



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

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March 27, 2013

13-NWP-020

CERTIFIED MAIL

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

Mike Johnson, Manager  
Washington River Protection Solutions  
PO Box 850, MSIN: H6-63  
Richland, Washington 99352

Re: Department of Ecology's Dangerous Waste Compliance Inspection at Hanfords 242-A  
Evaporator RCRA ID# WA7890008967 on November 13, 2012

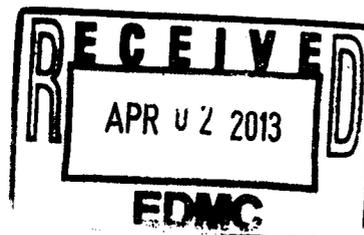
Dear Mr. Smith and Mr. Johnson:

Thank you for the assistance of United States Department of Energy - Office of River Protection and Washington River Protection Solutions, LLC staff during the Department of Ecology's inspection of the 242-A Evaporator. A copy of the inspection report is enclosed.

The purpose of this inspection was to determine compliance with Washington Administrative Code Chapters 173-303, Dangerous Waste Regulations and the Dangerous Waste Permit WA7890008967 Revision 8C. Specifically, the inspection focused on the Operation and Maintenance of the facility's seal loops and associated conductivity alarms. It was initiated in response to incidents discovered in August 2012 regarding the open pathway between the 242-A Evaporator Condenser Room and Double-Shell Tank 241-AW-102.

The violations found at inspection are listed and summarized in the enclosed report. You must complete the actions needed in order to correct these violations. Complete and send the **Compliance Certificate**, included in the enclosed report, **within 30 days** of receipt of this letter to:

Department of Ecology  
Nuclear Waste Program  
Attention: Jared Mathey  
3100 Port of Benton Blvd.  
Richland, Washington 99354



T-2.6



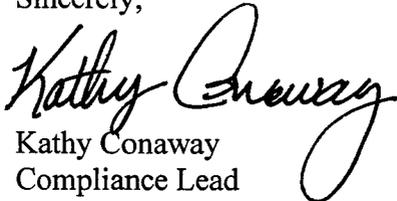
Mr. Smith and Mr. Johnson  
March 27, 2013  
Page 2

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Failure to comply with these requirements within 30 days of the date of receipt of this letter could result in an administrative order and/or a penalty of up to \$10,000 per day for each violation.

If you have questions or require clarification of any items in this letter or inspection report, please contact me at [kcon461@ecy.wa.gov](mailto:kcon461@ecy.wa.gov) or (509) 372-7890.

Sincerely,



Kathy Conaway  
Compliance Lead  
Nuclear Waste Program

jm/tkb  
Enclosure

cc electronic w/enc:

Jack Boller, EPA  
Dave Bartus, EPA  
Dennis Faulk, EPA  
Ron Koll, ORP  
Lori Huffman, ORP  
James Hamilton, WRPS  
Steve Killooy, WRPS  
Brian Von Bargaen, WRPS  
Jeff Voogd, WRPS  
Ken Niles, ODOE  
John Martell, Department of Health  
Gabriel Boothe, Department of Health

cc w/enc:

Steve Hudson, HAB  
Administrative Record ✓  
Environmental Portal

cc: w/o enc:

Stuart Harris, CTUIR  
Gabriel Bohnee, NPT  
Russell Jim, YN

**Washington Department of Ecology  
Hazardous Waste & Toxics Reduction Program  
Compliance Report**

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**Site: 200 Area Hanford Permit, 242-A Evaporator Dangerous Waste  
Management Unit  
RCRA ID#: WA 7890008967**

Inspection Date: November 13, 2012 - 9:00 am to 4:30 pm

Site Contacts: Michael Crockett – Washington River Protection Solutions (WRPS) – Health  
Radiation Technician (HRT)  
James Hamilton –WRPS  
Allan Hammack –WRPS - Nuclear Chemical Operator (NCO)  
Ron Koll – United States Department of Energy (USDOE) - Office of River  
Protection (ORP)  
Daryl Korslund - WRPS – NCO  
Tony Miskho - WRPS  
Rob Phipps – WRPS – NCO  
Brian Von Bargaen – WRPS  
Jeff Voogd\* – WRPS

\*Phone: (509) 373-4101

Site Location: Hanford Nuclear Reservation – 242-A Evaporator

At This Site Since: Began dangerous waste (DW) Operations in March of 1977

NAICS#: N/A

Current Site Status: Part III, Operating Unit 4, Dangerous Waste Management Unit Group, Final  
Permit Conditions

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**Ecology**

Lead Contact: Jared Mathey

Phone: 509-372-7949

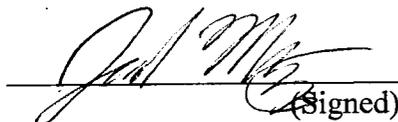
FAX: 509-372-7971

Other Representatives: Kathy Conaway

Phone: 509-372-7890

Report Date: March 27, 2013

Report By: Jared Mathey

  
\_\_\_\_\_  
(Signed)

3/27/13  
\_\_\_\_\_  
(Date)

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Type and Reason for Inspection

Ecology Nuclear Waste Program (NWP) staff conducted a dangerous waste inspection in response to a 242-A Evaporator (242-A) incident occurring between July and August 2012. In August 2012, an open

air pathway was discovered between the 242-A Evaporator and Double Shell Tank (DST) 241-AW-102. On September 12, 2012, Jeff Voogd informed Ecology of the discovery of the open pathway. According to the Hanford Dangerous Waste Permit, WA 7890008967 Rev 8C, Part III, Operating Unit 4, Condition 6.4.2, "The 242-A Building ventilation system is designed to provide air flow from uncontaminated zones to progressively more contaminated zones." When the condenser room piping was opened for maintenance, the potential existed for air to flow from more contaminated zones to less contaminated zones potentially threatening or endangering the health of employees working in the 242-A condenser room by exposure to tank vapors from the head space of DST 241-AW-102. The focus of Ecology's inspection was to investigate the incident, obtain an understanding of seal loops associated with DST 241-AW-102, and review the Operation and Maintenance (O&M) records for the 242-A facility.

#### Facility Background:

The Hanford Facility boundary encompasses an area of approximately 586 square miles. The 242-A Evaporator, Operating Unit Group 4, is a mixed waste treatment and storage facility in Hanford's 200 East Area. It is a conventional forced-circulation, vacuum evaporation system that is designed to reduce waste volume in the DSTs.

The evaporator treats the waste by removing water and most volatile organics. This creates a concentrated slurry waste stream that is routed back to the DST System and a process condensate stream. The process condensate stream is pumped from 242-A Tank C-100 through the Process Condensate (PC)-5000 encased underground pipeline (pipe-within-a-pipe) and routed to the Hanford Liquid Effluent Retention Facility (LERF). Off-gases from the 242-A treatment process are routed through a de-entrainment unit, a pre-filter, and high-efficiency particulate air filters before being discharged to the environment.

Tank C-100, the condensate collection tank, is a stainless steel 4.3 meter (14-foot) diameter by 5.9 meter (19-foot) high tank located in the condensate room. Process condensate from the primary condenser, inter condenser, and after-condenser drain by gravity to Tank C-100. Tank C-100 also receives potentially contaminated drainage from the vessel vent system via a seal pot. Concentrated slurry is pumped back into the DST System. The process condensate is routed through condensate filters before release to LERF.

