# RCRA Comprehensive Ground Water Monitoring Evaluation (CME) Inspection
# Texaco Research Center
# EPA ID No. NYD091894899
# NYSDEC Site No. 3-14-004
# Town of Fishkill, Dutchess County
# October 2023

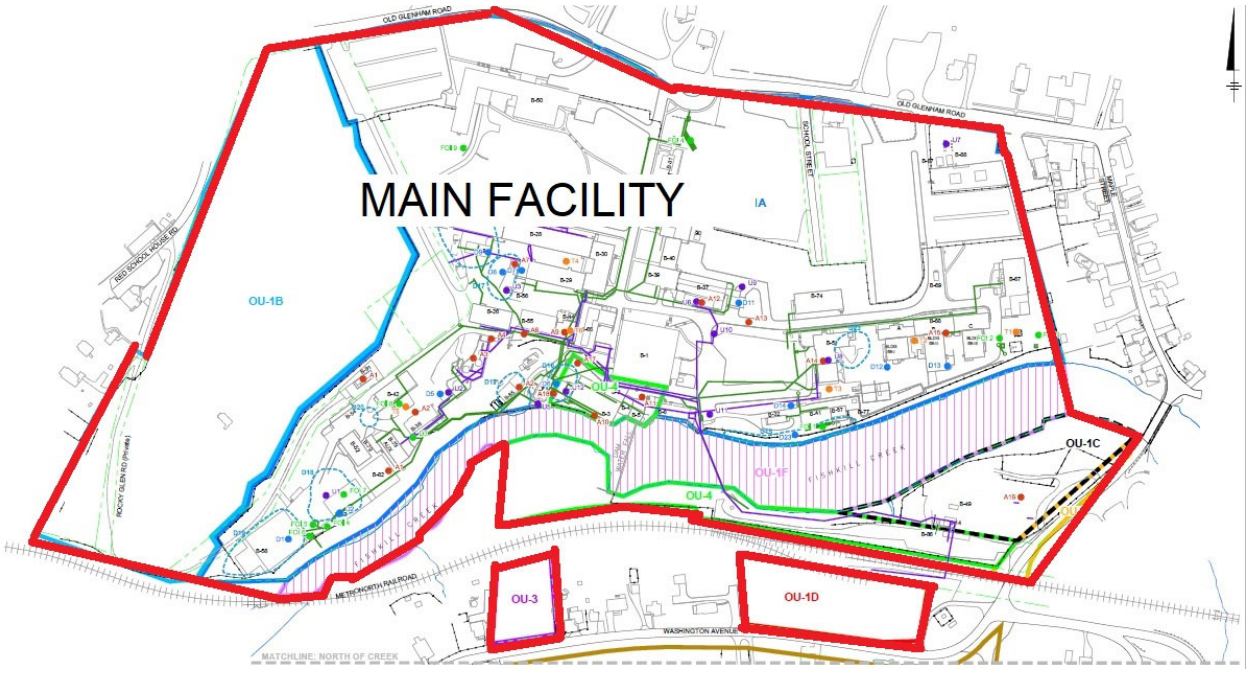
## Introduction

On October 25-27, 2023, Greta White of the New York State Department of Environmental Conservation (NYSDEC) performed a Comprehensive Ground Water Monitoring Evaluation (CME) of the groundwater monitoring program at the Texaco Research Center (site) in Beacon, New York (USEPA ID No. NYD091894899, NYSDEC site No. 314004). The facility is an inactive hazardous waste disposal site due to former disposal of facility and laboratory wastes. The site was classified as a Class 2 hazardous waste site under the initial NYSDEC Part 373 Hazardous Waste Management Permit until the permit expired on March 29, 1996. The site was reclassified as a Class 4 site in 1996 under a New York State Administrative Procedures Act extension and monitoring activities have been ongoing as part of Class 4 requirements. The most recent Part 373 permit is dated September 2010. The owner of the site, Chevron USA, Inc., signed administrative Consent Order (CO) 03-1112-08-12 with NYSDEC on October 31, 2013. The groundwater monitoring system was inspected to ensure continued compliance with the applicable permits, regulations and guidance.

