STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Richland Field Office
3100 Port of Benton Blvd., Richland, WA 99354 • 509-372-7950

May 11, 2022 22-NWP-076

Brian T. Vance, Manager
Richland Operations Office
United States Department of Energy
PO Box 550, MSIN: H5-30
Richland, Washington 99352

John Eschenberg, President
and Project Manager
Central Plateau Cleanup Company LLC
PO Box 1464, MSIN: A7-01
Richland, Washington 99352

Re: Dangerous Waste Compliance Inspection on February 15, 2022, at the 216-A-29 Ditch, 216-A-37-1 Crib, 216-A-36B Crib, 216-B-63 Trench, 216-S-10 Pond and Ditch, 216-B-3 Main Pond, 183-H Solar Evaporation Basins, 300 Area Process Trenches, Non-Radioactive Dangerous Waste Landfill, and Low-Level Burial Grounds - Green Islands, RCRA Site ID: WA7890008967, Nuclear Waste Program (NWP) Compliance Index Nos.: 22.756 to 22.765

Dear Brian T. Vance and John Eschenberg:

Thank you for your staff's time during the 216-A-29 Ditch, 216-A-37-1 Crib, 216-A-36B Crib, 216-B-63 Trench, 216-S-10 Pond and Ditch, 216-B-3 Main Pond, 183-H Solar Evaporation Basins, 300 Area Process Trenches, Non-Radioactive Dangerous Waste Landfill, and Low-Level Burial Grounds Green Islands inspections on February 15, 2022. The Department of Ecology's (Ecology) compliance report of this inspection is enclosed. The report cites one area of non-compliance and two concerns.

Specific deficiencies or violations not listed in the enclosed compliance report do not relieve your facility from having to comply with all applicable regulations.

If you have questions or need further information, please contact me at (360) 481-9830 or jared.mathey@ecy.wa.gov.

Sincerely,

Jared Mathey
Dangerous Waste Compliance Inspector
Nuclear Waste Program

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Enclosure

cc: See page 2

22-NWP-076
Groundwater Inspections
RCRA Site ID: WA7890008967
NWP Compliance Index No.: 22.756 to 22.765
Inspection Date: Febraury 15, 2022

cc electronic w/enc:

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Dave Einan, EPA
Matt Quarterman, EPA
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Michael Cline, USDOE
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NWP Compliance Index File: 22.756 to 22.765
Adam Shaffer, Ecology,
NWP Compliance Index File: 22.756 to 22.765
Kim Welsh, Ecology
Environmental Portal
Hanford Administrative Record
Hanford Facility Operating Record
CPCCo Correspondence Control
HAB Correspondence Control
HMIS Correspondence Control
USDOE Correspondence Control

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Washington Department of Ecology
Nuclear Waste Program
Compliance Report

Site:	216-A-29 Ditch, 216-A-37-1 Crib, 216-A-36B Crib, 216-B-63 Trench, 216-S-10 Pond and Ditch, 216-B-3 Main Pond, 183-H Solar Evaporation Basins, 300 Area Process Trenches, Non-Radioactive Dangerous Waste Landfill, and Low-Level Burial Grounds Green Islands
RCRA Site ID:	**WA7890008967**
Inspection Date:	February 15, 2022
Site Contacts:	Danielle Collins, Central Plateau Cleanup Company (CPCCo) Jennifer Williams, CPCCo
Site Location:	U.S. Department of Energy Hanford Site, Benton County
Current Site Status:	Treatment, Storage, and Disposal Facilities / Large Quantity Generator

Ecology

Lead Contact: Jared Mathey Phone: (360) 481-9830

Ecology Support: John Pulsipher

Report Date: May 11, 2022

Index #s are the following:

- Index No 22.756 - 216-A-29 Ditch
- Index No 22.757 - 216-A-37-1 Crib
- Index No 22.758 - 216-A-36B Crib
- Index No 22.759 - 216-B-63 Trench
- Index No 22.760 - 216-S-10 Pond and Ditch
- Index No 22.761 - 216-B-3 Main Pond
- Index No 22.762 - 183-H Solar Evaporation Basins
- Index No 22.763 - 300 Area Process Trenches (APT)
- Index No 22.764 - Nonradioactive Dangerous Waste Landfill (NRDWL)
- Index No 22.765 - Low-Level Burial Grounds (LLBG) - Green Islands

Report By: Jared Mathey

Mathey, Jared W. (ECY)
2022.05.11 15:42:37 -07'00'

(Signed) (Date)

Site Location

The Hanford Site was assigned a single United States Environmental Protection Agency (EPA) identification number, and is considered a single *Resource Conservation and Recovery Act of 1976* (RCRA), as amended, facility even though the Hanford Site contains numerous processing areas spread over a large geographic area. The Hanford Site is a tract of land approximately 580 square miles and is located in Benton County, Washington. This site is divided into distinct Dangerous Waste Management Units (DWMUs) administratively organized into "unit groups." A unit group may contain only one DWMU or many; currently, there are 30 unit groups at the Hanford Site. Individual DWMUs make up a small portion of the Hanford Site. Additional descriptive information on the individual DWMUs is contained in unit group permit applications and in Parts III, V, and VI of the Hanford Facility RCRA Permit, Dangerous Waste Portion, WA7890008967, Revision 8C (hereafter referred to as the Permit).

Owner and Operator Information

United States Department of Energy (USDOE) is the owner and operator of the 216-A-29 Ditch, 216-A-37-1 Crib, 216-A-36B Crib, 216-B-63 Trench, 216-B-3 Main Pond, 216-S-10 Pond and Ditch, 183-H Solar Evaporation Basins, 300 APT, NRDWL, and LLBG - Green Islands. CPCCo has contracted with USDOE to co-operate the 216-A-29 Ditch, 216-A-37-1 Crib, 216-A-36B Crib, 216-B-63 Trench, 216-B-3 Main Pond, 216-S-10 Pond and Ditch, NRDWL, and LLBG - Green Islands. CPCCo is contracted to conduct groundwater monitoring for the 183-H Solar Evaporation Basins and 300 APT.

Facility Background

In 2021, the United States Department of Energy Hanford Site reported as a Large Quantity Generator of hazardous waste on their Dangerous Waste Annual Report.

216-A-29 Ditch

The 216-A-29 Ditch is a man-made earthen percolation unit, regulated as an unlined (non-compliant) dangerous waste surface impoundment, located east of the 200 East Area. The ditch was used to manage chemical discharges from the separation and concentration processes at the Plutonium-Uranium Extraction (PUREX) Plant. Approximately 6,000,000 gallons of waste per day flowed to the ditch, estimated to be 6 ft. deep, 3,600 ft. long, and varies from 2-3 ft. depth in the south portion of the ditch to approximately 16 ft. depth in the north portion of the ditch. According to the DOE/RL-2020-59, Rev. 1, *2020 Hanford Annual Groundwater Report*, dated September 9, 2021, the 216-A-29 Ditch was monitored under a groundwater quality assessment program (DOE/RL-2016-23, 216-A-29 Ditch Interim Status Groundwater Quality Assessment Monitoring Plan) during the first half of 2020. For the remainder of 2020, the ditch was monitored under an indicator evaluation program because previous assessment results indicated that no dangerous waste groundwater contamination was attributed to releases from the 216-A-29 Ditch (DOE/RL-2019-27, *Groundwater Assessment First Determination Report for the 216-A-29 Ditch*). Interim status indicator evaluation monitoring was reinstated under DOE/RL-2008-58, *Interim Status Groundwater Monitoring Plan for the 216-A-29 Ditch*, during the third quarter of 2020. The plan modified the monitored constituents and sampling frequency, but there was no change to the monitoring network.

216-A-37-1 Crib

The 216-A-37-1 Crib is an inactive, man-made earthen percolation unit, designated as an unlined (non-compliant) dangerous waste surface impoundment, located outside of the 200 East Area adjacent to the PUREX Plant. The crib was used for percolation of process condensate waste from the 242-A Evaporator. According to the DOE/RL-2020-59, Rev. 1, *2020 Hanford Annual Groundwater Report*, dated September 9, 2021, the 216-A-37-1 Crib is in Indicator Evaluation and Detection Monitoring per Interim Status Subpart F Groundwater Monitoring requirements.

216-A-36B Crib

The 216-A-36B Crib is a man-made, subsurface liquid effluent disposal unit, designated as an unlined (non-compliant) surface impoundment, located south of the PUREX plant. The crib was used to manage process chemical waste from the PUREX plant. The design capacity of the impoundment was 116,000 gallons per day. The nature and quantity of mixed waste (MW) is identified in the unit group's "Part A Form." According to the DOE/RL-2020-59, Rev. 1, *2020 Hanford Annual Groundwater Report*, dated September 9, 2021, the 216-A-36B Crib is in Indicator Evaluation and Detection Monitoring per Interim Status Subpart F Groundwater Monitoring requirements.

216-B-63 Trench

The 216-B-63 Trench is a non-operation, open, and man-made earthen percolation unit that is designated as an unlined (non-compliant) dangerous waste surface impoundment. The trench was used to receive emergency cooling water and chemical waste from the 221-B Canyon Building. According to the DOE/RL-2020-59, Rev. 1, *2020 Hanford Annual Groundwater Report*, dated September 9, 2021, the 216-B-63 Trench is in Indicator Evaluation and Detection Monitoring per Interim Status Subpart F Groundwater Monitoring requirements.

216-S-10 Pond and Ditch

The 216-S-10 Pond and Ditch are non-operation, open, and man-made earthen percolation units that are designated as unlined (non-compliant) dangerous waste surface impoundments. The pond and ditch was used to manage chemical discharges from separation and concentration processes at the Reduction Oxidation (REDOX) Facility. According to the DOE/RL-2020-59, Rev. 1, *2020 Hanford Annual Groundwater Report*, dated September 9, 2021, the 216-S-10 Pond and Ditch is in Indicator Evaluation and Detection Monitoring per Interim Status Subpart F Groundwater Monitoring requirements.

216-B-3 Main Pond

The 216-B-3 Main Pond treatment, storage, and disposal (TSD) unit is a non-operation, man-made earthen percolation unit that is designated as an unlined (non-compliant) dangerous waste surface impoundment. The 216-B-3 Main Pond consists of the 216-B-3 Pond and 216-B-3-3 Ditch. The Main Pond TSD was used to dispose of cooling water discharges from 200 East Area facilities (PUREX Plant and B Plant). Additional effluent sources included chemical discharges and steam condensates (PUREX, B Plant, 242-A Evaporator, 242-B Evaporator, 244-AR Vault, 244-BXR Vault, 244-CR Vault, BY Tank Farm, 241-A Waste Ventilation System Complex, 283-E Water Treatment Facility, and 284-E Powerhouse). According to the DOE/RL-2020-59, Rev. 1, *2020 Hanford Annual Groundwater Report*, dated

September 9, 2021, the 216-B-3 Main Pond is in Indicator Evaluation and Detection Monitoring per Interim Status Subpart F Groundwater Monitoring requirements.