Other discharges during 242-A Evaporator processing include condensate from the steam used to heat the waste and cooling water used to condense the vapors. The 242-A Evaporator is designed to prevent contamination of these streams. The fluids on the uncontaminated side of the heat exchangers are maintained at a higher pressure than the waste stream so that uncontaminated fluid migrates toward the contaminated waste if a leak were to occur. The steam condensate and the cooling water are monitored continuously for radiation, pH, conductivity, and discharged to Treated Effluent Disposal Facility (TEDF) as long as none of the discharge limits are exceeded. The steam condensate and cooling water streams were assessed in the stream specific reports (WHC 1990a and WHC 1990b) and are not dangerous waste in accordance with Washington Administrative Code (WAC) 173-303.

### Inspection Summary:

On November 13, 2012, Jared Mathey and Kathy Conaway, Ecology NWP representatives, began the inspection at the 2440 Stevens Building, offices of USDOE - ORP. Ms. Conaway circulated a sign-in sheet. Representatives for WRPS (the ORP primary contractor), USDOE -ORP, and Richland Operations (RL) were present (see sign-in sheet) at the in-briefing. Additionally, Mr. Earnest McCormick, Washington State Department of Health (DOH), was at the in-briefing.

Ms. Conaway explained the purpose of the focused inspection outlining Ecology's recent concerns with seal loops and their associated alarms at the 242-A. Ms. Conaway identified potential concerns with notification by the facility and O&M with seal loops that protected the 242-A Evaporator condenser room from the head space of 241-AW-102 DST. Ms. Conaway also identified a concern with employee safety. Mr. Steve Weil, of RL, replied that USDOE self regulates worker safety at Hanford under Occupational Safety and Health Association (OSHA) regulations, not Ecology. Ms. Conaway said that she understood that and our inspection will be looking at safety as it applies to the permit and dangerous waste regulations (WAC 173-303).

Ms. Conaway explained the order of the inspection; first tour 242-A building, then ask a prepared list of inspector questions and perform document review in the afternoon. I explained I wanted to see the emergency shower located at building 272-AW, because it drained to 241-AW-102 DST and has seal loops similar to that of the 242-A condenser room. Mr. James Hamilton, WRPS, explained that the safety shower was not part of the 242-A Evaporator facility and that WRPS Operations would need to be contacted to set up an escort for that area. Ms. Conaway and I decided that after we completed the proper access procedure to the building areas for the inspection, we would go to 272-AW first and 242-A Evaporator second.

Ms. Conaway asked the WRPS and ORP representatives at the pre-briefing, if doing the inspection summary at the end of the day back at the 2440 Stevens Building would be helpful and proposed a time of 4:00 p.m. WRPS and ORP representatives agreed to our inspection schedule and out briefing time and location. Ms. Conaway and I left 2440 building and drove to the Hanford 200 Area site.

Onsite at Hanford, we went to Mobile Building-150 where Michael Crockett, WRPS Health Radiation Technician (HRT), facilitated our access procedure and provided us with daily dosimeters and badges. James Hamilton, Jeff Voogd, Brian Von Bargaen, Tony Miskho from WRPS, and Ron Koll from ORP (Escort Team) met us in Mobile Building-150. The Escort Team then went through their access procedure.

Ms. Conaway and I, along with the Escort Team, arrived at the 272-AW shop facility at 10:35a.m. Darrell Korslund, WRPS Nuclear Chemical Operator (NCO) joined us. Mr. Korslund was the site operations escort for this shop facility. Mr. Korslund first showed us Room 3 in the 272-AW building where we observed the indication panel for the safety shower seal loop liquid level. I observed a green light lit up on the control panel. Mr. Korslund told me that the green light indicated normal status for the seal pot liquid level. I observed that there were high and low level alarms also on the indication panel. Mr. Korslund told us that WRPS conducted and documented daily surveillance of the control panel as well as weekly water additions of the shower's drain line.

Ms. Conaway and I then visited the shower room at the 272-AW building. The shower is used for radiological decontamination of personnel in the event of a radiological emergency situation at the 242-A Evaporator. I observed an inventory checklist for weekly inspections of the supplies associated with decontamination procedure for the shower room. This inventory list was posted on a wall in the shower room. I asked how many gallons of water were added per week to the floor drain. Mr. Korslund told me about one gallon of water is added to the floor drain every week using a three gallon container. I asked Mr. Korslund if I could see the container used for the weekly water additions to the floor drain. Mr. Korslund told me he would see if he could find one around to show me. I asked Michael Crockett, HTP, if they have ever conducted contamination surveys of the safety shower room. Mr. Crockett told me they conducted and documented weekly radiological contamination surveys. I asked Mr. Crockett if any radiological / mixed waste contamination was ever found in the shower room. Mr. Crockett told me they only perform surveys for radiological contamination and not mixed-waste and that there has not been any radiological contamination noted in the safety shower room since he has been working here (Mr. Crockett has worked at Hanford since 2001).

After a bit of looking, Mr. Korslund found a similar container used for adding water to the shower drain floor and I took a photograph of the container. Ms. Conaway and I left the 272-AW building and proceeded to the 242-A Evaporator building at 10:58 a.m. Ms. Conaway and I with our Escort Team went to the 242-A control room. Allan Hammack, lead NCO with 37 years working at Hanford, provided an overview of the 242-A operations using a wall schematic to facilitate his presentation. Mr. Hammack explained that 242-A's primary mission is to reduce the volume of tank waste beginning with feed tank 241-AW-102. He told us that the last two campaigns 242-A completed for volume reduction of tank waste were in 2010. Brian Von Barga told us that there are two campaigns scheduled in the summer of 2013, and that only one of these campaigns is currently funded. I asked if the sump in the 242-A pump room has ever contained mixed waste. Mr. Hammack explained that the sump in the pump room may have contained mixed waste at some point in the 1980's and 1990's, but not in recent times. I asked Mr. Hammack if the sump ever overflowed and his answer was no. I then asked if the sump ever dried up. Mr. Hammack told me the sump has never dried up. He then explained that the level of water/liquid in the sump is monitored on a work shift basis. I asked if mixed and/or dangerous waste has ever passed through the weir box overflow trap or the weir box steam condensate line trap. Mr. Hammack told me no, there has never been mixed and/or dangerous waste contamination in the steam condensate lines.

After Mr. Hammack's presentation and my questions, I asked Rob Phipps, another NCO and control room operator, if I could get permission to enter the 242-A's control room computer area to observe the monitor screens. Mr. Phipps granted me access. I asked Mr. Phipps how long the Level Switch Low (LSL) 103-2 alarm was out of service. Mr. Phipps told me that this alarm had worked intermittently throughout the years. He explained that the LSL-103-2 alarm would be taken out of service, and then put back into service later on. Mr. Phipps said that when the alarm would act up, it would be taken back out of service. I asked Mr. Phipps when the alarm was scheduled to be repaired. He told me that a work order to repair the alarm was put in two and half years ago. He explained that when they would plan to repair the alarm, that many times the alarm would start working, so it would be taken off the repair list.

**Note:** Inhibited alarm records submitted to Ecology on December 11, 2012 are summarized on Page 10 of this report.

Mr. Von Bargaen stated that the conductivity probe associated with the LSL-1032 alarm was faulty, had been removed, and replaced with a new conductivity probe after the 242-A incident where an open air path was discovered between the Evaporator and DST 241-AW-102 on August 10, 2012. I asked if there was a maintenance procedure in place for the loop seal alarms. Mr. Von Bargaen said that WRPS is drafting a procedure for maintenance of the seal loop alarm probes which would be completed sometime in December 2012. I asked if there was a difference in maintenance procedures when the evaporator is operating during a campaign to reduce DST waste volume as to when 242-A is not in campaign operation. Mr. Hammack explained that there are some differences with preventative maintenance, but they are for the most part the same. However, Mr. Hammack said that a corrective maintenance is done on a work package request, and the procedures will vary more depending on what is listed on the work package.