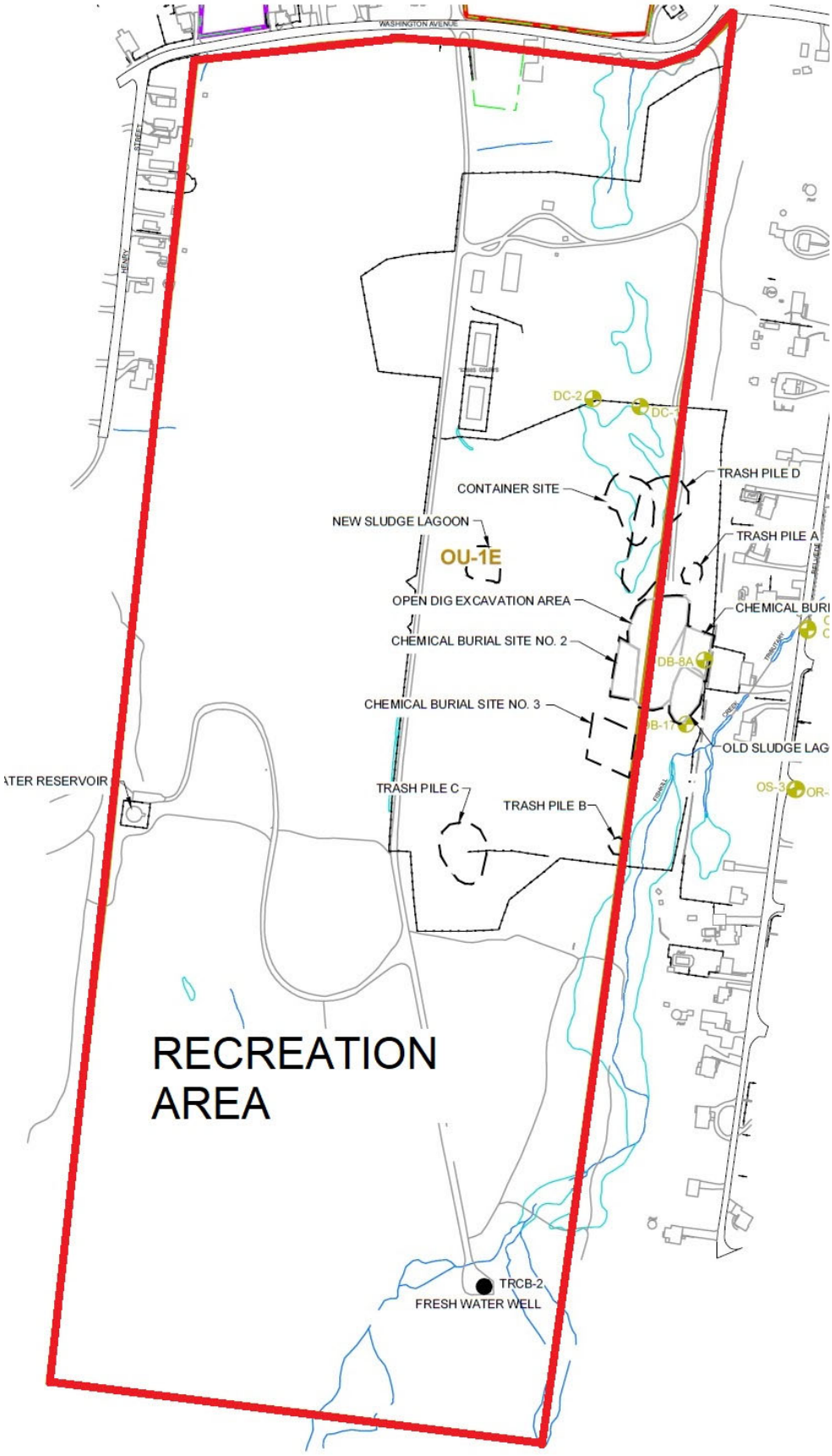
## Background

The approximately 153-acre site has two main areas, the Main Facility, and the Recreation Area. The Main Facility is bounded to the south by Fishkill Creek, to the north by Old Glenham Road, to the west by the Metro-North Railroad line and the Former Church Property, and to the east by private property including parking, residential housing and businesses. The Recreation Area (Rec Area) is south of the Creek and consists of an approximately 90-acre parcel. A former tank farm is also present to the south of the Fishkill Creek.

The Main Facility was historically utilized as a non-production, non-transportation laboratory complex engaged in research, development, and technical services related to petroleum products and energy. It contained parking areas, offices and laboratory buildings, above ground storage tanks (ASTs), underground storage tanks (USTs), roads, a wastewater treatment plant (WWTP), and storage areas. Petroleum, coal products, chemicals that were tested as potential additives, and solvents were used at the Main Facility in connection with research operations.