183-H Solar Evaporation Basins

The 183-H Solar Evaporation Basins consisted of four concrete basins used for waste treatment and disposal. The waste discharged to the basins originated in the 300 Area Fuel Fabrication Facility and included solutions of neutralized chromic, hydrofluoric, nitric, and sulfuric acid. Additional nonradioactive dangerous waste was discharged to the basins. The basin received MW consisting primarily of liquid neutralized acid process waste designated as Extremely Hazardous Waste (EHW) (WT01), and also received nonradioactive dangerous waste of listed discarded chemical products of cyanide (P030), vanadium oxide (P120), and formic acid (U123). Approximately 2.6 million pounds of waste per year was treated. The deactivated water treatment basins received a maximum of approximately 400,000 gallons of wastewater per year during operations and had a tank treatment design capacity of 700 gallons per day, treated by evaporation, and a tank treatment design capacity of 2,167,000 gallons across all four basins. Post-closure groundwater monitoring is being conducted as part of the interim remediation action for the 100-HR-3 Groundwater Operable Unit under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA).

300 Area Process Trenches

The 300 APT received dangerous waste liquid discharges from research and developmental laboratories in the 300 Area and from the fuels fabrication process. Effluent from the process trenches did not have a discharge outlet and infiltrated the soil column or evaporated. The estimated annual quantity of both regulated and non-regulated wastewater discharged to the unit was 120 million gallons per year, and the process trenches were designed to percolate up to 3,000,000 gallons of wastewater per day. Waste in the trenches consisted of state-only toxic, dangerous waste (WT02), discarded chemical products (U210), corrosive waste (D002), chromium (D007) ,and spent halogenated solvent (F001, F002, F003). Since 1998, the 300 APT are under groundwater monitoring to meet post-closure corrective action requirements.

Low-Level Burial Grounds - Green Islands WMA 4

There are 24 radioactive solid waste burial grounds in the Central Plateau (200 Area). The burial grounds were constructed as individual trenches; a total of 333 trenches. MW was disposed at several locations within individual trenches. The name “Green Islands” is associated with these MW locations because the areas of disposal are shown in the color of green on Hanford maps. It is not permissible to land dispose of dangerous or MW without first treating to Land Disposal Restrictions (LDR). Additionally, dangerous waste must be placed in a landfill unit built specifically to contain dangerous waste. The LLBGs were not build to the standards of a dangerous waste landfill and fail to meet the technical standards of Washington Administrative Code (WAC) 173-303-665 *Landfills,* (2) Design and operating requirements. According to the DOE/RL-2020-59, Rev. 1, *2020 Hanford Annual Groundwater Report*, dated September 9, 2021, the LLBG Green Islands WMA-4 is in Interim Status Indicator Evaluation Monitoring per Interim Status Subpart F Groundwater Monitoring requirements.

Non-Radioactive Dangerous Waste Landfill

The 600 Area Central Non-Radioactive Dangerous Waste Landfill, otherwise referred to as the NRDWL, and the Solid Waste Landfill (SWL) operated as one unit between 1973 and 1975. The units received waste from the Hanford site. In 1975, the 600 Area landfill was divided into two separate units because of the nature of the waste disposed at the NRDWL and SWL. The NRDWL hazardous waste is regulated under Chapter 173-303 WAC. The SWL received non-dangerous solid waste, which is regulated under Chapter 173-350 WAC *Solid Waste Handling Standards*. The NRDWL is a 10-acre land disposal unit that consists of 19 unlined trenches approximately 400 feet long, 16 feet wide at the base, and 15 feet deep. Six trenches (trenches 19N, 26, 28, 31, 33, and 34) were used for disposal of dangerous waste. The NRDWL was used from January 1975 through May 1985 for the disposal of dangerous waste generated from various Hanford Site operations. Asbestos was disposed in nine trenches (trenches 2N, 20, 21, 22, 23, 25, 27, 29, and 30). Nonhazardous waste was disposed in trench 1N. The NRDWL is an inactive landfill and ceased receiving nonradioactive dangerous waste for disposal in May 1985. This waste consists of listed waste, waste from nonspecific sources, characteristic waste, and state only waste. The NRDWL provided disposal of dangerous wastes generated from process operations, research and development laboratories, maintenance activities, and transportation functions located throughout the Hanford Facility. According to the DOE/RL-2020-59, Rev. 1, *2020 Hanford Annual Groundwater Report*, dated September 9, 2021, for the first half of 2020, the NRDWL was monitored under a groundwater quality assessment program (DOE/RL-2017-19, *Groundwater Quality Assessment Plan for the Nonradioactive Dangerous Waste Landfill, Hanford Site*). Beginning in August 2020, the site was monitored under an indicator parameter monitoring plan (DOE/RL-2015-32, *Groundwater Monitoring Plan for the Nonradioactive Dangerous Waste Landfill*) because assessment monitoring concluded that no dangerous waste groundwater contamination is attributed to releases from the NRDWL (DOE/RL-2019-22, *Groundwater Assessment First Determination Report for the Nonradioactive Dangerous Waste Landfill*).

Compliance Background

On June 24, 2020, Ecology conducted dangerous waste compliance inspections of the 216-A-29 Ditch, 216-A-37-1 Crib, 216-A-36B Crib, 216-B-63 Trench, 216-S-10 Pond and Ditch, 216-B-3 Main Pond, 183-H Solar Evaporation Basins, 300 APT, and LLBG – Green Islands Index Numbers 20.704 to 20.712. During this inspection, Ecology found no areas of non-compliance.

On March 11, 2020, Ecology conducted a dangerous waste compliance inspection of the NRDWL. During this inspection, Ecology found the following areas of non-compliance:

1. USDOE and CH2M Hill Plateau Remediation Company (CHPRC) failed to have adequate warning signs as required by WAC 173-303-310(2)(a).
2. USDOE and CHPRC failed to have a final cover design (90% design) and construction quality assurance plan for closing the NRDWL.
3. USDOE and CHPRC failed to have emergency equipment required in WAC 173-303-340(1)(c).

On January 26, 2021, Ecology conducted dangerous waste compliance inspections of the 216-A-29 Ditch, 216-A-37-1 Crib, 216-A-36B Crib, 216-B-63 Trench, 216-S-10 Pond and

Ditch, 216-B-3 Main Pond, 183-H Solar Evaporation Basins, 300 APT, NRDWL, and LLBG – Green Islands Index Numbers 21.722 – 21.731. During this inspection, Ecology found no areas of non-compliance.

Inspection Summary

On February 15, 2022, at 8:00 a.m., John Pulsipher and I arrived outside of Building 2753E. The following USDOE and CPCCo personnel were present:

- Danielle Collins – Inspection Coordinator, CPCCo
- Stacey Cutter – Environmental Compliance Officer, CPCCo
- Julie Johanson – Environmental Compliance Officer, CPCCo
- Kathy Higgins – Soil and Groundwater, USDOE
- Britt Wilkins – Groundwater Environmental Compliance Officer, CPCCo
- Jennifer Williams – Inspection Coordinator, CPCCo

Ms. Julie Johanson gave a safety briefing for our inspection, including watching out for animals, debris while driving, slips, trips, and falls, and the take cover location. As a part of the safety briefing, Ms. Britt Wilkins, said it was important to not drive off the roadway as there are areas that should not be driven over.

I asked if anyone knew when the annual Resource Conservation and Recovery Act (RCRA) Annual Groundwater Report would be issued for the Hanford Site. Ms. Kathy Higgins, said the report should be issued by March 1, 2022. Ms. Wilkens provided me a list of wells that were installed or added to the groundwater monitoring network since 2020. I observed the list was a highlighted list of wells I provided to CPCCo prior to the field inspection. Ms. Wilkens said that the highlighted wells were the ones that were installed or added to the groundwater monitoring network since 2020. I asked why some wells were not installed as responded to from last year's groundwater monitoring inspections. Ms. Wilkens said to ask that question on my records request. Ms. Wilkens went over the inspection route of 216-A-29 Ditch, 216-B-3 Main Pond, LLBG – Waste Management Area (WMA) -1, and 216-S-10 Pond and Ditch as the sequence of unit groups we would be visiting. We walked to our vehicles and left for the first new groundwater well installed at the 216-A-29 Ditch.

At 8:30 a.m., we arrived at 216-A-29 Ditch groundwater well 299-E25-241. I observed the following:

- The well had a Washington State well identification tag on the well casing that was visible above the land surface with unique well identification number BLD 050.
- The well had a cap that was locked on top of the casing.
- The well was protected from damage by four metal posts. The posts appeared over three inches in diameter, over three feet above the land surface, and over two feet away from the well casing.
- The well protection measures appeared to not be damaged.

DSC02902 - 216-A-29 Ditch groundwater well 299-E25-241

At 216-A-29 Ditch groundwater well 299-E25-242. I observed the following:

- The well had a Washington State well identification tag on the well casing that was visible above the land surface with unique well identification number BLD 044.
- The well had a cap that was locked on top of the casing.
- The well was protected from damage by four metal posts. The posts appeared over three inches in diameter, over three feet above the land surface, and over two feet away from the well casing.
- The well protection measures appeared to not be damaged.

DSC02903 - 216-A-29 Ditch groundwater well 299-E25-242

We arrived at the 216-A-29 Ditch groundwater well 299-E26-82, where I observed the well casing cap removed with a device on a cable hanging over the well head. I observed three CPCCo soil and groundwater workers, Mr. Brandon Thunau, Mr. James Patterson, and Mr. Chris Meisner. I asked Mr. Thunau what they were doing and he responded that they were moisture logging the well. I then walked to the other side of the well where I told Mr. James Patterson, Geophysical Operator, I was conducting a groundwater monitoring inspection and asked if he could tell me more about what they were doing. Mr. Patterson told me they were doing a soil moisture level reading for percent moisture through the outside of the well casing.

I observed the following at the 216-A-29 Ditch groundwater well 299-E26-82:

- The well had a Washington State well identification tag on the well casing that was visible above the land surface with unique well identification number BLD 046.
- The well had a cap that was unlocked, sitting on top of the bollards for access to the well.
- The well was protected from damage by four metal posts. The posts appeared over three inches in diameter, over three feet above the land surface, and over two feet away from the well casing.
- The well protection measures appeared to not be damaged.