I asked about the weekly water fill for the seal loop associated with the LSL-103-2 alarm. Mr. Hammack told me that the top seal loop (i.e., the seal loop associated with C103-1) is filled weekly and the water acts as a positive control for the seal loop, (i.e., a positive control to prevent vapor connectivity between the 242-A condenser room and DST 241-AW-102) where the alarm did not because alarms don't always perform as designed. He used the example as in "a false reading" scenario.

I asked what was the reason that the seal loop went dry. Mr. Von Bargaen explained he thought the extensive maintenance work activity performed in the 242-A condenser room and area of the seal loop, created open areas which may have resulted in more potential for water evaporation. Mr. Voogd added that a metal flange or plastic covering was always used to provide a closure on the pipes under repair to reduce risk for radiological contamination. I asked if they thought there would be any potential for any air flow or pressure pushing the seal open and Mr. Von Bargaen said that there was no evidence of anything blowing the seal open.

I asked Mr. Phipps if I could physically see LSL-C1031, LSL-C1032, LSL-C1001, LSL-SP-1, and WFI-SUMP1 alarms on the Monitor and Control System (MCS) computer control panel. He showed me each of the locations of the alarms on the MCS. I requested print outs of the computer screens showing these alarms. Mr. Phipps printed out these computer screen images and I gave them to Mr. Hamilton to approve release through the USDOE document clearance procedures.

Ms. Conaway and I along with our Escort Team proceeded to the 242-A condenser room. Mr. Hammack showed us the piping that had undergone maintenance, which was right next to the seal loop associated with instrument alarm Level Element Low (LEL) C103-1. He showed us where the water was added to the seal loop associated with LEL C103-1. Mr. Hamilton took a picture of the condenser piping and associated alarm to be shared with Ecology. Mr. Hammack explained that when water is added to the seal loop associated with C103-1, it overflows into the second seal loop with instrument alarm LEL C103-2 located at the bottom floor of the condenser room. I asked how much water is typically added to the C103-1 seal loop. He told me typically between one to two gallons per week. I asked Mr. Hammack when he would typically add water to the seal loops and he answered that they typically do the water additions weekly, on Mondays. Mr. Von Bargaen explained that in addition to the weekly water fills, daily rounds are performed in which room pressure is checked in the 242-A condenser room. He explained that a lower pressure can be an indicator of a failed seal loop.

**Note:** Mr. Hamilton from WRPS took inspection photos inside of the 242-A Evaporator, so that Ecology would not lose their camera due to potential contamination while in the condenser room.

I asked during the life of the 242-A Evaporator if the steam condensate divert valve was ever triggered sending contaminated steam condensate back down the drain lines to DST 241-AW-102.

Mr. Von Bargen said that steam condensate has never been diverted back to the tank 241-AW-102, because that would mean a rupture of the steam condensate lines, which has never occurred.

Ms. Conaway and I then went to the lower floor in the condenser room where Mr. Hammack showed us where the drain pipe went from the seal loop above (C103-1) into the concrete and where the seal loop associated with C103-2 was located. Mr. Hamilton took a picture of the piping and associated alarm. Mr. Hammack showed us where C100-1 loop seal was located. I asked where the water is added to this loop seal and he told me that this loop seal is filled by a valve mechanism that a person manually operates. I observed a glass tube site, which indicated the water level amount in the C100-1 loop seal. Ms. Conaway and I then went up several floors to observe the LEL-SP-1 seal loop alarm, which was also filled by a valve. We completed our field walk down and drove to the 2750 Hanford office building, Room A-125 to review the requested paper records.

Ron Koll, James Hamilton, Brian Von Bargen, Jeff Voogd, Tony Miskho, Greta Davis, Kathy Conaway, and I were in attendance in Room A-125. I asked about operation and maintenance of the 242-A Evaporator. Mr. Von Bargen said that their dangerous waste permit is evaluated with all procedures whether those procedures are for operating mode or stand down mode. Ms. Conaway asked if the permit Contingency Plan had been implemented in the last three years and Mr. Hamilton and Mr. Voogd said it had not.

I briefly reviewed the records associated with water additions to the floor drain in the safety shower in 272-AW Room 3. The maintenance records for the 272-AW Room 3 appeared correctly documented with no missing information from the section of records I reviewed.

I reviewed *Attachments 7, Steam Condensate Weir Level Form*, and *Attachments 8, Steam Condensate Floor Drains*, which documented the weekly water additions to the floor drains at the 242-A Evaporator for the years 2008 and 2012. Mr. Von Bargen explained that the records for those two years looked different, because in 2008, the water fills were associated with what were called "rattles", but were changed to a formal maintenance procedure about two years ago. I asked about the missing weekly water addition records between the first and third week in January 2012, a missing month's period between April and May 2012, and other times between the middle of May 2012 to the end of August 2012. Mr. Hamilton and Mr. Von Bargen explained that there are times when the condenser room is not accessible to staff, such as during planned power outages and facility shut downs, and therefore, water cannot be added. Mr. Hamilton explained that the May to August period of time where water was not added, was during the Terminal Box (TBX) outage where the 242-A Evaporator was completely closed and all the power was off to the building. He explained that not adding water is not critical during this shut-down period because the 242-A is completely closed down, there is no ventilation turned on, and no air is flowing in the condenser room. Under normal 242-A operating conditions, there is a positive control environment through water additions.

Mr. Von Bargen explained that outside of this summer's incident when the condenser piping was opened for maintenance, there has always been a positive control in place, because alarm LEL C103-1 has always worked, showing that the loop seal associated with C103-1 was always properly filled with

water. Mr. Voogd added that whenever maintenance work was finished on the condenser piping, it was either covered with plastic wrap and taped, or a flange was put over the piping.

I asked a series of questions about the DST ventilation system and its operation. Mr. Hamilton and Mr. Von Bargen explained that during the same time the condenser piping repair was going on at the 242-A Evaporator, the DST ventilation system was also periodically shut down. They explained this was due to the testing of the DST exhauster requirements associated with the 242-A Evaporator. They explained further that in the AW Tank Farms, the exhausters have separate stacks and work in tandem of the two trains; A-Train and B-Train. Both exhauster trains are interconnected. These exhauster trains operate typically one at a time. I requested that Mr. Von Bargen and Mr. Hamilton submit information to Ecology to verify dates and times that both DST exhausts were down during the 242-A Evaporator condenser piping incident.

Ms. Conaway provided WRPS a document list request from the inspection and set a timeframe of December 3, 2012 for WRPS to submit the requested documents to Ecology. Ms. Conaway and I concluded our document review and field inspection at 3:30 p.m. and proceeded back to the 2440 Stevens Building for the end of day inspection summary.

During the out briefing, Ms. Conaway told WRPS and ORP that Ecology was very appreciative of their cooperation in answering our inspection questions, which were in some cases more broad than just dangerous waste related. Ms. Conaway said there appeared to be no dangerous waste violations at this time and that Ecology would continue their review of records and provide a final inspection report and meeting closeout at a later date. We thanked everyone and returned to the Ecology office.

