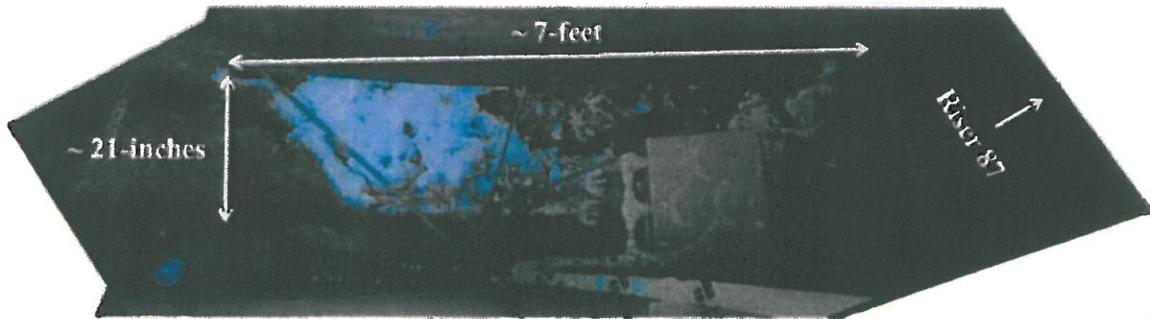


**Attachment B. Evolution of the visual observations of the waste leaked in the annulus
(cont.)**

Video inspection from Riser 77



9/07/2012



3/03/2014