DSC02904 - 216-A-29 Ditch groundwater well 299-E26-82

We then drove to the 216-B-3 Main Pond. At 8:54 a.m. we arrived at the 216-B-B Main Pond, groundwater well 699-42-44B where I observed the following:

- The well had a Washington State well identification tag on the well casing that was visible above the land surface with unique well identification number BMS 714.
- The well had a cap that was locked on top of the casing.
- The well was protected from damage by four metal posts. The posts appeared over three inches in diameter, over three feet above the land surface, and over two feet away from the well casing.
- The well protection measures appeared to not be damaged.

DSC02905 - 216-B-3 Main Pond groundwater well 699-43-44B

At the 216-B-3 Main Pond groundwater well 699-43-44C, I observed the following:

- The well had a Washington State well identification tag on the well casing that was visible above the land surface with unique well identification number BMS 706.
- The well had a cap that was locked on top of the casing.
- The well was protected from damage by four metal posts. The posts appeared over three inches in diameter, over three feet above the land surface, and over two feet away from the well casing.
- The well protection measures appeared to not be damaged.

DSC02906 - 216-B-3 Main Pond groundwater well 699-43-44C

At the 216-B-3 Main Pond groundwater well 699-43-43B, I observed the following:

- The well had a Washington State well identification tag on the well casing that was visible above the land surface with unique well identification number BLD 013.
- The well had a cap that was locked on top of the casing.
- The well was protected from damage by four metal posts. The posts appeared over three inches in diameter, over three feet above the land surface, and over two feet away from the well casing.
- The well protection measures appeared to not be damaged.

DSC02907 - 216-B-3 Main Pond groundwater well 699-43-43B

At the 216-B-3 Main Pond groundwater well 699-43-43C, I observed the following:

- The well had a Washington State well identification tag on the well casing that was visible above the land surface with unique well identification number BMS 705.
- The well had a cap that was locked on top of the casing.
- The well was protected from damage by four metal posts. The posts appeared over three inches in diameter, over three feet above the land surface, and over two feet away from the well casing.
- The well protection measures appeared to not be damaged.

DSC02908 -216-B-3 Main Pond groundwater well 699-43-43C

At the 216-B-3 Main Pond groundwater well 699-44-42B, I observed the following:

- The well had a Washington State well identification tag on the well casing that was visible above the land surface with unique well identification number BMS 704.
- The well had a cap that was locked on top of the casing.
- The well was protected from damage by four metal posts. The posts appeared over three inches in diameter, over three feet above the land surface, and over two feet away from the well casing.
- The well protection measures appeared to not be damaged.

DSC02909 - 216-B-3 Main Pond groundwater well 699-44-42B

We then drove to the LLBG Green Islands – WMA-1. At 9:30 a.m., we arrived at the LLBG Green Islands – WMA-1 groundwater well 299-E33-276 where I observed the following:

- The well had a Washington State well identification tag on the well casing that was visible above the land surface with unique well identification number BMS 707.
- The well had a cap that was locked on top of the casing.
- The well was protected from damage by four metal posts. The posts appeared over three inches in diameter, over three feet above the land surface, and over two feet away from the well casing.
- The well protection measures appeared to not be damaged.

DSC02910 - LLBG Green Islands – WMA-1 groundwater well 299-E33-276

At the LLBG Green Islands – WMA-1 groundwater well 299-E33-283, I observed the following:

- The well had a Washington State well identification tag on the well casing that was visible above the land surface with unique well identification number BMS 718.
- The well had a cap that was locked on top of the casing.
- The well was protected from damage by four metal posts. The posts appeared over three inches in diameter, over three feet above the land surface, and over two feet away from the well casing.
- The well protection measures appeared to not be damaged.

DSC02911 - LLBG Green Islands – WMA-1 groundwater well 299-E33-283

At the LLBG Green Islands – WMA-1 groundwater well 299-E28-35, I observed the following:

- The well had a Washington State well identification tag on the well casing that was visible above the land surface with unique well identification number BMS 703.
- The well had a cap that was locked on top of the casing.
- The well was protected from damage by four metal post. The posts appeared over three inches in diameter, over three feet above the land surface, and over two feet away from the well casing.
- The well protection measures appeared to not be damaged.

DSC02912 - LLBG Green Islands – WMA-1 groundwater well 299-E28-35

We then drove to the 216-S-10 Pond and Ditch. At 9:58 a.m. we arrived at the 216-S-10 Pond and Ditch groundwater well 299-W26-15 where I observed the following:

- The well had a Washington State well identification tag on the well casing that was visible above the land surface with unique well identification number BMS 721.
- The well had a cap that was locked on top of the casing.
- The well was protected from damage by four metal posts. The posts appeared over three inches in diameter, over three feet above the land surface, and over two feet away from the well casing.
- The well protection measures appeared to not be damaged.

DSC02913 - 216-S-10 Pond and Ditch groundwater well 299-W26-15

At the 216-S-10 Pond and Ditch groundwater well 699-32-77B, I observed the following:

- The well had a Washington State well identification tag on the well casing that was visible above the land surface with a unique well identification number BMS 722.
- The well had a cap that was locked on top of the casing.
- The well was protected from damage by four metal posts. The posts appeared over three inches in diameter, over three feet above the land surface, and over two feet away from the well casing.
- The well protection measures appeared to not be damaged.

DSC02914 - 216-S-10 Pond and Ditch groundwater well 699-32-77B

At the 216-S-10 Pond and Ditch groundwater well 299-W26-16, I observed the following:

- The well had a Washington State well identification tag on the well casing that was visible above the land surface with unique well identification number BMS 725.
- The well had a cap that was locked on top of the casing.
- The well was protected from damage by four metal posts. The posts appeared over three inches in diameter, over three feet above the land surface, and over two feet away from the well casing.
- The well protection measures appeared to not be damaged.

DSC02915 - 216-S-10 Pond and Ditch groundwater well 299-W26-16

At the 216-S-10 Pond and Ditch groundwater well 299-W27-3, I observed the following:

- The well had a Washington State well identification tag on the well casing that was visible above the land surface with unique well identification number BMS 720.
- The well had a cap that was locked on top of the casing.
- The well was protected from damage by four metal posts. The posts appeared over three inches in diameter, over three feet above the land surface, and over two feet away from the well casing.
- The well protection measures appeared to not be damaged.

DSC02916 - 216-S-10 Pond and Ditch groundwater well 299-W27-3

I gave an inspection out-brief. I explained I did not observe any problems during the inspection. I said I would send a records request out by the end of the day. I coordinated inspection photos with Ms. Williams and Ms. Collins. I thanked everyone for their time and we departed the facility at 10:23 a.m.

Records Review

New Proposed Wells

I requested to provide a list of all additional new wells proposed to be installed at 216-A-29 Ditch, 216-A-37-1 Crib, 216-A-36B Crib, 216-B-63 Trench, 216-S-10 Pond & Ditch, 216-B-3 Main Pond, 183-H Solar Evaporation Basins, 300 Area Process Trenches, NRDWL, and LLBG - Green Islands in all of 2022. The records request asked to include the well description, up-gradient or down-gradient, and proposed date of well completion and to provide a list of decommissioned wells, if any, at these facilities, from January 2021 to January 2022. I received the below response and table of information from USDOE and CPCCo.

> There aren't (*sic*) any decommissioned wells at these facilities from January 2021 to January 2022.

Table 1 – New Groundwater Wells Planned for Calendar Year 2022

Well Identification	Location	Completion	Notes
216—A-29 Ditch			
216-A-29_PW-1 (216-E25-248)	Downgradient	Planned end of FY22	
216-A-29_PW-2 (299-E25-249)	Downgradient	Planned end of FY22	
216-A-29_PW-3 (299-E25-250)	Downgradient	Planned end of FY22	
216-A-37-1 Crib			
216-A-37-1_PW-2 (299-E25-243)	Downgradient	Planned end of FY22	
216-A-37-1_PW-1 (299-E25-244)	Downgradient	Planned end of FY22	
299-E25-245	Downgradient	Planned end of FY22	Replacement for 299-E25-17
299-E25-246	Downgradient	Planned end of FY22	Replacement for 299-E25-19
299-E25-247	Downgradient	Planned end of FY22	Replacement for 299-E25-20
216-A-37-1_PW-3 (299-E25-125)	Upgradient	Planned end of FY22	
216-A-36B Crib			
299-E17-58	Upgradient	March 2022	Replacement for 299-E17-1
216-B-63 Trench			
No new wells planned			
216-S-10 Pond & Ditch			
No new wells planned			
216-B-3 Main Pond			
No new wells planned			
183-H Solar Evaporation Basin			
No new wells planned			
300 Area Process Trenches			
No new wells planned			
NRDWL			
No new wells planned			
Low-Level Burial Grounds (Green Islands)			
299-W10-204 (WMA-3_PW1)	Downgradient	Planned end of FY22	
299-W10-205 (WMA-3_PW2)	Downgradient	Planned end of FY22	
299-W7-15 (WMA-3_PW3)	Downgradient	Planned end of FY22	
299-W7-16 (WMA-3_PW6)	Downgradient	Planned end of FY22	
WMA-4_PW1 (D0028)	Downgradient	Planned end of FY22	
WMA-4_PW2 (D0029)	Downgradient	Planned end of FY22	
WMA-4_PW3 (D0030)	Upgradient	Planned end of FY22	

Maintenance Records

I requested and reviewed the following 2021 well maintenance records for wells at the 216-A-29 Ditch, 216-A-36B Crib, 216-A-37-1 Crib, 216-B-3 Main Pond, 216-B-63 Trench, 216-S-10 Pond and Ditch, 183-H Solar Evaporation Basins, 300 APT, NRDWL, and LLBG - Green Islands. Below are my observations.

216-A-29 Ditch

- None.

216-A-36B Crib

- None.

216-A-37-1 Crib

- On June 9, 2021, Well 299-E25-20 had a camera survey and cleaning performed. The Well Maintenance Report indicated that the carbon steel well casing showed degradation. Additionally, sand was removed from 291 feet to 298 feet, the pump was reinstalled and the well was purged with 1,000 gallons.
- On August 18, 2021, a Well Concern Report was filed that Well 299-E25-19 needed to be relabeled. On December 15, 2021, Well 299-E25-19 had all of its labels replaced.