**Summary of 242-A weekly maintenance ticklers to fill seal loop in overflow line from the steam condensate weir to 241-AW-102 (Tickler Number EVP-701) and to add water to floor drains in the condenser room (Tickler Number EVP-786).**

**Note:** Unless otherwise noted, all records reviewed were received by Ecology on 12/11/12.

**2007 Dates where water was not added to 242-A Evaporator condenser room seal loops or floor drains per maintenance ticklers and reasoning why the maintenance procedure was not performed. No maintenance records were missing for 2007.**

7/8/07 – Operating

10/28/07 – Power outage in condenser room

11/4/07 – No entry allowed in condenser room

11/11/07 – No entry allowed in condenser room

**2008 Dates where water was not added to 242-A Evaporator condenser room seal loops or floor drains per maintenance ticklers and reasoning why the maintenance procedure was not performed. No maintenance records were missing for 2008.**

4/6/08 – Power outage – No water added in condenser room

4/13/08 – Power outage – No water added in condenser room

4/20/08 – Power outage – No water added in condenser room

4/27/08 – Power outage – No water added in condenser room

5/4/08 – Power outage – No water added in condenser room

5/11/08 – Power outage – No water added in condenser room

5/18/08 – Power outage – No water added in condenser room  
5/25/08 – Power outage – No water added in condenser room  
6/1/08 – Power outage – No water added in condenser room  
6/8/08 – Power outage – No water added in condenser room  
9/14/08 – Unable to enter condenser room for floor drain additions  
11/9/08 – Unable to enter condenser room  
11/16/08 – Unable to enter condenser room  
11/23/08 – Unable to enter condenser room  
11/30/08 – Unable to enter condenser room  
12/7/08 – Unable to enter condenser room  
12/14/08 – Unable to enter condenser room  
12/21/08 – Unable to enter condenser room  
12/28/08 – Unable to enter condenser room

**2009 Dates where water was not added to 242-A Evaporator condenser room seal loops or floor drains per maintenance ticklers and reasoning why the maintenance procedure was not performed. No maintenance records were missing for 2009.**

1/18/09 – Not done per Standing Order OPS-08-008  
2/15/09 – No water additions to floor drains due to newly painted floor  
6/20/09 – Operating – No water additions  
9/27/09 – O/S water outage – No water added to seal loops  
10/10/09 – Power outage – No water additions  
10/17/09 – Water off - No water additions to seal loops  
11/8/09 – Water off – No water additions to seal loops  
11/21/09 – Water off – No water additions to seal loops  
12/6/09 – Water off – No water added to seal loops  
12/20/09 – Water off – No water added to seal loops

**2010 Dates where water was not added to 242-A Evaporator condenser room seal loops or floor drains per maintenance ticklers and reasoning why the maintenance procedure was not performed. No maintenance records were missing for 2010.**

1/5/10 – Water is off – No water additions to seal loops  
8/8/10 – Basement posted as C.A. – No water added to floor drains  
9/12/10 – In Operation mode – No water added to seal loops  
11/7/10 – Electrical wires over drain in hall – No water added to this drain or seal loops  
11/14/10 – Electrical wires over drain in hall – No water added to this drain or seal loops  
11/21/10 – No water valved in – No water added to seal loops

**2011 Dates of missing maintenance records or where water was not added to 242-A Evaporator condenser room seal loops or floor drains per maintenance ticklers with reasoning why the maintenance procedure was not performed.**

**Note:** Unless otherwise noted below, all records I reviewed were received by Ecology on 12/11/12.

1/2/11 – Water service building is valved out – No water added to seal loops  
1/16/11 – Water is turned off – No water additions to seal loops  
1/23/11 – Raw water seemed – No water additions to seal loops  
2/14/11 – Water valved out – No water additions to seal loops

2/20/11 – Water is valved out – No water additions to floor drains  
2/27/11 – Condenser room posted as C.A. – No water additions to seal loops or floor drains  
3/13/11 – Water turned off – No water additions to seal loops  
4/3/11 – Missing Record  
4/10/11 – Missing Record  
4/17/11 – Missing Record  
4/24/11 – Missing Record  
5/1/11 – Missing Record – On 1/16/13 – WRPS provided Ecology a copy of the operating logbook which showed this maintenance tickler was completed on 5/2/11.  
5/8/11 – Missing Record  
5/15/11 – Missing Record  
5/22/11 – Missing Record  
5/29/11 – Missing Record

**Summary of missing or non-performed 242-A weekly safety equipment inspections and operational check records to fill seal loop in overflow line from the steam condensate weir to 241-AW-102 (Attachment 7) and to add water to floor drains in the condenser room (Attachment 8) from Document No 242-85B-005.**

**Note:** Unless otherwise noted below, all records reviewed were received by Ecology on 12/11/12.

6/12/11 – Missing Attachment 7 & 8  
6/16/11 – Missing Attachment 7  
6/26/11 – Missing Attachment 7 & 8  
7/3/11 – Water valved out – No water added to seal loops  
7/10/11 – Missing Attachment 7 & 8  
7/17/11 – Attachment 7 & 8  
7/24/11 – Missing Attachment 7 & 8  
7/31/11 – Water isolated at service water building – No water added to seal loops  
8/7/11 – Missing Attachment 7 & 8  
8/14/11 – Raw water is valved out – Water added to weir seal loops  
9/4/11 – Missing Attachment 7 & 8  
9/11/11 – Water is valved out – No water added to weir seal loops  
9/18/11 – Missing Attachment 7 & 8  
10/2/11 – Water is valve out – No water added to seal loops  
10/9/11 – No water added – Water on level – Missing signature of shift manager  
10/16/11 – Missing Attachment 7 & 8  
11/6/11 – Water is valved out – No water added to seal loops  
11/20/11 – No signatures of shift manager for Attachment 7 & 8  
12/4/11 – Missing Attachment 7 & 8  
12/11/11 – Missing Attachment 7 & 8

**2012**

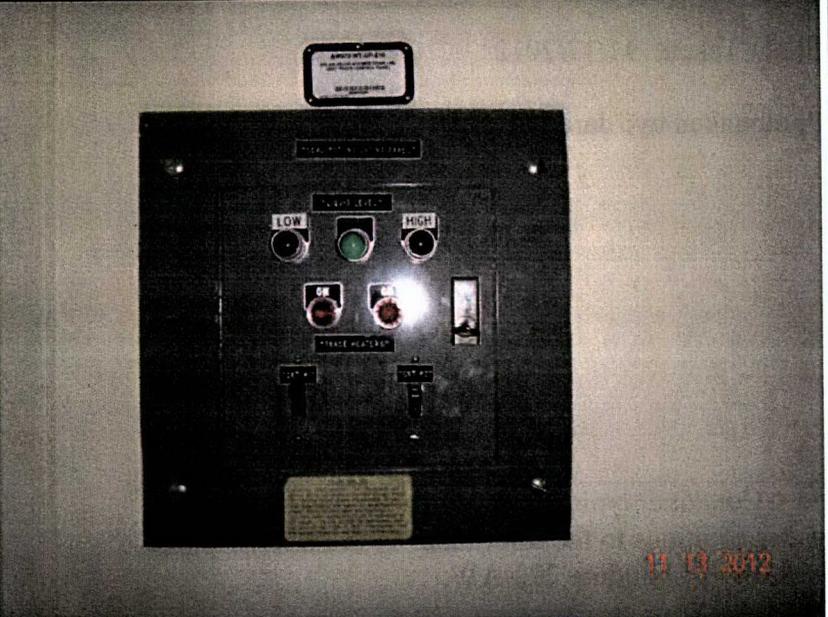
1/8/12 – Missing Attachment 7 & 8  
2/5/12 – Water isolated to raw water – No water additions to seal loops  
2/26/12 – Missing Attachment 7 & 8 – On 1/16/13 – WRPS showed Ecology records indicating that Attachment 8 was completed on 2/27/12