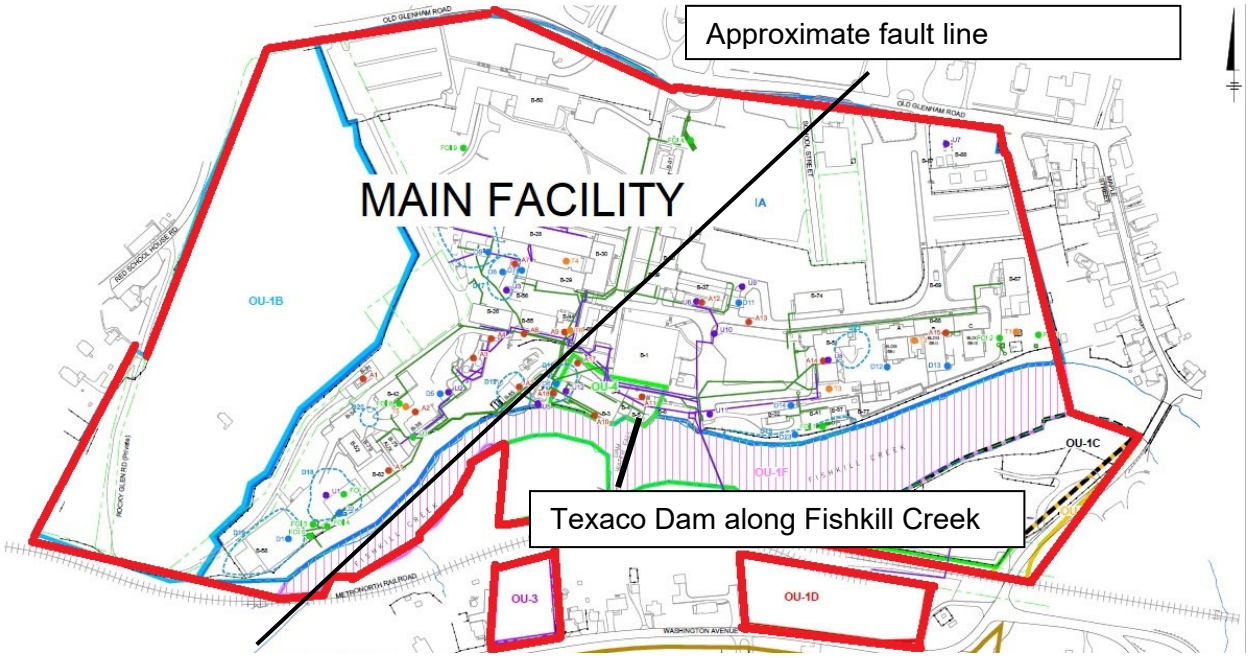



The Recreation Area is an undeveloped property located south of Washington Avenue and Fishkill Creek. Areas of interest consisted of an “old” sludge lagoon and a “new” sludge lagoon (the two sludge lagoons are separate locations approximately 550 feet apart), three chemical burial sites, a disposal pit, and a container disposal site. Additionally, four areas were identified that were referred to as Trash Piles “A” through “D”. These four separate areas were used for the disposal of non-hazardous materials during the history of the facility. Materials disposed of in these locations primarily consisted of wood and metal debris, grass clippings, old empty drums, and general trash. Initial remediation began in 1985 and lasted through 1986 to remove trash from Trash Piles “A” and “B” and to excavate the container disposal site, three chemical burial sites, old sludge lagoon, and disposal pit. Initial remediation also identified an area between several of these locations that required remediation, and this area was excavated under the identification ‘open dig area.’ Approximately 26,300 tons of material had been removed as part of these remedial actions. Closure of the ‘new’ sludge lagoon was completed in 1986 following excavation. Additional excavation pits were dug in the Trash Pile “C” area to address aesthetic concerns by removing visible trash in 2000. Interim Corrective Measures (ICMs) were performed between November 2005 and April 2006 to excavate and remove impacts from a hotspot at “Trash Pile “D” near the former Open Dig Area identified in 2001, as well as surface soils from Chemical Burial Sites 1 and 3. In total an estimated 4,900 cubic yards or 10,600 tons were excavated to address volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) (polycyclic aromatic hydrocarbons [PAHs]) exceedances of NYSDEC recommended soil cleanup objectives (SCOs) . A “No Further Action” (NFA) determination was made by NYSDEC in 2006 for these interim corrective measures. The property formerly included four structures (a washroom, storage shed, tennis court, and picnic shelter). Structures were removed during the sitewide building demolition project that took place in 2011 through 2012. Currently no structures exist except for remnants of the tennis court, a pump house that houses an inactive potable well system, and an associated concrete reservoir.


WASHINGTON AVENUE
DC-2
CONTAINER SITE
TRASH PILE D
NEW SLUDGE LAGOON
OU-1E
TRASH PILE A
OPEN DIG EXCAVATION AREA
CHEMICAL BURIAL SITE NO. 2
DB-8A
CHEMICAL BURIAL SITE NO. 3
OLD SLUDGE LAG
TRASH PILE C
TRASH PILE B
RECREATION AREA
TRCB-2
FRESH WATER WELL

**Geology & Hydrogeology**

Overburden deposits consist of fill, sand, silt, clay, gravel, and till. Fill covers much of the Main Facility ranging up to 15 feet thick and typically is comprised of sand and silt and often contains building debris, asphalt, coal fragments, cinders, and/or ask. The till at the site consists of an unsorted mixture of sand, gravel, cobbles, and boulders in a matrix of fine sand, silt, and clay. Till generally directly overlies the bedrock beneath the site. Till is not encountered at all areas of the site and is more than 20 feet thick in areas. Depth to bedrock ranges across the site, from outcrops in the northwest of the Main Facility and to greater than 50 feet below grade south of the creek. The granitic gneiss and dolostone bedrock is separated by a fault which transects the Main Facility; the granitic gneiss bedrock encountered in the northwest portion of the Main Facility and dolostone encountered in the southeast portion and in the Recreation Area.