216-B-3 Main Pond

- On February 23, 2021, Well 699-43-43B had a new bladder pump installed.
- On February 25, 2021, a Well Concern Report was filed that Well 699-42-42B needed to be relabeled. On April 8, 2021, Well 699-42-42B had its well ID and well name relabeled due to fading.
- On July 14, 2021, Well 699-43-44B had its well name and radiologic status relabeled.
- On July 14, 2021, Well 699-43-43C had its well name relabeled.
- On July 14, 2021, Well 699-44-42B had its well name and radiologic status relabeled and had a new lock installed.
- On August 17, 2021, Well 699-43-43C had a bladder pump installed.
- On August 18, 2021, Well 699-43-44B had a pump installed.
- On August 18, 2021, Well 699-44-42B had a pump installed.
- On September 27, 2021, Well 699-43-43C had a bladder pump removed and staged on-site for re-installation.
- On September 27, 2021, Well 699-43-44B had a bladder pump removed and staged on-site for re-installation.
- On September 27, 2021, Well 699-44-42B had a bladder pump removed and staged on-site for re-installation.
- On September 20, 2021, Well 699-43-43B had its pump removed.
- On October 21, 2021, Well 699-43-44C had a pump installed and a camera survey performed. I observed no observations on the results of the camera survey.

- On October 21, 2021, Well 699-44-42B had a pump installed.

216-B-63 Trench

- On June 21, 2021, Well 299-E27-18 had a camera survey performed with results showing that the well was very clean with no further work needed.
- On December 13, 2021, Well 299-E27-16 had its pump removed, well surveyed with a camera, the well scrubbed, and pump placed back in the well. I observed no results of the camera survey.

216-S-10 Pond and Ditch

- On February 1, 2021, a Well Concern Report was filed for Well 299-W26-14 that indicated the well needed to be relabeled. On February 4, 2021, Well 299-W26-14 had its well name, well ID, and radiologic status relabeled.
- On February 23, 2021, a Well Concern Report was filed for Well 299-W26-13 that indicated they were unable to obtain a water level measurement due to an E-tape getting hung up at 50 meters, and that an obstruction needs to be removed. On March 15. 2021, Well 299-W26-13 appeared to be surveyed to find obstructions, which none were found.

183-H Solar Evaporation Basins

- None.

300 Area Process Trenches

- None.

Nonradioactive Dangerous Waste Landfill

- On January 6, 2021, a Well Concern Report was filed to relabel Well 699-26-35A. On April 7, 2021, Well 699-26-35A had its well ID and well name relabeled due to fading.
- On January 6, 2021, a Well Concern Report was filed to re-set a loose bollard at Well 699-26-33A. On June 9, 2021, Well 699-26-33A had a loose protective bollard reset.

Low-Level Burial Grounds - Green Islands Waste Management Area -4

- On February 1, 2021, a Well Concern Report was filed that Well 299-W18-21 needed to be relabeled. On February 3, 2021, Well 299-W18-21 had its well name, well ID, and radiologic status relabeled.
- On March 8, 2021, Well 299-W18-21 had a camera survey performed where they found a brass or copper rod 3/8” in diameter and 6” in length that needs to be removed.
- On March 31, 2021, Well 299-W18-21 had a camera survey performed with a tool to remove the welding rod from the well. The well was flushed with 30 gallons of water.

Groundwater Well Pre-Trip Inspection Records

I requested and reviewed copies of all 2021 groundwater pre-trip inspections for RCRA groundwater wells at the 216-A-29 Ditch, 216-A-36B Crib, 216-A-37-1 Crib, 216-B-3 Main Pond, 216-B-63 Trench, 216-S-10 Pond and Ditch, 183-H Solar Evaporation Basins, 300 APT, NRDWL, and LLBG - Green Islands WMA -4. I observed groundwater well pre-trip inspections

occurred on dates identified in Table 2. I also observed that each Groundwater Well Pre-Trip Inspection record contained the date and time of the inspection, the printed name and handwritten signature of the inspector, and notations of observations made.

Table 2 – Groundwater Well Pre-Trip Inspection Dates

Unit Group	Well Number	Groundwater Well Pre-Trip Inspections				
216-A-29 Ditch	299-E25-34	1/5/2021	3/22/2021	6/30/2021		
	299-E25-35	1/8/2021	3/23/2021	6/30/2021	10/1/2021	
	299-E25-43	1/5/2021	3/22/2021	6/30/2021		
	299-E25-47	1/5/2021	3/22/2021	6/30/2021	10/1/2021	
	299-E25-238	1/5/2021	3/22/2021	6/30/2021		
	299-E25-239	1/8/2021	3/23/2021	6/30/2021		
	299-E26-80	1/5/2021	3/22/2021	6/30/2021		
	299-E26-13	1/5/2021	3/22/2021	6/30/2021		
216-A-36B Crib	299-E17-1	12/30/2020	6/30/2021			
	299-E17-14	12/30/2020	6/30/2021			
	299-E17-15	12/30/2020	6/30/20201			
	299-E17-16	12/30/2020	6/30/2021			
	299-E17-18	12/30/2020	6/30/2021			
	299-E17-19	12/30/2020	6/30/2021			
216-A-37-1 Crib	299-E25-17	1/5/2021	6/30/2021	10/1/2021		
	299-E25-19	1/5/2021	6/30/2021	10/1/2021		
	299-E25-20	1/5/2021	6/10/2021	6/30/2021	9/7/2021	10/1/2021
	299-E25-47	1/5/2021	6/10/2021	10/1/2021		
	299-E25-35	1/8/2021	3/23/2021	6/30/2021	10/1/2021	
	299-E25-95	1/5/2021	6/30/2021	10/1/2021		
216-B-3 Pond	699-42-42B	1/4/2021	2/25/2021	6/28/2021	10/1/2021	
	699-43-43B	1/4/2021	6/28/2021	9/20/2021	10/1/2021	
	699-43-45	1/4/2021	6/28/2021	10/1/2021		
	699-44-39B	1/4/2021	6/28/2021	10/1/2021		
	699-44-43C	1/4/2021	6/28/2021	10/1/2021		
	699-43-43C	8/23/2021	9/24/2021	10/1/2021		
	699-43-44B	8/23/2021	9/24/2021	10/1/2021		
	699-43-44C	8/23/2021	9/24/2021	10/1/2021		
	699-44-42B	8/23/2021	9/24/2021	10/1/2021		
216-B-63 Trench	299-E27-16	4/29/2021	11/1/2021			
	299-E27-18	4/29/2021	11/1/2021			

Table 2 – Groundwater Well Pre-Trip Inspection Dates

Unit Group	Well Number	Groundwater Well Pre-Trip Inspections				
	299-E27-19	4/29/2021	11/1/2021			
	299-E33-33	4/29/2021	11/1/2021			
	299-E34-8	4/29/2021	11/1/2021			
	299-E34-12	4/29/2021	11/1/2021			
216-S-10 Pond and Ditch	299-W26-13	4/29/2021	11/1/2021			
	299-W26-14	4/29/2021	11/1/2021			
	699-32-76	4/29/2021	11/1/2021			
	699-33-75	4/29/2021	11/1/2021			
	699-33-76	4/29/2021	11/1/2021			
183-H	199-H4-8	5/3/2021	9/7/2021	10/1/2021	12/3/2021	
	199-H4-84	5/3/2021	9/7/2021	10/1/2021	12/3/2021	
	199-H4-85	5/3/2021	9/7/2021	10/1/2021	12/3/2021	
	199-H4-88	5/3/2021	9/7/2021	10/1/2021	12/3/2021	
	199-H4-89	5/3/2021	9/7/2021	10/1/2021	12/3/2021	
300 APT	399-1-10A	5/24/2021	8/29/2021			
	399-1-10B	5/24/2021	8/29/2021			
	399-1-16A	5/24/2021	8/29/2021			
	399-1-16B	5/24/2021	8/29/2021			
	399-1-17A	5/24/2021	8/29/2021			
	399-1-17B	5/24/2021	8/29/2021			
	399-1-18A	5/24/2021	8/29/2021			
	399-1-18B	5/24/2021	8/29/2021			
NRDWL	699-25-34B	12/30/2020	3/29/2021	6/28/2021	10/1/2021	
	699-25-34D	1/20/2021	3/29/2021	4/6/2021	7/14/2021	10/12/2021
	699-25-34F	12/30/2020	3/29/2021	6/28/2021	10/1/2021	
	699-26-33A	12/30/2020	3/29/2021	6/28/2021	10/1/2021	
	699-26-34A	12/30/2020	3/29/2021	6/28/2021	10/1/2021	
	699-26-34B	12/30/2020	3/29/2021	6/28/2021	10/1/2021	
	699-26-35A	12/30/2020	3/29/2021	6/28/2021	10/1/2021	
	699-26-38	12/30/2020	3/29/2021	6/28/2021	10/1/2021	
LLBG Green Islands WMA 4	299-W15-17	1/18/2021	3/18/2021	7/2/2021		
	299-W15-30	1/18/2021	3/18/2021	7/2/2021		
	299-W15-83	1/5/2021	3/18/2021	7/2/2021		

Table 2 – Groundwater Well Pre-Trip Inspection Dates

Unit Group	Well Number	Groundwater Well Pre-Trip Inspections				
	299-W15-94	1/18/2021	3/18/2021	7/2/2021		
	299-W15-152	1/18/2021	3/18/2021	7/2/2021		
	299-W15-224	1/5/2021	3/18/2021	7/2/2021		
	299-W18-21	1/5/2021	3/18/2021	7/1/2021	11/1/2021	12/3/2021
	299-W18-22	1/5/2021	3/18/2021	7/1/2021	11/1/2021	12/3/2021

I observed on January 6, 2021, that the Groundwater Well Pre-Trip Inspection form noted that the northwest bollard at Well 699-26-33A at NRDWL was damaged. I observed on February 25, 2021, that the Groundwater Well Pre-Trip Inspection form noted that Well 699-42-42B at the 216-B-3 Main Pond had labels faded and needs new labels. I observed on September 20, 2021, Well 699-43-43B at the 216-B-3 Main Pond was noted that the bladder was being removed and sampling was occurring with a different type of pump. I observed on October 1, 2021, that Well 699-44-42B at the 216-B-3 Main Pond was noted that it had no pump and that the bladder was on the ground. I observed on October 1, 2021, that Well 699-26-34A at NRDWL needed to be relabeled. I observed on October 1, 2021, that Well 299-E25-19 at the 216-A-37-1 Crib needs its orange label replaced. I observed on October 12, 2021, the Well 699-25-34D at NRDWL needs an orange label added.

Groundwater Well Pump Check Inspection Records and Depth to Water Measurements

I observed that Groundwater Sample Reports were completed for the below listed wells and Unit Groups in Table 3 on the following dates demonstrating inspections of the well pump (if installed) and depth to water measurements. I observed each inspection record contained the date and time of the inspection, the printed name and handwritten signature of the inspector, and notations of observations made.