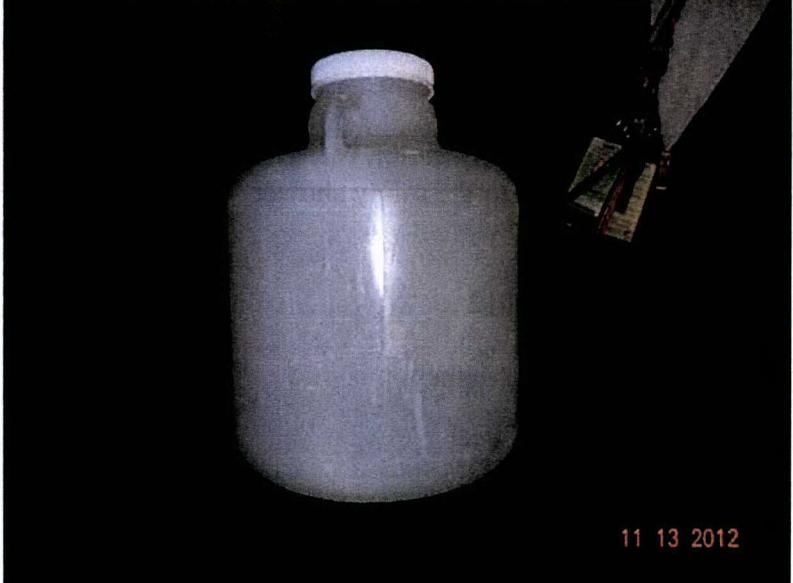
- 3/4/12 – Missing Attachment 7 & 8
- 3/11/12 – Missing Attachment 7 & 8 – On 1/16/13 – WRPS showed Ecology records indicating that Attachments 7 and 8 were completed on 3/12/12
- 3/18/12 – Missing Attachment 7 & 8 – On 1/16/13 – WRPS showed Ecology records indicating that Attachments 7 and 8 were completed on 3/19/12
- 3/25/12 – Missing Attachment 7 – On 1/16/13 – WRPS showed Ecology records indicating that Attachment 7 was completed on 3/26/12
- 4/1/12 – Missing Attachment 7 & 8
- 4/8/12 – Missing Attachment 7
- 4/15/12 – Missing Attachment 7 & 8
- 4/22/12 – Missing Attachment 7 & 8
- 5/6/12 – Missing Attachment 7
- 5/13/12 – Missing Attachment 7
- 5/20/12- Missing Attachment 7 & 8 – On 1/16/13 – WRPS showed Ecology records indicating that Attachments 7 and 8 were completed on 5/21/12
- 5/27/12 – Missing Attachment 7 & 8
- 6/17/12 – Missing Attachment 7 & 8
- 6/24/12 – Condenser room has restricted access – No water additions to seal loops or floor drains
- 7/15/12 – Missing Attachment 7 & 8
- 7/22/12 – Missing Attachment 7 & 8
- 8/19/12 – Missing Attachment 7 & 8 – On 1/16/13 – WRPS showed Ecology records indicating that water additions to the weir seal loop were done twice daily for over a week's duration of time after August 10, 2012.
- 9/2/12 – Missing Attachment 7
- 9/16/12 - Missing Attachment 7 & 8

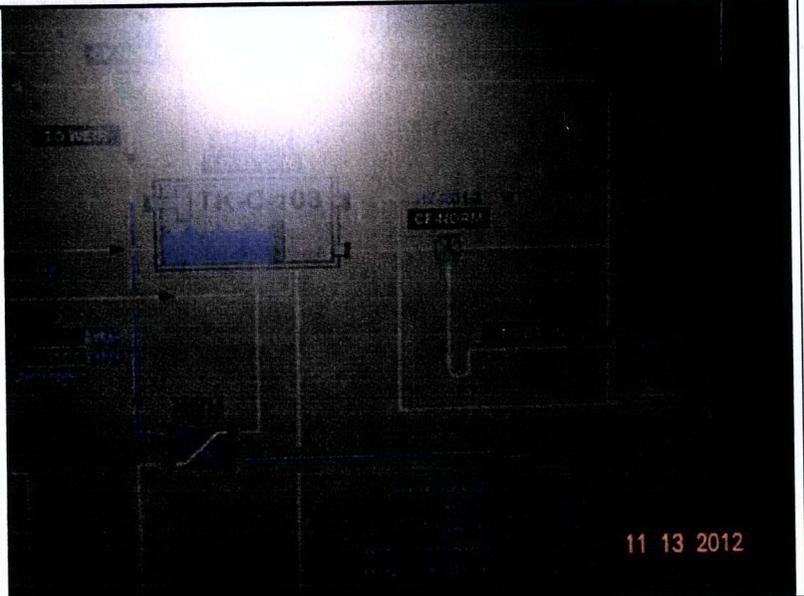
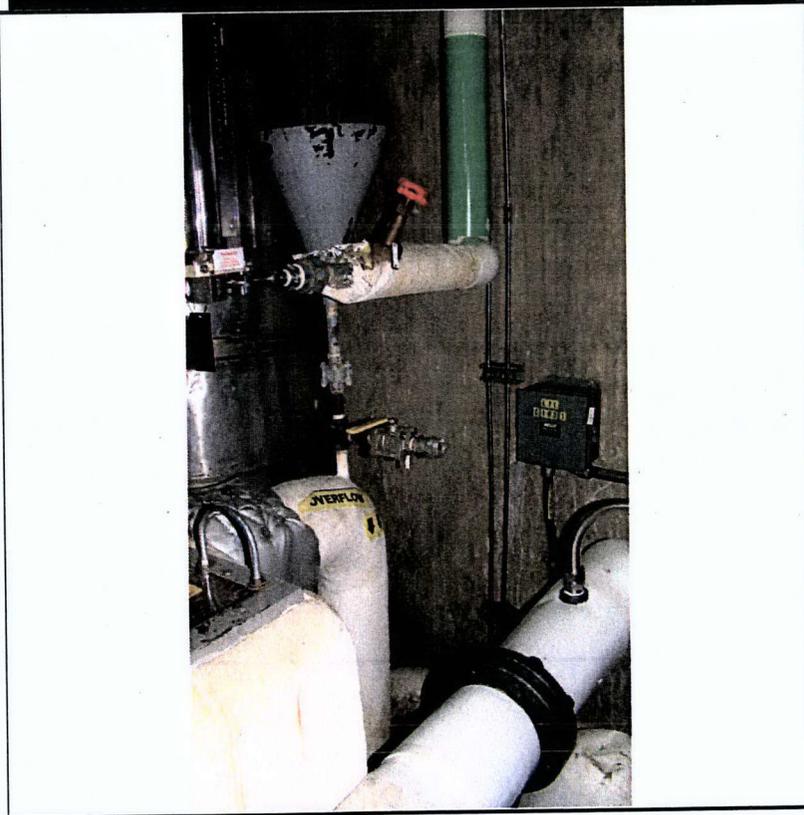
**Summary of 242-A Inhibited Alarm Logbook Data Sheets from Attachment 1 from Document No. TO-600-530 for LSL-C-103-2, LSL-RWSMP, and LSL-C-100-1 alarms from 4/14/07 to 10/2/12.**  
**Note:** Records received by Ecology on 12/11/12

- LSL-C-103-2 - 4/14/07 – Cycling, water previously added, bad sensor– Returned 5/2/07
- LSL-C-103-2 – 10/22/07 – Cycling Nuisance - Returned 10/23/07
- LSL-C-103-2 – 1/10/08 – Cycling – Returned 7/29/08
- LSL-C-103-2 – 10/14/08 – Incomplete Record
- LSL-C-103-2 – 10/19/08 – Cycling, water added – Incomplete record
- LSL-C-103-2 – 2/27/10 – Cycling – Returned to service 4/7/10
  