Fishkill Creek is the dominant surface water body in the vicinity of the site. Water level of the creek is controlled by several dams, the Texaco Dam being located on-site near Building 5 (Main Facility). The Fishkill Creek joins the Hudson River approximately five miles downstream of the site. Although the creek bifurcates the site, most of the Main Facility and Recreation Area are located outside of the 100-year floodplain. However, the lower portion of the Main Facility, near the wastewater treatment plant and portions of the tank farm, is located within the 100-year floodplain.

There exists both overburden and bedrock groundwater aquifers on-site accept in areas where bedrock crops out at or very close to the surface. Groundwater flow in the overburden is predominantly toward Fishkill Creek. On the Main Facility, there is a generally strong downward hydraulic gradient except very near the creek where there is a slight upward gradient, suggesting limited hydraulic connectivity between the overburden and bedrock aquifers. While the till restricts movement of groundwater it does not prevent it considering certain regions of bedrock groundwater (namely in the dolostone) have been impacted by releases to the overburden, demonstrating that the overburden does not serve as a barrier to contaminant migration in these areas. In the area near the Texaco Dam, Fishkill Creek loses water to the overburden as it then moves around the dam discharging to the creek below the dam, a

common occurrence near dams. The overburden aquifer in the Recreation Area generally follows the topography, moving from areas of higher elevation in the east and west toward a small valley where former disposal activities occurred. There is a groundwater divide in the valley that aligns with the topographic divide. Groundwater north of the divide moves northward toward Fishkill Creek, while groundwater south of the divide moves south-southeast toward an unnamed tributary to Fishkill Creek.

Groundwater in the granitic gneiss has low hydraulic conductivity and slopes toward the fault and, where the fault underlies Fishkill Creek, toward the creek itself. The horizontal hydraulic gradient in the granitic gneiss is relatively steep, and then steepens dramatically as the fault and river are approached. Fractures in this rock are poorly integrated, therefore migration pathways are sporadic. The steep hydraulic gradient in the granitic gneiss along the fault and its abrupt change in slope in the dolostone suggest that either the fault is highly transmissive and acting as a preferential pathway for groundwater flow, or that the bulk hydraulic conductivity of the dolostone is much higher than that of the granitic gneiss and can easily accommodate any seepage of groundwater from the granitic gneiss across the fault (or both). It is difficult to anticipate the effect of faults on groundwater movement. Some faults are transmissive while others are filled with gouge and clay weathered from the rock and are effectively impermeable. The dolostone is a karst aquifer; therefore, estimating the direction of groundwater movement is challenging. It is reasonable to infer groundwater flow in the dolostone is toward the southwest, hydraulically down strike and that it is constrained by the fault. A downward hydraulic gradient is inferred across most of the dolostone, save near and beneath the creek. All groundwater on-site ultimately discharges to the Fishkill Creek.

**Inspection**

On October 25-27, 2023, a CME of the groundwater monitoring program at the site was performed. The inspection included review of well maintenance and sampling procedures, as well as a site inspection and groundwater sampling oversight. Prior to the inspection, staff reviewed facility records, including operational records, the CO, Site Management Plan, and RCRA Permit Closure Plan.

The following tasks were completed:

- A meeting with Edward Meyer of Arcadis of New York, Inc. (Arcadis) to discuss facility operations and activities, modifications to plans/programs and electronic submissions of reports and data.
- A review of facility records with respect to groundwater monitoring operations and maintenance.
- A site tour to review monitoring well conditions and site activities, including oversight of groundwater sample collection. While hazardous waste activities are in post-closure status, remedial investigation of the site under CO 03-1112-08-12 is still on-going.

**Findings**

Facility monitoring wells are in good condition and are maintained and operated appropriately. All wells were clearly marked, identified, and locked. Surface seals were in good condition. Well materials, locations and depths are appropriate. Exceptions to this are listed on the attached Monitoring Well Inspection Form. Photographs of select wells are presented in the attached Photolog.

**Groundwater Sampling**

The following 10 monitoring wells are sampled semi-annually in April and October as part of RCRA closure monitoring:

- Monitoring wells located in the Recreation Area:
  - DC-1
  - DC-2
  - DB-8A
  - DB-17
- Monitoring wells located along Belvedere Road (off-site):
  - OR-2
  - OR-3
  - OS-2
  - OS-3
- Monitoring wells located at the former Washington Avenue Tank Farm:
  - TF-5
  - TF-23

An Operations and Monitoring Checklist is attached, herein. All monitoring is performed in accordance with the RCRA Permit Closure Plan and industry standards. Groundwater samples are analyzed for volatile organic compounds (VOCs) via USEPA Method 8260, semi-volatile organic compounds (SVOCs) via USEPA Method 8270, and dissolved lead via USEPA Method 6020. The results are presented to NYSDEC in an annual Order on Consent Groundwater Monitoring Report.

The following compounds are typically identified in select monitoring wells above NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Class GA Groundwater Standards: trichloroethylene (TCE), benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, 1,4-dioxane, and 4-methylphenol. Although these compounds are present in excess of groundwater standards, the distribution and concentrations of these compounds have decreased and/or remain consistent over time. Analytical trends for these monitoring wells from the 2022 Order on Consent Groundwater Monitoring Report are attached.