Table 3 – Groundwater Well Pump Inspection and Depth to Water Measurement Dates

Unit Group	Well Number	Groundwater Well Pump Check Inspection and Depth to Water Measurement Dates				
216-A-29 Ditch	299-E25-34	1/11/2021	3/23/2021	7/20/2021		
	299-E25-35	1/8/2021	3/23/2021	7/20/2021	10/12/2021	
	299-E25-43	1/11/2021	3/23/2021	7/20/2021		
	299-E25-47	1/8/2021	3/23/2021	7/20/2021		
	299-E25-238	1/8/2021	3/23/2021	7/20/2021		
	299-E25-239	1/8/2021	3/23/2021	7/20/2021		
	299-E26-80	1/11/2021	3/23/2021	7/20/2021		
	299-E26-13	1/11/2021	3/23/2021	7/20/2021		
216-A-36B Crib	299-E17-1	1/6/2021	7/1/2021			
	299-E17-14	1/6/2021	7/1/2021			

Table 3 – Groundwater Well Pump Inspection and Depth to Water Measurement Dates

Unit Group	Well Number	Groundwater Well Pump Check Inspection and Depth to Water Measurement Dates				
	299-E17-15	1/6/2021	7/1/2021			
	299-E17-16	1/6/2021	7/1/2021			
	299-E17-18	1/6/2021	7/1/2021			
	299-E17-19	1/6/2021	7/1/2021			
216-A-37-1 Crib	299-E25-17	1/7/2021	7/19/2021	10/12/2021		
	299-E25-19	1/7/2021	7/19/2021	10/12/2021		
	299-E25-20	1/7/2021	6/11/2021	7/20/2021	9/9/2021	10/12/2021
	299-E25-47	1/8/2021	3/23/2021	7/20/2021		
	299-E25-35	1/8/2022	3/23/2021	7/20/2021	10/12/2021	
	299-E25-95	1/7/2021	7/20/2021	10/12/2021		
216-B-3 Pond	699-42-42B	1/5/2021	2/25/2021	7/15/2021	10/21/2021	
	699-43-43B	1/5/2021	7/19/2021	9/20/2021	10/21/2021	
	699-43-45	1/5/2021	7/15/2021	10/26/2021		
	699-44-39B	1/5/2021	7/15/2021	10/22/2021		
	699-44-43C	1/5/2021	7/15/2021	10/22/2021		
	699-43-43C	8/26/2021	9/24/2021	10/22/2021		
	699-43-44B	8/26/2021	9/24/2021	10/22/2021		
	699-43-44C	8/26/2021	9/24/2021	10/22/2021		
	699-44-42B	8/26/2021	9/24/2021	10/22/2021		
216-B-63 Trench	299-E27-16	5/4/2021	11/4/2021			
	299-E27-18	5/4/2021	11/4/2021			
	299-E27-19	5/4/2021	11/5/2021			
	299-E33-33	5/5/2021	11/4/2021			
	299-E34-8	5/4/2021	11/4/2021			
	299-E34-12	5/4/2021	11/4/2021			
216-S-10 Pond and Ditch	299-W26-13	5/3/2021	11/5/2021			
	299-W26-14	5/3/2021	11/5/2021			
	699-32-76	5/3/2021	11/5/2021			
	699-33-75	5/3/2021	11/5/2021			
	699-33-76	5/3/2021	11/5/2021			
183-H Solar Evap Basin	199-H4-8	6/8/2021	9/16/2021	10/14/2021*	12/15/2021	
	199-H4-84	2/22/2021	6/8/2021	9/16/2021*	10/14/2021*	12/15/2021

Table 3 – Groundwater Well Pump Inspection and Depth to Water Measurement Dates

Unit Group	Well Number	Groundwater Well Pump Check Inspection and Depth to Water Measurement Dates				
	199-H4-85	6/8/2021	9/16/2021	10/14/2021	12/15/2021	
	199-H4-88	6/8/2021	9/16/2021	10/14/2021	12/15/2021	
	199-H4-89	6/8/2021	9/16/2021	10/14/2021	12/15/2021	
300 APT	399-1-10A	6/1/2021	9/2/2021			
	399-1-10B	6/1/2021	9/2/2021			
	399-1-16A	6/2/2021	9/1/2021			
	399-1-16B	6/2/2021	9/1/2021			
	399-1-17A	6/2/2021	9/1/2021			
	399-1-17B	6/2/2021	9/1/2021			
	399-1-18A	6/1/2021	9/2/2021			
	399-1-18B	6/1/2021	9/2/2021			
NRDWL	699-25-34B	1/19/2021	4/1/2021	7/14/2021	10/12/2021	
	699-25-34D	1/20/2021	4/6/2021	7/14/2021	10/12/2021	
	699-25-34F	1/19/2021	4/1/2021	7/14/2021	10/12/2021	
	699-26-33A	1/19/2021	4/1/2021	7/14/2021	10/11/2021	
	699-26-34A	1/19/2021	4/1/2021	7/14/2021	10/11/2021	
	699-26-34B	1/20/2021	4/1/2021	7/21/2021	10/11/2021	
	699-26-35A	1/19/2021	4/1/2021	7/14/2021	10/12/2021	
	699-26-38	1/19/2021	4/1/2021	7/21/2021	10/11/2021	
LLBG Green Islands WMA 4	299-W15-17	1/18/2021	3/18/2021	7/2/2021		
	299-W15-30	1/18/2021	3/18/2021	7/2/2021		
	299-W15-83	1/18/2021	3/18/2021	7/2/2021		
	299-W15-94	1/18/2021	3/18/2021	7/2/2021		
	299-W15-152	1/18/2021	3/18/2021	7/2/2021		
	299-W15-224	1/18/2021	3/18/2021	7/2/2021		
	299-W18-21	1/18/2021	3/18/2021	7/6/2021		
	299-W18-22	1/18/2021	3/18/2021	7/6/2021		

I observed the following notation of issues on the Groundwater Sample Reports I reviewed.

- On October 14, 2021, Well 199-H4-8 is dry, so no depth to water or sampling occurred.

- On September 16, 2021, Well 199-H4-84 had no water. Notations indicated that the sampler touched the bottom of the well, there was no water to pump, and that notifications were made per procedures.
- On October 14, 2021, Well 199-H4-84 was noted as dry.

Groundwater Monitoring Records

216-A-29 Ditch

I reviewed 2021 groundwater monitoring records for the 216-A-29 Ditch against requirements in 40 Code of Federal Regulation (CFR) 265.90 through 265.94, Subpart F - *Ground-Water Monitoring* as incorporated by reference and modified by WAC 173-303-400(3), per Permit Condition I.A in the Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion Revision 8C. I also compared these records with DOE/RL-2008-58, Rev 1, *Interim Status Groundwater Monitoring Plan for the 216-A-29 Ditch*, dated May 13, 2020, and DOE/RL-2008-58, Rev 1, Change 1, *Interim Status Groundwater Monitoring Plan for the 216-A-29 Ditch*, dated September 29, 2021.

I observed Wells 299-E25-34, 299-E25-35, 299-E25-43, 299-E25-47, 299-E25-238, 299-E25-239, 299-E26-80, and 299-E26-13 were all sampled at least semi-annually for pH, specific conductance, total organic carbon, and total organic halogen and at least annually for chloride, iron, manganese, phenols, sodium, and sulfate. I observed that the critical mean of for total organic carbon (604 µg/L) was exceeded in Well 299-E25-239 on January 8, 2021, (656 µg/L) and July 20, 2021, (888 µg/L), and Wells 299-E26-80 (3,640 µg/L), 299-E25-43 (4,230 µg/L), and 299-E25-34 (3,613 µg/L) on January 11, 2021. I observed that Wells 299-E25-239, 299-E26-80, 299-E25-43, and 299-E25-34 were resampled for total organic carbon and sent to two different labs for analysis on March 23, 2021, with levels below the critical mean. I observed that down-gradient Well 299-E25-239 was not resampled for total organic carbon after the exceedance on July 20, 2021.

Note: On April 26, 2022, I received the following response from CPCCo regarding why down-gradient Well 299-E25-239 was not resampled for total organic carbon after the exceedance on July 20, 2021.

> As described in Section 1.1 of the Hanford Site RCRA Groundwater Monitoring Report for 2021 (DOE/RL-2021-50, Rev. 0), in cases where the calculated critical mean (CM) of indicator parameters is below the limit of quantitation (LOQ), RCRA groundwater monitoring sampling results from down-gradient wells are compared to the LOQ. In 2021, the LOQ for total organic carbon (TOC) was the laboratory's required detection limit of 1,000 µg/L. For 216-A-29, the calculated CM for TOC in 2021 was 604 µg/L (Table 10 in ECF-HANFORD-21-0011, *Calculation of Critical Means for Calendar Year 2021 RCRA Groundwater Monitoring*, Rev. 0) which is below the LOQ of 1,000 µg/L. Therefore, the LOQ of 1,000 µg/L was used to determine if an exceedance had occurred.

> In the July sampling of well 299-E25-239, the TOC result of 888 µg/L is less than the LOQ of 1,000 µg/L, therefore resampling of the well was not performed.

On May 3, 2022, I received documentation that showed in 2021, that the LOQ for total organic carbon was the laboratory's required detection limit of 1,000 µg/L. Below is the response that I received from CPCCo:

> Attached are the lab report pages for TOC on the samples in question. All samples were run at GEL laboratory. Four TOC samples are collected for each event and GEL runs every TOC sample in quadruplicate and reports the average value as the final result. They include results from all four runs as well as the average in their reports. Included with the sample results, GEL reports the method detection limit (under the column header "DL" [detection limit]) and the LOQ value (under the column header RL). Note: the labs tend to use the terms LOQ, PQL (practical quantitation limit) and RL (reporting limit) interchangeably so how the LOQ is labeled in lab reports can vary from lab to lab. In addition, the lab has flagged all these results with a "B" qualifier which further substantiates that the results are all below their quantitation level. The lab uses the HEIS defined qualifiers per our contract and for this method the "B" qualifier is defined as a value measured above the MDL (method detection limit or detection limit) but below the quantitation level.
>
> In addition, the only other lab CPCCo uses for TOC is Test America Denver (TADN), who also has a published LOQ of 1000 ug/L for TOC. A review of some data packages from the lab verified that they are indeed reporting to an LOQ of 1000 ug/L.
>
> GEL and TADN are the only two labs that are currently under contract to perform TOC analysis.

In accordance with Permit Attachment 8, *Inspection and Training Plan for Groundwater Monitoring Wells*, I observed that samples of well corrosion constituents of iron, chromium, nickel, molybdenum and manganese were sampled during each well monitoring event.

216-A-36B Crib

I reviewed 2021 groundwater monitoring records for the 216-A-36B Crib against requirements in 40 CFR 265.90 through 265.94, Subpart F - *Ground-Water Monitoring* as incorporated by reference and modified by WAC 173-303-400(3), per Permit Condition I.A in the Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion Revision 8C. I also compared these records with DOE/RL-2010-93, Rev 2, *Interim Status Groundwater Monitoring Plan for the 216-A-36B PUREX Plant Crib*, dated October 19, 2020, and DOE/RL-2010-93, Rev 3, *Interim Status Groundwater Monitoring Plan for the 216-A-36B PUREX Plant Crib*, dated March 24, 2021.