- LSL-RWSMP – 5/7/07 – Cycling, water had been added– Returned 8/22/07
- LSL-RWSMP – 9/19/07 – Cycling in and out. Relay cabinet in RW service building is chattering – Returned 8/5/08
- LSL-RWSMP – 6/26/09 – Cycling, water added per ARP, no success– Returned 3/10/10
- LSL-RWSMP – 1/11/12 – Cycling from “Normal” to “Level Lo” Reason unknown at this time – Returned 6/12/12
  
- LSL-C-100-1 – 9/30/12 – Possible Instrument Malfunction – Returned 10/2/12
- LSL-C-100-1 – 10/2/12 – Possible Instrument Malfunction - Returned 10/31/12

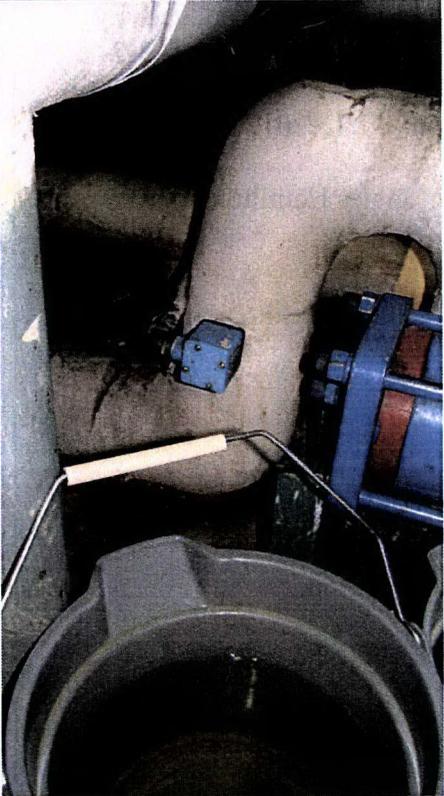
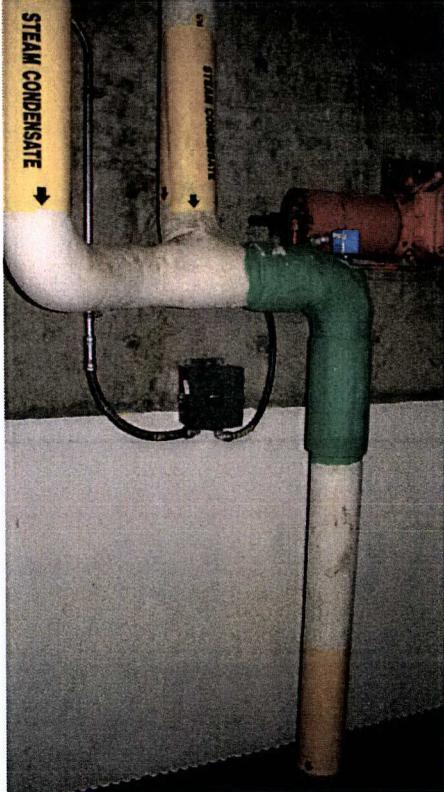
Photo Log

Area & Description	Photographs
<p>#1 – Building 272-AW: Seal pot indication panel for the safety shower seal loop liquid level.</p> <p>Date photo taken: 11/13/2012</p> <p>Photo taken by: Jared Mathey</p>	
<p>#2 – Building 272-AW: Location where water is added weekly to the safety shower drain to seal loop.</p> <p>Photo Taken: 11/13/2012</p> <p>Photo taken by: Jared Mathey</p>	

Area & Description	Photographs
<p>#3 – Safety showers in building 272-AW. Drains connect to floor drain where water is added.</p> <p>Photo Taken: 11/13/2012</p> <p>Photo taken by: Jared Mathey</p>	 <p>A photograph showing a safety shower drain area in a tiled room. The floor is covered in small, dark mosaic tiles. Two circular floor drains are visible, one in the foreground and one further back. The walls are tiled with larger, light-colored tiles. A date stamp '11-13-2012' is visible in the bottom right corner of the photo.</p>
<p>#4 – Container typically used to add weekly water additions to the safety shower drain to seal loop in building 272-AW.</p> <p>Photo Taken: 11/13/2012</p> <p>Photo taken by: Jared Mathey</p>	 <p>A photograph of a large, clear plastic container, likely used for adding water to the safety shower drain. The container is cylindrical with a white cap and is set against a dark background. A date stamp '11 13 2012' is visible in the bottom right corner of the photo.</p>

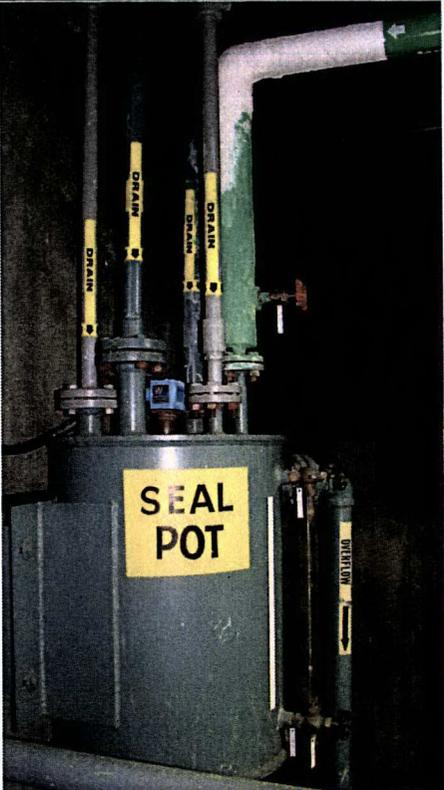
Area & Description	Photographs
<p>#5 – Picture of the 242-A Evaporator MCS control panel.</p> <p>Photo Taken: 11/13/2012</p> <p>Photo taken by: Jared Mathey</p>	
<p>#6 – Water funnel to fill seal loop C-103-1</p> <p>Date photo taken: 11/13/2012</p> <p>Photo taken by: James Hamilton –WRPS</p>	

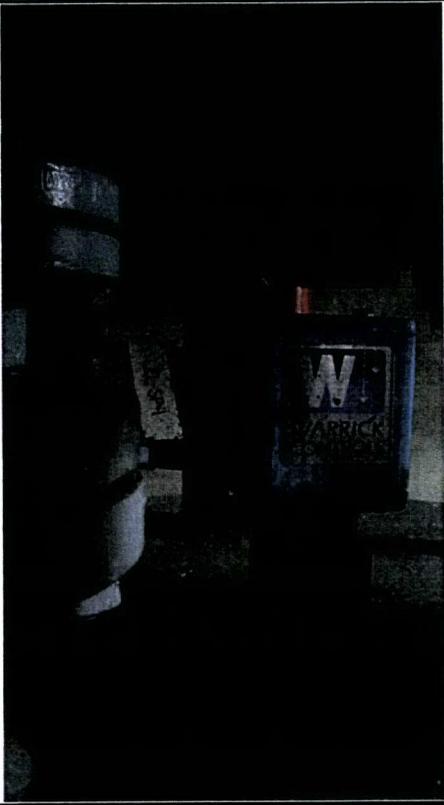
Area & Description	Photographs
<p>#7 – 242-A condenser room seal loop C-103-1 and conductivity alarm LEL C-103-1</p> <p>Date photo taken: 11/13/2012</p> <p>Photo taken by: James Hamilton –WRPS</p>	
<p>#8 – Water buckets in 242-A condenser room used to fill Seal loop C-103-1</p> <p>Date photo taken: 11/13/2012</p> <p>Photo taken by: James Hamilton –WRPS</p>	

Area & Description	Photographs
<p>#9 – 242-A condenser room conductivity alarm LEL-C103-1 for seal loop C-103-1</p> <p>Date photo taken: 11/13/2012</p> <p>Photo taken by: James Hamilton –WRPS</p>	 A photograph showing a grey bucket with a white probe inserted into a pipe system. The probe is connected to a blue electrical box mounted on a pipe. The background is dark and industrial.
<p>#10 – 242-A condenser room conductivity alarm LEL C103-2 for seal loop C-103-2</p> <p>Date photo taken: 11/13/2012</p> <p>Photo taken by: James Hamilton –WRPS</p>	 A photograph showing a green pipe with a black electrical box mounted on it. A yellow label with the text "STEAM CONDENSATE" and a downward arrow is visible on the pipe. The background is dark and industrial.