**Conclusion**

The RCRA groundwater monitoring program continues to be performed as planned. Review of analytical results of groundwater samples indicate an overall reduction of contaminant concentrations consistent with the goals of the RCRA Permit Closure Plan. The conclusion after review of the groundwater monitoring program is that the program is appropriate to monitor groundwater at the facility. The next CME will be performed in 2032.

# MONITORING WELL INSPECTION FORM

| Location & Well ID | Type (monitoring, compliance, micro-well, etc) | Active/ Inactive | Labeled Yes/No | Maintained Yes/No | Protected & Secured Yes/No | Sealed with Cement to Prevent Infiltration? Yes/No | Cement Apron Present? Yes/No | Last year sampled | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **OU-1A (Main Facility)** | | | | | | | | | |
| ITMW-2 | Bedrock Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | Missing 2 bolts |
| ITMW-3 | Bedrock Monitoring Well | Active | Yes | No | No | Yes | Yes | | missing 1 bolt/bolt holder broken; missing lock |
| ITMW-4 | Bedrock Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | missing 2 of 2 bolts; flushmount in grass is hard to locate |
| ITMW-5 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| ITMW-6 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| ITMW-7 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| ITMW-8 | Bedrock Monitoring Well | Active | Yes | No | No | Yes | Yes | | missing 2 of 2 bolts; needs new shallow j-plug |
| ITMW-26 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| ITMW-27 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SB35-4R | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-1 | Bedrock Monitoring Well | | | | | | | | unable to locate |
| SWMW-10 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | along fault; flushmount |
| SWMW-12 | Bedrock Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | missing 3 of 3 bolts; flushmount filled w/sediment, cleaned out |
| SWMW-13 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-14 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-15 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-16 | Bedrock Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | flushmount; missing star key for central bolt |
| SWMW-17 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-23 | Overburden Monitoring Well | | | | | | | | along fault; much rubble in the area, unable to locate |
| SWMW-24 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-25 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | along fault; flushmount filled with sediment, cleaned out |
| SWMW-26 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | along fault; flushmount |
| SWMW-39 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-40 | Bedrock Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | needs 3 bolts, one is broken off in hole, seal is good |
| SWMW-41 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-43 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-44 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | along fault; flushmount |
| SWMW-48 | Bedrock Monitoring Well | | | | | | | | unable to locate |
| SWMW-56 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-58 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-62 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-66 | Bedrock Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | missing 1 of 3 bolts, 2 existing are stripped |
| SWMW-67 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-68 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-69 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |
| SWMW-70 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |
| SWMW-103 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount; slug infestation cleaned out |
| SWMW-104 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-105 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-106 | Bedrock Monitoring Well | Active | Yes | No | No | Yes | Yes | | stickup needs lock |
| SWMW-107 | | Active | Yes | Yes | Yes | Yes | Yes | | |

# MONITORING WELL INSPECTION FORM

| Location & Well ID | Type (monitoring, compliance, micro-well, etc) | Active/ Inactive | Labeled Yes/No | Maintained Yes/No | Protected & Secured Yes/No | Sealed with Cement to Prevent Infiltration? Yes/No | Cement Apron Present? Yes/No | Last year sampled | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **OU-1A (Main Facility) - Con't** | | | | | | | | | |
| SWMW-108 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |
| SWMW-109 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |
| SWMW-110 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-111 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-112 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount; some plant growth within pushing up dirt |
| SWMW-113 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-117 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-119 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |
| SWMW-122 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |
| SWMW-126 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| **OU-1A (Main Facility - Bldg 36/58/83)** | | | | | | | | | |
| BR-2 | Bedrock Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | missing 1 of 3 bolts |
| GT-1 | Bedrock Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | flushmount; missing 1 of 2 bolts |
| GT-2 | Overburden Monitoring Well | | | | | | | | unable to locate - under equipment |
| ITMW-10 | Overburden Monitoring Well | | | | | | | | not on map? Did not encounter |
| ITMW-12 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| ITMW-13 | Bedrock Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | flushmount; needs a manhole cover |
| ITMW-14 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| ITMW-20 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| ITMW-21 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| ITMW-22 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| ITMW-29 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| ITMW-30 | Bedrock Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | missing 1 of 3 bolts |
| ITMW-31 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-2 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-3 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |
| SWMW-4 | Bedrock Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | flushmount; broken lid; located in front of loading doc |
| SWMW-5 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-6 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | surrounded by poison ivy |
| SWMW-7 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |
| SWMW-42 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |
| SWMW-45 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-46 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |
| SWMW-47 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-49 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |
| SWMW-51 | Bedrock Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | flushmount; cover broken |
| SWMW-52 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |
| SWMW-54 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount; buried in dirt, cleaned out |
| SWMW-55 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-59 | Overburden Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | flushmount; missing 1 of 3 bolts |
| SWMW-114 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |
| SWMW-115 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-116 | Bedrock Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | flushmount; missing star key for central bolt |
| SWMW-123 | Bedrock Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | flushmount; missing 1 of 3 bolts |
| SWMW-125 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |

# MONITORING WELL INSPECTION FORM

| Location & Well ID | Type (monitoring, compliance, micro-well, etc) | Active/ Inactive | Labeled Yes/No | Maintained Yes/No | Protected & Secured Yes/No | Sealed with Cement to Prevent Infiltration? Yes/No | Cement Apron Present? Yes/No | Last year sampled | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **OU-1A (Main Facility - Bldg 36/58/83) - Con't** | | | | | | | | | |
| SWMW-135 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |
| SWMW-136 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |
| SWMW-137 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-138 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |
| Unknown Well 1 | Overburden Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | in building; cannot open due to corrosion |
| Unknown Well 2 | Overburden Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | in building; cannot open due to corrosion |
| Unknown Well 3 | Overburden Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | in building; cannot open due to corrosion |
| **OU-1A (Main Facility - Bldg 45/55)** | | | | | | | | | |
| ITMW-9 | Bedrock Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | missing 1 bolt |
| ITMW-11 | Bedrock Monitoring Well | | | | | | | | unable to locate; surrounded by poison ivy |
| ITMW-23 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (south of building B-78) |
| ITMW-24 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| ITMW-25 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| ITMW-28 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-8 | Overburden Monitoring Well | Inactive | | | | | | | questionable abandonment, filled with bentonite |
| SWMW-9 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-27 | Bedrock Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | flushmount; filled with dirt, cleaned out; missing 3 bolts |
| SWMW-28 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-57 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-64 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-65 | Overburden Monitoring Well | Active | Yes | No | Yes | Yes | Yes | | flushmount; filled with dirt, cleaned out; needs new cover |
| SWMW-124 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | flushmount |
| SWMW-139 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |
| SWMW-140 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | stickup |
| **OU-1C (Former Washington Avenue Tank Farm)** | | | | | | | | | |
| SWMW-18 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (well replaces TF-24) |
| SWMW-19 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (well replaces TF-25); 4" well; low hanging branches over well |
| SWMW-20 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | locked |
| SWMW-21 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | odorous upon opening; sock in well |
| SWMW-22 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (well replaces TF-14) |
| SWMW-29 | Overburden Monitoring Well | Active | Yes | Yes | Yes | No | Yes | | (replaces TF-9 & -9A); concrete pad cracked; spray painted red |
| SWMW-30 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (well replaces TF-18); locked |
| SWMW-31 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (well replaces TF-27); 4" well |
| SWMW-32 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (well replaces TF-7); tree branches hanging low over well |
| SWMW-33 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (well replaces TF-28); 4" well |
| SWMW-34 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (well replaces TF-29); 4" well |
| SWMW-35 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (well replaces TF-8) |
| SWMW-36 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (well replaces TF-30); 4" well |
| SWMW-37 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (well replaces TF-10) |
| SWMW-38 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-50 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (well replaces TFSB-4); locked |
| SWMW-53 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (well replaces TF-16); 4" well |
| SWMW-60 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-61 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |

# MONITORING WELL INSPECTION FORM

| Location & Well ID | Type (monitoring, compliance, micro-well, etc) | Active/ Inactive | Labeled Yes/No | Maintained Yes/No | Protected & Secured Yes/No | Sealed with Cement to Prevent Infiltration? Yes/No | Cement Apron Present? Yes/No | Last year sampled | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **OU-1C (Former Washington Avenue Tank Farm) - Con't** | | | | | | | | | |
| SWMW-71 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (well replaces TF-22) |
| SWMW-73 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (replacement well for ITMW-19) |
| SWMW-73/ ITMW-19 (installed in 2000) | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-74 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (replacement well for ITMW-18) |
| SWMW-74/ ITMW-18 (installed in 2000) | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (installed in 2000) |
| TF-5 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| TF-6 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | water in outer casing, below well level |
| TF-15 | Overburden Monitoring Well | Active | No | Yes | Yes | Yes | Yes | | needs to be labeled; 4" well |
| TF-23 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | 2 1" diameter Schedule 80 PVC SVI wells next to it |
| TF-26 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| **OU-1D (Residential Property)** | | | | | | | | | |
| SWMW-63 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (S of RR Tracks) |
| SWMW-128 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | S. of RR Track, near OU-1D |
| SWMW-129 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (S of RR Tracks) |
| **OU-1E (Back 93)** | | | | | | | | | |
| DB-8A | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | well is dry; typically dry; SVI well adjacent |
| DB-17 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | slow groundwater production |
| DC-1 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | in wetland area; constant sedimentation |
| DC-2 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| OR-2 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| OR-3 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | had to locate with metal detector |
| OS-2 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| OS-3 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | lock was replaced |
| SWMW-130 (D) | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (NE Part of Site) |
| SWMW-130 (S) | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (NE Part of Site) |
| SWMW-131 | Bedrock Monitoring Well | | | | | | | | (NE Part of Site) unable to access (no agreement in place) |
| SWMW-132 (D) | Bedrock Monitoring Well | | | | | | | | (NE Part of Site) unable to access (no agreement in place) |
| SWMW-132 (S) | Bedrock Monitoring Well | | | | | | | | (NE Part of Site) unable to access (no agreement in place) |
| **OU-4 (Hydroelectric Facility & Dam)** | | | | | | | | | |
| SB35-1R | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (N of Creek); flushmount |
| SB35-3R | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (N of Creek) |
| SWMW-11 | Bedrock Monitoring Well | Active | Yes | No | No | Yes | Yes | | missing 3 of 3 bolts; flushmount filled w/sediment, cleaned out; no lock; needs to be cut down and re-surveyed |
| SWMW-72 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (S of Creek) |
| SWMW-101 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (S of Creek) |
| SWMW-102 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (S of Creek) |
| SWMW-118 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | |
| SWMW-120 (1) | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (S of Creek); stickup, open borehole |
| SWMW-121 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (S of Creek); stickup |
| SWMW-127 | Overburden Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (S of Creek) |
| SWMW-133 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (S of Creek); behind gate; homeless hut near it |
| SWMW-134 | Bedrock Monitoring Well | Active | Yes | Yes | Yes | Yes | Yes | | (S of Creek); stickup |