I observed Wells 299-E17-1, 299-E17-14, 299-E17-15, 299-E17-16, 299-E17-18, and 299-E17-19 were all sampled at least semi-annually for pH, specific conductance, total organic carbon, and total organic halogen and at least annually for chloride, iron, manganese, phenols, sodium,

and sulfate. I observed that the critical means for pH, specific conductance, total organic carbon, and total organic halogen were not exceeded during 2021 for any of the sampling results I reviewed. In accordance with Permit Attachment 8, *Inspection and Training Plan for Groundwater Monitoring Wells*, I observed that samples of well corrosion constituents of iron, chromium, nickel, molybdenum and manganese were sampled during each well monitoring event.

216-A-37-1 Crib

I reviewed 2021 groundwater monitoring records for the 216-A-37-1 Crib against requirements in 40 CFR 265.90 through 265.94, Subpart F - *Ground-Water Monitoring* as incorporated by reference and modified by WAC 173-303-400(3), per Permit Condition I.A in the Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion Revision 8C. I also compared these records with DOE/RL-2010-92, Rev 3, *Interim Status Groundwater Monitoring Plan for the 216-A-37-1 PUREX Plant Crib*, dated September 27, 2017 and DOE/RL-2010-92, Rev 4, *Interim Status Groundwater Monitoring Plan for the 216-A-37-1 PUREX Plant Crib*, dated February 16, 2021.

I observed Wells 299-E25-17, 299-E25-19, 299-E25-20, 299-E25-35, 299-E25-47, and 299-E25-95 were all sampled at least semi-annually for pH, specific conductance, total organic carbon, and total organic halogen. I observed on January 7, 2021, that the pH measurement for Well 299-E25-20 (7.64 average of four samples), exceeded the lower bound critical mean for pH (7.78). I observed that Well 299-E25-20 was resampled for pH on June 11, 2021, with samples sent to two separate labs.

Note: On April 26, 2022, I received the following response from CPCCo regarding the long period of time it took to complete confirmation sampling for Well 299-E25-20:

> Well 299-E25-20 was sampled 1/7/21 and missed during the data review was a possible exceedance (low) of the critical means range for pH in this well. The 2021 pH critical means range is 7.78 to 8.69 and the overserved average value in this well was 7.64 pH units. Once the possible exceedance was identified the well was resampled (6/11/21) and the exceedance was confirmed. A groundwater quality assessment plan (DOE/RL-2021-32, R0) has been written and implemented for 216-A-31-1 Crib.

I observed pH readings were also analyzed in the field with readings averaging (7.76) below the lower bound critical mean (7.78). I observed pH readings analyzed at one off-site lab averaged 7.76, which was below the lower bound critical mean (7.78). I observed results for the second lab sample averaged 7.89 and were above the lower bound critical mean (7.76). Both of these results were flagged as exceeding the holding time. I observed on July 20, 2021, that the total organic carbon measurement for Well 299-E25-20 (8,580 µg/L average of four samples), exceeded the critical mean for total organic carbon (758 µg/L). I observed that Well 299-E25-20 was resampled for total organic carbon on September 9, 2021. I observed the samples were sent to two different labs for analysis with confirmation of the exceedance with levels above the critical mean for both labs (9,613 and 9,935 µg/L).

In DOE-RL-2021-50, Rev. 0, *Hanford Site RCRA Groundwater Monitoring Report for 2021,* dated February 23, 2022, I observed the following statement:

> The pH and TOC exceedances necessitated a groundwater quality assessment program. DOE/RL-2021-32, Interim Status Groundwater Quality Assessment Plan for the 216-A-37-1 PUREX Plant Crib, was published in July and implemented beginning in October 2021.

I observed Wells 299-E25-17, 299-E25-19, 299-E25-20, 299-E25-35, 299-E25-47 and, Well 299-E25-95 were sampled at least annually for chloride, iron, manganese, phenols, sodium, and sulfate. In accordance with Permit Attachment 8, *Inspection and Training Plan for Groundwater Monitoring Wells*, I observed that samples of well corrosion constituents of iron, chromium, nickel, molybdenum and manganese were sampled during each well monitoring event.

I reviewed the last quarter of 2021 groundwater monitoring records for the 216-A-37-1 Crib against requirements in DOE/RL-2021-32, Rev. 0, *Interim Status Groundwater Quality Assessment Plan for the 216-A-37-1 PUREX Plant Crib*, dated July 13, 2021. I observed Wells 299-E25-17, 299-E25-19, 299-E25-20, 299-E25-35, 299-E25-47, and 299-E25-95 were all sampled in the last quarter of 2021 for alkalinity, calcium, chromium, chloride, dissolved oxygen, iron, magnesium, manganese, molybdenum, nickel, nitrate, pH, phenols, potassium, specific conductance, sodium, sulfate, temperature, turbidity, total organic carbon, and total organic halogen. I observed that sampling constituents identified in Appendix 5 of Ecology Publication No. 97-407, Chemical Test Methods For Designating Dangerous Waste WAC 173-303-090 & -100, were marked as not applicable for Wells 299-E25-17, 299-E25-19, 299-E25-20, 299-E25-35, 299-E25-47, and 299-E25-95.

Note: On April 26, 2022, I received the below response to a question I asked on why dangerous waste constituents were not being sampled at the 216-A-37-1 Crib.

> The requirements of 40 CFR 265.93(d)(3) are met in DOE/RL-2021-32 as follows:
>
> (d)(3)(ii) Sampling and analytical methods for those hazardous wastes or hazardous waste constituents in the facility
>
> - The hazardous wastes or hazardous waste constituents in the facility are provided in Table 2-1, Groundwater Quality Assessment Constituents for the 216-A-37-1 Crib.
>
> - The associated sampling and analytical methods are provided in Section A.3 of Appendix A
>
> (d)(3)(iii) Evaluation procedures, including any use of previously-gathered ground-water quality information
>
> – Data evaluation for the assessment constituents in Table 2-1 is provided in Section 3.2

In looking at DOE/RL-2021-32, Rev. 0, *Interim Status Groundwater Quality Assessment Plan for the 216-A-37-1 PUREX Plant Crib*, dated July 13, 2021, I observed that Table 2-1 included requirements for sampling the dangerous waste constituents ammonia, m-Cresol (3-Methylphenol), o-Cresol (2-Methylphenol), p-Cresol (4-Methylphenol), 1,1,1-Trichloroethane, Acetone, Methylene chloride, Methyl ethyl ketone (2-Butanone), and Methyl isobutyl ketone (4-Methyl-2-pentanone). I observed in Table 2-2 that these dangerous waste constituents were required to be sampled quarterly. I observed these dangerous waste constituents were sampled in the last quarter of 2021 for all wells in the 216-A-37-1 Crib.

216-B-3 Main Pond

I reviewed 2021 groundwater monitoring records for the 216-B-3 Main Pond against requirements in 40 CFR 265.90 through 265.94, Subpart F - *Ground-Water Monitoring* as incorporated by reference and modified by WAC 173-303-400(3), per Permit Condition I.A in the Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion Revision 8C for the first half of 2021. I also compared these records with DOE/RL-2008-59, Rev 2, *Interim Status Groundwater Monitoring Plan for the 216-B-3 Pond*, dated November 2, 2020, and DOE/RL-2008-59, Rev 3, *Interim Status Groundwater Monitoring Plan for the 216-B-3 Pond*, dated January 19, 2021. In DOE-RL-2021-50, Rev. 0, *Hanford Site RCRA Groundwater Monitoring Report for 2021*, dated February 23, 2022, I observed the following statement:

> The January 2021 sampling event indicated a possible exceedance of the critical mean for specific conductance in downgradient well 699-42-42B (Table 3-6). The exceedance was confirmed in February 2021, and the unit entered into a groundwater quality assessment monitoring program in accordance with 40 CFR 265.93(d)(4) in July 2021. Groundwater monitoring at B Pond in the third and fourth quarters of 2021 was conducted under DOE/RL-2021-24, Interim Status Groundwater Quality Assessment Plan for the 216-B-3 Pond. The assessment monitoring program increased the sampling frequency to quarterly (from semiannual), added the constituents ammonia and cadmium, and continued the quarterly sampling of new wells for Ecology Publication No. 97-407 constituents, but did not affect the wells in the monitoring network.

I observed Wells 699-43-43B, 699-42-42B, 699-43-45, 699-44-39B, and 699-44-43C were all sampled at least semi-annually in the first half of 2021 for pH, specific conductance, total organic carbon, and total organic halogen and at least annually for chloride, iron, manganese, phenols, sodium, and sulfate. I observed that on January 5, 2021, the specific conductance measurement for Well 699-42-42B (310 uS/cm (micro-Siemens per centimeter) average of four samples), exceeded the critical mean for specific conductance (309 uS/cm). I observed that Well 699-42-42B was resampled for specific conductance on February 25, 2021. I observed one set of samples was conducted in the field and the other sent to a separate lab for analysis with levels below the critical mean for field measurements (306 uS/cm) and above the critical mean for the lab sample (317 uS/cm).

In accordance with Permit Attachment 8, *Inspection and Training Plan for Groundwater Monitoring Wells*, I observed that samples of well corrosion constituents of iron, chromium, nickel, molybdenum and manganese were sampled during each well monitoring event.

Wells 699-43-43C, 699-43-44B, 699-43-44C, and 699-44-42B are newly installed wells and are required to obtain initial background concentrations for values of all parameters (40 CFR 265, Appendix 3 and Chloride, Iron, Manganese, Phenols, Sodium, Sulfate, pH, Specific Conductance, Total Organic Carbon, and Total Organic Halogens) determined quarterly for one full year. I observed Wells 699-43-43B, 699-43-43C, 699-43-44B, and 699-44-42B were sampled at least quarterly for the above constituents starting in the second half of 2021. I observed that gross alpha was only measured once in the second half of 2021 in Wells 699-43-43C, 699-43-44C, and 699-43-44B and was not measured at all in Well 699-44-42B. I observed that gross beta was only measured once in the second half of 2021 in Wells 699-43-43C, 699-43-44C, 699-43-44B, and Well 699-44-42B. I observed that radium and Coliform Bacteria was not analyzed at all in Wells 699-43-43C, 699-43-44C, 699-43-44B, and Well 699-44-42B.