Area & Description	Photographs
<p>#11 – 242-A condenser room conductivity alarm LEL C103-2 for seal loop C-103-2</p> <p>Date photo taken: 11/13/2012</p> <p>Photo taken by: James Hamilton –WRPS</p>	
<p>#12 – 242-A condenser room conductivity alarm LEL C100-1 and seal loop C-100-1</p> <p>Date photo taken: 11/13/2012</p> <p>Photo taken by: James Hamilton –WRPS</p>	

Area & Description	Photographs
<p>#13 – 242-A condenser room conductivity alarm LEL C100-1 and seal loop C-100-1</p> <p>Date photo taken: 11/13/2012</p> <p>Photo taken by: James Hamilton –WRPS</p>	 A photograph showing a blue-painted metal pipe system. A yellow label with the word "CAUTION" and a radiation symbol is affixed to the pipe. To the right of the pipe is a vertical glass seal loop with a black valve handle at the bottom. The background is a dark, textured wall.
<p>#14 – 242-A condenser room conductivity alarm LEL C100-1 for seal loop C-100-1</p> <p>Date photo taken: 11/13/2012</p> <p>Photo taken by: James Hamilton –WRPS</p>	 A close-up photograph of a blue, rectangular LEL C100-1 alarm device. The device is mounted on a metal pipe. A white tag with the text "LEL C100-1" is attached to the side of the device. The background is dark and indistinct.

Area & Description	Photographs
<p>#15 – 242-A condenser room Seal Pot – SP-1</p> <p>Date photo taken: 11/13/2012</p> <p>Photo taken by: James Hamilton –WRPS</p>	 A photograph of a grey metal seal pot. A yellow label on the front of the pot reads "SEAL POT". Several pipes are connected to the top of the pot, each with a yellow label that says "DRAIN". The background is dark, suggesting an industrial setting.
<p>#16 – 242-A condenser room conductivity alarm LEL SP-1</p> <p>Date photo taken: 11/13/2012</p> <p>Photo taken by: James Hamilton –WRPS</p>	 A photograph of a blue rectangular conductivity alarm unit. The unit is mounted on a metal structure. To the right of the unit, there is a large white cylindrical component. The background is dark and industrial.

Area & Description	Photographs
<p>#17 – 242-A condenser room conductivity alarm LEL SP-1</p> <p>Date photo taken: 11/13/2012</p> <p>Photo taken by: James Hamilton –WRPS</p>	
<p>#18 – 242-A Evaporator pump room</p> <p>Date photo taken: 11/13/2012</p> <p>Photo taken by: James Hamilton –WRPS</p>	

<b>Area &amp; Description</b>	<b>Photographs</b>
#19 – 242-A Evaporator pump room  Date photo taken: 11/13/2012  Photo taken by: James Hamilton –WRPS	

### Compliance Problems

*The following conditions identified during the inspection on November 13, 2012 were not in compliance with Dangerous Waste and/or other environmental laws.*

*Each problem is covered in three parts:*

- (1) the citations from the regulations and Dangerous Waste Permit,*
- (2) the specific observations from the inspection that highlight the problem, and*
- (3) the corrective measures needed to fix the problem and achieve compliance.*

*On the last page(s) of this report is a 'Compliance Certificate' which again lists these compliance citations and directives in a table. That certificate also lists the deadlines for the corrective measures to be completed. The certificate explains how to complete the form and return it to the Department of Ecology.*

### AREAS OF NONCOMPLIANCE

#### Violations

- 1) Permit Number WA 7890008967 Rev 8C Condition I.E.10.c states that "the Permittees will retain at the Facility, or other approved location, records of all monitoring and maintenance records, copies of all reports and records required by this Permit, and records of all data used to complete the application for this Permit, which are not associated with a particular TSD unit, for a period of at least ten (10) years from the date of certification of completion of post-closure care, or corrective action for the Facility, whichever is later. This information may be retained on electronic media." Emphasis added.
- 2) Permit Number WA 7890008967 Rev 8C Condition II.L.1 Proper Design and Construction, states that "the Permittees will design, construct, maintain, and operate the Facility to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous substances to air, soil, ground water, or surface water, which could threaten human health, or the environment." Emphasis added.

Washington Administrative Code (WAC) 173-303-283(3) Performance standards, states in part, "Unless authorized by state, local, or federal laws, or unless otherwise authorized in this regulation, the owner/operator must design, construct, operate, or maintain a dangerous waste facility that to the maximum extent practical given the limits of technology prevents: . . . (i) Endangerment of the health of employees, or the public near the facility."

WAC 173-303-283(3)(i) (Emphasis added).

#### Inspection Observations

- 1) A significant amount of O&M records for the 242-A Evaporator seal loop and floor drain water additions were missing from April 2011 to September 2012. These missing records are associated with O&M requirements for adding water to seal loops and floor drains in the 242-A Evaporator condenser room. These seal loops, when properly filled and maintained, provide a protective barrier from mixed-waste vapors between the head space of DST 241-AW-102 and the 242-A condenser room.

- 2) The 242-A Inhibited Alarm Logbook Data Sheets, provided by the facility, indicated that the conductivity alarm LEL C-103-2 had a "bad sensor" on April 14, 2007. These records showed that the alarm was not replaced and continued to be in a cycle "of being inhibited and/or returned to service" from April 14, 2007 to April 7, 2010.

The WRPS response to Agenda Item No. 10 from Ecology's Air Quality Inspection No. 820, received by Ecology on November 5, 2012, stated that

As a part of the actions during the subsequent investigation and causal analysis for this event, it was noted that the creation of preventative maintenance actions and datasheets are necessary to address the following instrumentation: LEL-C103-1, LEL-C103-2, LEL-C100-1, and LEL-SP-1. These instruments are associated with the following alarms: LSL-C1031, LSL-C1032, LSL-C1001, and LSL-SP-1, respectively. The actions associated with the development of the preventive maintenance activity and datasheets are scheduled for issuance by December 19, 2012.

WRPS's statement indicates that preventative maintenance procedures and record keeping were not in place for the conductivity alarm LEL C-103-2 prior to the 242-A July/August incidents.

From reviewing the operating records made available from the dangerous waste inspection, Ecology did not find any evidence indicating that mixed-waste vapors from the headspace of 241-AW-102 Double Shell Tank (DST) went to the 242-A Evaporator condenser room when the condensate piping was opened for maintenance activities. Regardless, the potential existed for mixed-waste vapors from the headspace of 241-AW-102 DST to enter the 242-A Evaporator condenser room, because of the combination of:

- a) The opening of steam condensate lines at the specific location where there were open connectivity issues between 241-AW-102 and the 242-A condenser room,
- b) Lack of proper O&M and repair of seal loop alarm LEL C-103-2,
- c) Lack of complete records to verify that water was added to the seal loops weekly as required, and
- d) The shutting down of both DST exhausters during the same time repair of 242-A condenser piping occurred.