# Photolog

1. Decontamination of interface meter at OS-2.


2. Accessing DB-8A for sounding of well.

# Photolog


3. Groundwater sampling setup at OS-2.

4. OS-3/OR-3. Recent paving buried OR-3. Located with metal detector and exposed.

# Operations and Monitoring Checklist

**Monitoring Well(s) Sampled: DB-8A, DB-17A, DC-1, DC-2, OR-2, OR-3, OS-2, OS-3, TF-5, TF-23**

| | | |
|---|---|---|
| **I.** | **Field Evaluation** | Yes/No |
| **A.** | **Groundwater Monitoring System** | |
| 1. | Are the numbers, depths, and locations of monitoring wells in agreement with those reported in the facility's monitoring plan?<br>Numbers and locations match. DC-1 is located in a wetland and sedimentation is an issue affecting depth. | Yes/No |
| **B.** | **Monitoring Well Construction** | |
| *1.* | Identify construction material and diameter **Applicable to new wells, otherwise should be found in reports.*<br>a. Primary casing: 2" diameter PVC casing (OS-2 and OS-3 are 4")<br>b. Secondary or outside casing: with 4" steel stickup (TF-5 has a 6" stickup) or flushmount roadbox (OS-3 has 8" PVC and SS Flushmount) | |
| 2. | Is the upper portion of the borehole sealed with concrete to prevent infiltration from the surface? | Yes |
| 3. | Is the well fitted with an above-ground protective device?<br>Some wells are finished with flushmount roadboxes (OR-2, OR-3, OS-2, OS-3) | Yes/No |
| 4. | Is the protective cover fitted with locks to prevent tampering? If a facility utilizes more than a single well design, answer the above questions for each well design? | Yes |
| **C.** | **Surficial Well Inspection and Field Observation** | |
| 1. | Are the wells adequately maintained? | Yes |
| 2. | Are the monitoring wells protected and secure? | Yes |
| 3. | Do the wells have surveyed casing elevations? | Yes |
| 4. | Are the groundwater samples turbid? | Some |

| | | |
|---|---|---|
| 1. | Have all physical characteristics of the site been noted in the inspector's field notes (i.e., surface waters, topography, surface features)? | Yes |
| 2. | Has a site sketch been prepared by the field inspector with scale, north arrow, locations) of buildings, locations) of regulated units, locations of monitoring wells, and a rough depiction of the site drainage pattern? | Yes |
| **D.** | **Sampling of Immiscible Layers** | N/A |
| 1. | Are the immiscible layers sampled separately prior to well evacuation? | |
| 2. | Do the procedures used minimize mixing with water soluble phases? | N/A |
| **E.** | **Well Evacuation** | Yes |
| 1. | Are low yielding wells evacuated to dryness? | |
| 2. | Are high-yielding wells evacuated so that at least three casing volumes are removed? Not if low-flow purging, yes if 3 volume purging | Yes/No |
| 3. | Low flow? | |
| 4. | Purging of wells? 3 volumes | |
| 5. | What device is used to evacuate the wells? Bailer, Monsoon pump, bladder pump | |
| 6. | If any problems are encountered (e.g., equipment malfunction) are they noted in a field logbook? | Yes |
| **F.** | **Sample Withdrawal** | |
| 1. | For low yielding wells, are samples for volatiles, pH, and oxidation/reduction potential drawn first after the well recovers? *PFAS? | Yes |
| 2. | Are samples withdrawn with either HDPE/resin or stainless-steel sampling devices? | Yes |
| 3. | Are sampling devices either bottom-valve bailers or positive gas displacement bladder pumps, grunfos, peristaltic pumps? Monsoon pump too | Yes |
| 4. | Are samples collected in a manner to maintain sample integrity (e.g., minimize agitation and aeration) | Yes |
| 5. | Is care taken to avoid placing clean sampling equipment on the ground or other contaminated surfaces prior to insertion into the well? | Yes |