Note: On April 26, 2022, I received the following response from CPCCo regarding my observations on Appendix III constituents of gross beta, radium and Coliform Bacteria that were not sampled:

> The parameters referenced in 40 CFR 265.92(c)(1), and specifically parameters characterizing the suitability of the ground water as a drinking water supply as specified in Appendix III, were obtained quarterly for one year from the 216-B-3 Pond well network in 1989 and 1990. Wells 699-43-43C, 699-43-44C, 699-43-44B, and 699 44-42B were not part of the 216-B-3 Pond well network at that time.
>
> The requirements of 40 CFR 265.92(b)(1) and 40 CFR 265.92(c)(1) apply during the first year of monitoring at a facility as the purpose of monitoring for Appendix III constituents is to determine if a drinking water source is being compromised. Monitoring for Appendix III constituents when new wells are installed at facilities already vetted for drinking water concerns is not supported by the regulations nor in applicable Federal Register discussions on the groundwater rules. These statements are supported by reading 40 CFR 265.92(c)(2), which states:
>
> > "For each of the indicator parameters specified in paragraph (b)(3) of this section, at least four replicate measurements must be obtained for each sample and the initial background arithmetic mean and variance must be determined by pooling the replicate measurements for the respective parameter concentrations or values in samples obtained from upgradient wells **during the first year**." [emphasis added]
>
> And by reference to the Federal Register (FR) Vol. 45, No. 98, Monday, May 19, 1980, pgs. 33193-33194, "40 CFR Parts 264 and 265" "v. Detailed Analysis of Phase I Rules," "E. Subpart F – Ground-Water Monitoring," "3. Sampling and Analysis," where the FR states (cutout of the FR is provided below):
>
> > "The regulations require monitoring for three sets of parameters that each serve a different purpose."

> The first set reflect the aquifer's suitability as a drinking water supply. These parameters, contained in Appendix III, are those specified in the Interim Primary Drinking Water Regulations established under the Safe Drinking Water Act. Owners and operators are to test for these parameters quarterly **during the first year only** and report this information to the Regional Administrator.
>
> While the Agency is concerned about ground-water protection for a variety of purposes, use of ground water as a drinking water source is of particular concern. These interim status regulations do not establish a specific ground-water protection standard, but the Agency has decided that the Phase II regulations will, at a minimum, be designed to protect drinking water supplies. **The purpose of the initial sampling for drinking water parameters is to identify facilities that may be severely degrading present and future drinking water supplies. The fact that a particular aquifer is becoming unsuitable as a drinking water source will be useful to the Agency in establishing priorities for permits**. The Agency will focus its initial attention on facilities which appear to be having the greatest effect on an aquifer's suitability as a drinking water supply. By using contaminants from the Interim Primary Drinking Water Regulations the Agency does not mean to suggest that this specifies a complete list of the parameters that define an aquifer's potential as an acceptable drinking water supply, but these contaminants will be useful to the Agency in establishing its priorities. [emphasis added]
>
> 40 CFR 265 Appendix III monitoring has already been completed at 216-B-3. WHC-SD-EN-AP-013, 1989, Rev. 0, Interim-Status Ground-Water Monitoring Plan for the 216-8-3 Pond, Chapter 3.0, "Monitoring Parameters," states, "Ground-water samples will be analyzed for the parameters listed in Table 3.1, as required by 40 CFR 265.92, for volatile organic constituents by method #8240 (EPA 1986), for hydrazine, and for ammonia. These constituents will be analyzed quarterly for 1 year from the wells previously indicated."

I compared groundwater monitoring records for the second half of 2021, against requirements of DOE/RL-2021-24, Rev. 0, *Interim Status Groundwater Quality Assessment Plan for the 216-B-3 Pond*, dated March 30, 2021. I observed Wells 699-43-43B, 699-42-42B, 699-43-45, 699-44-39B, 699-44-43C, 699-43-43C, 699-43-44B, 699-43-44C, and 699-44-42B were sampled quarterly for alkalinity, ammonia, cadmium, calcium, chromium, chloride, dissolved oxygen, iron, magnesium, manganese, molybdenum, nickel, nitrate, pH, phenols, potassium, specific conductance, sodium, sulfate, total organic carbon, and total organic halogen. Due to the large number of constituents, I randomly selected dangerous waste constituents of 2-Picoline, Pronamide, Aldrin, Aroclor 1016, Ethylbenzene, Hexachlorodibenzofurans, and Zinc, where I observed each were sampled quarterly in the second half of 2021 in Wells 699-44-42B, 699-43-43B, 699-43-44B, 699-43-44C, and 699-43-43C.

216-B-63 Trench

I reviewed 2021 groundwater monitoring records for the 216-B-63 Trench against requirements in 40 CFR 265.90 through 265.94, Subpart F - *Ground-Water Monitoring* as incorporated by reference and modified by WAC 173-303-400(3), per Permit Condition I.A in the Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion Revision 8C. I also compared these records with DOE/RL-2008-60, Rev 1, Interim Status Groundwater Monitoring Plan for the 216-B-63 Trench, dated June 10, 2020.

I observed Wells 299-E27-16, 299-E27-18, 299-E27-19, 299-E33-33, 299-E34-8, and 299-E34-12 were all sampled at least semi-annually for pH, specific conductance, total organic carbon, and total organic halogen and at least annually for chloride, iron, manganese, phenols, sodium, and sulfate. I observed that the critical means for pH, specific conductance, total organic carbon, and total organic halogen were not exceeded during 2021 for any of the sampling results I reviewed. In accordance with Permit Attachment 8, *Inspection and Training Plan for Groundwater Monitoring Wells*, I observed that samples of well corrosion constituents of iron, chromium, nickel, molybdenum and manganese were sampled during each well monitoring event.

216-S-10 Pond and Ditch

I reviewed 2021 groundwater monitoring records for the 216-S-10 Pond and Ditch against requirements in 40 CFR 265.90 through 265.94, Subpart F - *Ground-Water Monitoring* as incorporated by reference and modified by WAC 173-303-400(3), per Permit Condition I.A in the Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion Revision 8C. I also compared these records with DOE/RL-2008-61, Rev. 1, *Interim Status Change Number 1: Interim Status Groundwater Monitoring Plan for the 216-S-10 Pond and Ditch*, dated June 11, 2020, DOE/RL-2008-61, Rev 2, *Interim Status Groundwater Monitoring Plan for the 216-S-10 Pond and Ditch*, dated February 11, 2021, and DOE/RL-2008-61, Rev 2, *Interim Status Change Number 1: Interim Status Groundwater Monitoring Plan for the 216-S-10 Pond and Ditch*, dated April 14, 2021.

I observed Wells 299-W26-13, 299-W26-14, 699-32-76, 699-33-75, and 699-33-76 were all sampled at least semi-annually for pH, specific conductance, total organic carbon, and total organic halogen and at least annually for chloride, iron, manganese, phenols, sodium, and sulfate. I observed that the critical means for pH, specific conductance, total organic carbon, and total organic halogen were not exceeded during 2021 for any of the sampling results I reviewed. In accordance with Permit Attachment 8, Inspection and Training Plan for Groundwater Monitoring Wells, I observed that samples of well corrosion constituents of chromium, iron, manganese, molybdenum, and nickel were sampled during each well monitoring event.

183-H Solar Evaporation Basins

I reviewed 2021 groundwater monitoring records for the 183-H Solar Evaporation Basins against requirements in Chapter 3.0 Groundwater Monitoring from the Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion Revision 8C.

I observed Wells 199-H4-8, 199-H4-84,199-H4-85, 199-H4-88 and 199-H4-89 were all sampled semi-annually for chromium, dissolved oxygen, nitrate, pH, specific conductance, temperature, and turbidity. I observed on September 16, 2021, that Well 199-H4-8 (61.2 µg/L) and on

October 14, 2021, Well 199-H4-89 (94.3 µg/L) exceeded the concentration limit for total chromium (48 µg/L) in Chapter 3.0 Groundwater Monitoring.

300 Area Process Trenches

I reviewed 2021 groundwater monitoring records for the 300 APT against requirements in Chapter 3.0 Groundwater Monitoring from the Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion Revision 8C.

I observed Wells 399-1-10A, 399-1-10B, 399-1-16A, 399-1-16B, 399-1-17A, 399-1-17B, 399-1-18A, and 399-1-18B were all sampled at least semi-annually for cis-1,2-DCE, Trichloro-ethene (TCE), pH, specific conductance, temperature, and turbidity. I observed the concentration limits of cis-1,2-DCE (16 µg/L) and TCE (4 µg/L) at the 300 Area Process Trenches was not exceeded in any of the groundwater monitoring records I reviewed.

Nonradioactive Dangerous Waste Landfill

I reviewed 2021 groundwater monitoring records for the NRDWL against requirements in DOE/RL-2020-57, Rev. 0, *Groundwater Quality Assessment Plan for the Nonradioactive Dangerous Waste Landfill*, dated November 30, 2020. I observed Wells 699-25-34B, 699-25-34D, 699-25-34F, 699-26-33A, 699-26-34A, 699-26-34B, 699-26-35A, and 699-26-38 were sampled quarterly for alkalinity, calcium, chromium, chloride, dissolved oxygen, iron, magnesium, manganese, molybdenum, nickel, nitrate, pH, potassium, sodium, specific conductance, sulfate, temperature, total organic carbon, total organic halogen, and turbidity.

Due to the thousands of sample constituents taken in 2021, I randomly selected a subset of phenols and dangerous waste constituents to verify quarterly sampling. I observed Wells 699-25-34B, 699-25-34D, 699-25-34F, 699-26-33A, 699-26-34A, 699-26-34B, 699-26-35A, and 699-26-38 were sampled quarterly for 1,2-Dibromoethane, 2,4-Dinitrophenol, Aroclor 1254, copper, diallate, diphenylamine, ethylbenzene, famphur, n-nitrosodi-n-butylamine, pentachlorophenol, and tetrachlordibenzofuran.

In accordance with Permit Attachment 8, *Inspection and Training Plan for Groundwater Monitoring Wells*, I observed that samples of well corrosion constituents of chromium, iron, manganese, molybdenum, and nickel were sampled during each well monitoring event.

Low-Level Burial Grounds – Green Islands – Waste Management Area 4

I reviewed 2021 groundwater monitoring records for the LLBG – Green Islands WMA-4 against requirements in 40 CFR 265.90 through 265.94, Subpart F - *Ground-Water Monitoring* as incorporated by reference and modified by WAC 173-303-400(3), per Permit Condition I.A in the Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion Revision 8C. I also compared these records with DOE/RL-2009-69, Rev. 2, *Interim Status Change Number 1: Interim Status Groundwater Monitoring Plan for the LLBG WMA-4*, dated June 10, 2020.