The lack of proper O&M of the conductivity alarm LEL C-103-2 created a situation where there was not a proper safety system or barrier in place to prevent workers from exposure of mixed-waste vapors from the head space of DST 241-AW-102. This is not in compliance with WAC 173-303-283(3)(i) and the Hanford Dangerous Waste Permit.

#### **Corrective Measures**

- 1) **Immediately, upon receipt of this inspection report**, O&M records associated with adding water to seal loops and floor drains in the 242-A condenser room, will be properly documented and maintained.
- 2) **Within 30-days of receipt of this inspection report**, develop an O&M preventative maintenance datasheet procedure for all 242-A's seal loop conductivity alarms and provide a copy of the procedure to Ecology for review and approval. At a minimum, the procedure will include a schedule for maintaining these alarms and replacement when not functioning properly.

## AREAS OF CONCERN

- 1) The steam condensate emergency divert drain line and the pump room sump drain line may, at times, be used to transport mixed waste to DST 241-AW-102. These specific drain lines are not currently permitted under the dangerous waste permit for the 242-A Evaporator (see below citation from the permit).

### Permit Citation

Permit Number WA 7890008967 Rev 8C Part III, Operating Unit 4 - 242-A Evaporator Condition 4.0 states in part that:

Other discharges during 242 A Evaporator processing include condensate from the steam used to heat the waste and cooling water used to condense the vapors. The 242 A Evaporator is designed to prevent contamination of these streams. The fluids on the uncontaminated side of the heat exchangers are maintained at a higher pressure than the waste stream so that uncontaminated fluid migrates toward the contaminated waste if a leak were to occur. The steam condensate and the cooling water are monitored continuously for radiation, pH, conductivity, and discharged to TEDF as long as none of the discharge limits are exceeded. The steam condensate and cooling water streams were assessed in the stream specific reports (WHC 1990a and WHC 1990b) and are not dangerous waste in accordance with WAC 173-303.

### Discussion

If the 242-A Evaporator steam condensate were contaminated with mixed-waste it would trigger the HV-EA1-2 divert valve, sending contaminated steam condensate to 241-AW-102 DST through the drain line protected by the seal loop associated with alarm LEL-C103-2. This drain line is currently not part of the 242 A Dangerous Waste Permit.

The September 4, 2012, Event Investigation Report No. EIR-2012-016, (i.e., the WRPS investigation report into the connectivity between the air space between the 242-A Evaporator steam condensate lines and the head space of 241-AW-102) states that on July 25, 2012, "fixed contamination (3000 dpm  $\beta$  direct) was not found on valve HV-EA1-2 but on the inside of the pipe flange, after HV-EA1-2 was removed." The area where radiological contamination was found is the drain line directly under the HV-EA1-2 divert valve. WRPS stated that this divert valve has never been used to divert contaminated steam condensate to 241-AW-102. Radiological contamination, an indicator of the presence of mixed-waste, was found on the inside of the steam condensate divert line to 241-AW-102, which is currently not part of the Dangerous Waste Permit.

Additionally, the September 4, 2012 WRPS Event Investigation Report No. EIR-2012-016, stated that a vacuum into the steam condensate line was noted on July 25, 2012 and August 10, 2012, indicating that seal loop liquid level, associated with LEL-C103-2, was low enough to allow air to pass between the head space of 241-AW-102 and the open steam condensate line in the 242-A condenser room. Process diagrams provided in response to Ecology Air Quality Inspection No. 820, showed that the drain line under the HV-EA1-2 divert valve is directly protected from 241-AW-102 tank vapors by the C-103-2 water seal loop. This evidence, along with the lack of a properly functioning conductivity alarm and lack of records verifying that water was added to this seal loop, could indicate that tank vapors from the 241-AW-102 head space may be the cause of the fixed contamination found on the inside of the steam condensate line. Because of this and if a diversion

occurs from HV EA1-2, the potential exists for steam condensate contaminated with mixed-waste to flow through this drain line. It should be noted that this same line ties to the pump room sump, which in times past has, contained mixed-waste. With this, this specific portion of the steam condensate drain line should be included in the dangerous waste permit for the 242-A Evaporator.

- 2) Since water is known to evaporate out of the condenser room seal loops over time, I have a concern of how seal loop water seals will be maintained during long periods of shutdown of the 242-A Evaporator. Specifically, my concern relates to when the 242-A Evaporator control room monitor and control system computer is turned off (the computer system which monitors the conductivity alarms) and access to the condenser room is restricted where water additions cannot be made to seal loops. From reviewing the historical O&M records, I observed there were periods as long as several consecutive months where water was not added to seal loops in the 242-A Evaporator condenser room. Additionally, the seal loops may be more inclined to dry out over time if the Attachment 7 – Stem Condensate Weir Level Check procedure from Document No. 242-85B-005 is followed after a long period of restricted condenser room access, verse if this procedure is followed on a weekly basis. Attachment 7 requires approximately one gallon of water be added to the seal loops, however, more water may need to be added to the seal loops if water has not been added for a long period of time. This is especially the case when water is added to the upper seal loop through valve 2-5A which requires the seal loop to be full enough to overflow and fill the lower seal loop C-103-2. C-103-2 was the seal loop that went dry causing the connectivity between the 242-A condenser room and the 241-AW-102 DST. I recommend this issue be addressed in the Attachment 7 procedure for the 242-A Evaporator condenser room.

**COMPLIANCE CERTIFICATE**

**Instructions: Return this Completed Form or Request an Extension** -- Use this form to report if the action(s) needed to achieve compliance, identified during the inspection on November 13, 2012, have been completed. Complete the shaded portion of the table and mail a copy of this form to Jared Mathey at the following address: Washington Department of Ecology, Nuclear Waste Program, Attention: Jared Mathey, at 3100 Port of Benton Blvd, Richland, WA 99354.

An extension of the deadlines to achieve compliance may be requested. Please make a request in writing, including the reasons an extension is necessary and proposed date(s) for completion, and send it Jared Mathey before the date specified above. Ecology will provide a written approval or denial of your request.

*The problems identified below must be corrected in order to be in compliance with Washington Dangerous Waste Regulations (Chapter 173-303 WAC), Dangerous Waste Permit, or other environmental laws or regulations. Please indicate the date each action is completed, or indicate "Not Completed" and initial each item. Include any comments explaining the actions taken on a separate piece of paper.*

Violation Cited	Date Observed	Corrective Action Required	Corrective Action Taken	Date Corrective Action Taken
Permit Number WA 7890008967 Rev 8C Condition I.E.10.c	11/13/12	Immediately upon receipt of this inspection report, O&M records associated with adding water to seal loops and floor drains in the 242-A condenser room, will be properly documented and maintained by USDOE. See #1 in "Corrective Measures" page 22 of this report.		
WAC 173-303-283(3)(i) and Condition II.L.1 from Dangerous Waste Permit Number WA 7890008967 Rev 8C	11/13/12	Within 30-days of receipt of this inspection report, develop an O&M preventative maintenance datasheet procedure for all 242-A's seal loop conductivity alarms and provide a copy of the procedure to Ecology for review and approval. See #2 under "Corrective Measures" page 22 of this report.		

Please certify to the following:

Kevin Smith - ORP Manager, has responsibility for the overall operation of the Hanford Facility 242-A Evaporator and is duly authorized to sign all reports and other information requested pertaining to compliance with the Part B Permit. As an authorized signatory, my certification is included below:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

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Kevin Smith – ORP Manager  
Hanford Nuclear Reservation

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Mike Johnson – WRPS Manager  
Hanford Nuclear Reservation