I observed Wells 299-W15-17, 299-W15-30, 299-W15-83, 299-W15-94, 299-W15-152, 299-W15-224, 299-W18-21, and 299-W18-22 were all sampled at least semi-annually for pH, specific conductance, total organic carbon, and total organic halogen and at least annually for chloride, iron, manganese, phenols, sodium, and sulfate. I observed that the critical mean for total organic carbon (1,640 µg/L) was exceeded in down-gradient Wells 299-W15-152 (2,348

µg/L average), 299-W15-17 (2,925 µg/L average), 299-W15-224 (2,925 µg/L average), 299-W15-30 (5,910 µg/L average), 299-W15-83 (3,450 µg/L average), and 299-W15-94 (3,288 µg/L average) on January 18, 2021. I observed on March 18, 2021, that down-gradient Wells 299-W15-152, 299-W15-17, 299-W15-30, 299-W15-83, and 299-W15-94 were resampled for total organic carbon and sent to two separate labs with both results being below the critical mean. I observed on March 18, 2021, that Well 299-W15-224 was resampled for total organic carbon and sent to two separate labs with one result being above the critical mean (1,650 µg/L) and the other result below the critical mean (1,082 µg/L). I observed the high total organic carbon readings flagged with a "Y" review flag.

In DOE-RL-2021-50, Rev. 0, *Hanford Site RCRA Groundwater Monitoring Report for 2021*, dated February 23, 2022, I observed the following statement:

> Confirmation split samples to verify the exceedance, collected in March 2021, returned irregular and inconclusive TOC results. A second confirmation sampling event, conducted in July 2021, returned TOC results below the critical mean value (1,640 µg/L) (Table 2-27).

Note: On April 26, 2022, I received the following in part from CPCCo:

> During the January 18, 2021, RCRA semi-annual sampling event at LLBG WMA-4, one upgradient and 6 downgradient wells exceeded the critical mean for TOC (1640 ug/L), with a maximum result of 16,400ug/L at 299-W15-30 (downgradient). Verification sampling, conducted on March 18, 2021, resulted in anomalous results. A blank sample study for TOC was conducted on May 19; samples shipped to the lab on May 20, 2021.
>
> The TOC study data package was received on June 16, 2021, reporting all TOC values as non-detect. Project chemist (Scot Fitzgerald) recommends submitting an RDR and flagging the errant results from both semi-annual and verification samples with "Y" flag (suspect).
>
> Per Field Sampling Operations (Kyle Stiles) and Sample Management & Reporting (Kelly Whitley), LLBG WMA-4 cannot be sampled twice within a month; some network wells are located within the ERDF container transfer area from the PFP demolition. Additionally, access to wells is restricted to Fridays that PFP demolition is not in operation. Discussions with Bill Faught, Heather Sulloway, Kyle Stiles, and Kelly Whitely, on June 15, 2021, concluded another verification sample at all LLBG WMA-4 network wells would be collected in July, during the second semi-annual sampling event. Groundwater sampling for WMA-4 in June 2021 was performed per RCRA-CN-01-DOE/RL-2009-69-R2.
>
> Second verification sampling, conducted on July 2 and July 6, 2021, returned TOC results below the critical mean value.

In accordance with Permit Attachment 8, *Inspection and Training Plan for Groundwater Monitoring Wells*, I observed that samples of well corrosion constituents of chromium, iron, manganese, molybdenum, and nickel were sampled during each well monitoring event.

Compliance Problems

The Dangerous Waste inspection on February 15, 2021, found the following compliance problems.

Each problem is covered in three parts:
(1) **Citation from the regulations**
(2) **Specific observations** from the inspection that highlight the problem
(3) **Required actions** needed to fix the problem and achieve compliance

The problems listed below must be corrected to comply with Washington Dangerous Waste Regulations (Chapter 173-303 WAC), or other environmental laws or regulations. Complete the required actions listed below and respond to Ecology at the following address within the times specified below. Include all supporting documentation such as photographs, records, and statements explaining the actions taken and dates completed to return to compliance.

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

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

If you have any questions about information in this Compliance Report, please call: Jared Mathey at (360) 481-9830

This does not relieve you of your continuing responsibility to comply with the regulations at all times.

Index No 22.757 - 216-A-37-1 Crib

1) **WAC 173-303-400(3), as referenced by the Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion Revision 8C - Condition I.A Effect of Permit.**

   40 CFR 265.93(c)(2) If the comparisons for downgradient wells made under paragraph (b) of this section show a significant increase (or pH decrease), the owner or operator must then immediately obtain additional ground-water samples from those downgradient wells where a significant difference was detected, split the

samples in two, and obtain analyses of all additional samples to determine whether the significant difference was a result of laboratory error.

Observations: I observed on January 7, 2021, that the pH measurement for down-gradient Well 299-E25-20 (7.64 average of four samples), exceeded the lower bound critical mean for pH (7.78). I observed it was over five months later (June 11, 2021) when Well 299-E25-20 was resampled for pH and sent to two different labs for analysis.

On April 26, 2022, I received the following response from CPCCo regarding the long period of time it took to complete confirmation sampling for Well 299-E25-20:

> Well 299-E25-20 was sampled 1/7/21 and missed during the data review was a possible exceedance (low) of the critical means range for pH in this well. The 2021 pH critical means range is 7.78 to 8.69 and the overserved average value in this well was 7.64 pH units. Once the possible exceedance was identified the well was resampled (6/11/21) and the exceedance was confirmed. A groundwater quality assessment plan (DOE/RL-2021-32, R0) has been written and implemented for 216-A-31-1 Crib.

Action Required: When comparisons for downgradient wells show a significant increase (or pH decrease) against critical means, USDOE and CPCCo must immediately obtain additional groundwater samples from those downgradient wells where a significant difference was detected, split the samples in two, and obtain analyses of all additional samples to determine whether the significant difference was a result of laboratory error. **No further action required**, confirmation sampling occurred on June 11, 2021.

Concerns

Index No 22.765 - Low-Level Burial Grounds (LLBG) - Green Islands – WMA - 4

1) I observed the critical mean for total organic carbon (1,640 µg/L) was exceeded in down-gradient Wells 299-W15-152, 299-W15-17, 299-W15-224, 299-W15-30, 299-W15-83, and 299-W15-94 on January 18, 2021. I observed on March 18, 2021, that down-gradient Wells 299-W15-152, 299-W15-17, 299-W15-30, 299-W15-83, and 299-W15-94 were resampled for total organic carbon and sent to two separate labs with both results being below the critical mean. I observed on March 18, 2021, that Well 299-W15-224 was resampled for total organic carbon and sent to two separate labs with one result being above the critical mean (1,650 µg/L) and the other result below the critical mean (1,082 µg/L). I observed the high total organic carbon readings flagged with a "Y" review flag.

   In DOE-RL-2021-50, Rev. 0, *Hanford Site RCRA Groundwater Monitoring Report for 2021*, dated February 23, 2022, I observed the following statement:

   > Confirmation split samples to verify the exceedance, collected in March 2021, returned irregular and inconclusive TOC results. A second confirmation sampling event, conducted in July 2021, returned TOC results below the critical mean value (1,640 µg/L) (Table 2-27).

   I observed that samples for total organic carbon taken on July 2, 2021, were sent to two separate labs and came back below the critical mean value.

   On April 26, 2021, I received the following in part from CPCCo:

   > During the January 18, 2021, RCRA semi-annual sampling event at LLBG WMA-4, one upgradient and 6 downgradient wells exceeded the critical mean for TOC (1640 ug/L), with a maximum result of 16,400ug/L at 299-W15-30 (downgradient). Verification sampling, conducted on March 18, 2021, resulted in anomalous results. A blank sample study for TOC was conducted on May 19; samples shipped to the lab on May 20, 2021.
   >
   > The TOC study data package was received on June 16, 2021, reporting all TOC values as non-detect. Project chemist (Scot Fitzgerald) recommends submitting an RDR and flagging the errant results from both semi-annual and verification samples with "Y" flag (suspect).
   >
   > Per Field Sampling Operations (Kyle Stiles) and Sample Management & Reporting (Kelly Whitley), LLBG WMA-4 cannot be sampled twice within a month; some network wells are located within the ERDF container transfer area from the PFP demolition. Additionally, access to wells is restricted to Fridays that PFP demolition is not in operation. Discussions with Bill Faught, Heather Sulloway, Kyle Stiles, and Kelly Whitely, on June 15, 2021, concluded another verification sample at all LLBG WMA-4 network wells would be collected in July, during the

second semi-annual sampling event. Groundwater sampling for WMA-4 in June 2021 was performed per RCRA-CN-01-DOE/RL-2009-69-R2.

Second verification sampling, conducted on July 2 and July 6, 2021, returned TOC results below the critical mean value.

If samples were inconclusive from the March 18, 2021, sampling event, instead of waiting nearly four months to resample, USDOE and CPCCo immediately should have obtained additional groundwater samples from these downgradient wells where a significant difference was detected. Additionally, confirmation sampling and regularly scheduled semi-annual sampling should be done in separate sampling events and not combined. Doing both confirmation and semi-annual sampling together appears not the best practice and could be interpreted as a non-compliance.

Index No 22.756 - 216-A-29 Ditch

2) On April 26, 2022, I received the following response from CPCCo regarding why down-gradient Well 299-E25-239 was not resampled for total organic carbon after the exceedance on July 20, 2021.

As described in Section 1.1 of the Hanford Site RCRA Groundwater Monitoring Report for 2021 (DOE/RL-2021-50, Rev. 0), in cases where the calculated critical mean (CM) of indicator parameters is below the limit of quantitation (LOQ), RCRA groundwater monitoring sampling results from down-gradient wells are compared to the LOQ. In 2021, the LOQ for total organic carbon (TOC) was the laboratory's required detection limit of 1,000 µg/L.

For 216-A-29, the calculated CM for TOC in 2021 was 604 µg/L (Table 10 in ECF-HANFORD-21-0011, Calculation of Critical Means for Calendar Year 2021 RCRA Groundwater Monitoring, Rev. 0) which is below the LOQ of 1,000 µg/L. Therefore, the LOQ of 1,000 µg/L was used to determine if an exceedance had occurred.

In the July sampling of well 299-E25-239, the TOC result of 888 µg/L is less than the LOQ of 1,000 µg/L, therefore resampling of the well was not performed.

I observed in ECF-HANFORD-21-0011, Revision 0, *Calculation of Critical Means for Calendar Year 2021 RCRA Groundwater Monitoring for the 216-A-29 Ditch*, that there is no mention of the LOQ footnoted for total organic carbon. I did observe mention of LOQs for other constituents in separate dangerous waste management units, such as the 216-B-3 Main Pond in this document. If critical means are below the LOQ, then this needs to be clearly specified in Calculation of Critical Means document, so it is apparent when confirmation sampling needs to occur or not. Otherwise, when groundwater scientists and compliance inspectors review records, it may appear that confirmation sampling should have been required when it may not be.