| | | |
|---|---|---|
| 6. | If dedicated sampling equipment is not used, is equipment disassembled and thoroughly cleaned between samples? | Yes |
| 7. | If sampling equipment requires decontamination, is the process following its specific protocol? Ex. *Alconox for PFAS. | Yes |
| 8. | If samples are for organic analysis, does the cleaning procedure include the following sequential steps:<br>☒Nonphosphate detergent wash<br>☐Tap water rinse<br>☐Distilled/deionized water rinse | Yes |
| 9. | Are equipment blanks taken to ensure that sample cross-contamination has not occurred? One/day | Yes |
| **G.** | **In-situ or Field Analyses** | |
| 1. | Are the following labile (chemically unstable) parameters determined in the field: YSI Pro DDS<br>☒pH<br>☒Temperature<br>☒Specific conductivity<br>☒Redox potential<br>☐Chlorine<br>☒Dissolved oxygen<br>☒Turbidity<br>☐Other (specify): | Yes |
| 2. | Is monitoring equipment calibrated according to manufacturers' specifications and consistent with SW-846? | Yes |
| 3. | Are the date, procedure, and maintenance for equipment calibration documented in the field logbook? | Yes |
| **II.** | **Review of Sample Preservation and Handling Procedures** | |
| **A.** | **Sample Containers** | |
| 1. | Are samples transferred from the sampling device directly to their compatible containers? GW yes/no Soil should be homogenized | Yes |
| 2. | Are trip blanks used for each sample container type to verify cleanliness?<br>*Trip blanks for VOCs 1/cooler containing VOCs | Yes |

| | | |
|---|---|---|
| **B.** | **Sample Preservation Procedures** | |
| 1. | Is sample preservation procedures followed as established in the Site Monitoring Program? | Yes |
| **C.** | **Special Handling Considerations** | |
| 1. | Are organic samples handled without filtering? | Yes |
| 2. | Are samples for volatile organics transferred to the appropriate vials to eliminate headspace over the sample? | Yes |
| 3. | Is the sample for dissolved metals filtered through a 0.45 micron filter? *See SMP Documents samples are filtered at the lab | Yes/No |
| 4. | Is the second portion not filtered and analyzed for total metals? Lab filtered | Yes/No |
| 5. | Is one equipment blank prepared each day of groundwater sampling? | Yes |
| **III.** | **Review of Chain-of-Custody Procedures** | |
| **A.** | **Sample Labels** | |
| 1. | Are sample labels used? | Yes |
| 2. | Do they provide the following information:<br>☒Sample identification number<br>☐Name of collector<br>☒Date and time of collection<br>☐Place of collection<br>☒Parameter(s) requested, and preservatives used | Yes |
| 3. | Do they remain legible even if wet? | Yes |
| **B.** | **Sample Seals** | |
| 1. | Did lab provide seals? If so, are sample seals placed on those containers to ensure samples are not altered? | Yes |
| **C.** | **Field Logbook** | |
| 1. | Is a field logbook maintained? | Yes |

| | | |
|---|---|---|
| 2. | Does it document the following*: *Check all applicable*<br><br>☐Purpose of sampling (e.g., detection or assessment)<br>☐Location of well(s)<br>☒Total depth of each well<br>☒Static water level depth and measurement technique<br>☒Presence of immiscible layers and detection method<br>☐Collection method for immiscible layers and sample identification numbers<br>☒Well evacuation procedures<br>☒Sample withdrawal procedure<br>☒Date and time of collection<br>☒Well sampling sequence<br>☒Types of sample containers (no) and sample identification number(s) (yes)<br>☒Preservative(s) used<br>☒Parameters requested<br>☒Field analysis data and method(s)<br>☒Sample distribution and transporter<br>Field observations<br><br>☒Unusual well recharge rates<br>☒Equipment malfunction(s)<br>☒Possible sample contamination<br>☒Sampling rate | Yes |
| **D.** | **Chain-of-Custody Record** | |
| 1. | Is a chain-of-custody record included with each sample? | Yes |
| 2. | Does it document the following:<br>☒Sample number<br>☒Signature of collector<br>☒Date and time of collection<br>☒Sample type<br>☐Station location<br>☒Number of containers<br>☒Parameters requested<br>☒Signatures of persons involved in chain-of-custody<br>☒Inclusive dates of custody | Yes |
| **E.** | **Sample Analysis Request Sheet** | |
| 1. | Does a sample analysis request sheet accompany each sample? | Yes |

| | | |
|---|---|---|
| 2. | Does the request sheet document the following:<br>☒Name of person receiving the sample<br>☐Date of sample receipt<br>☒Duplicates<br>☒Analysis to be performed | Yes |
| **III.** | **Review of Quality Assurance/Quality Control** | |
| A. | Is the validity and reliability of the laboratory and field generated data ensured by a QA/QC program? | Yes |
| B.<br>1. | Does the QA/QC program include:<br>Documentation of any deviation from approved procedures? | Yes |
| 2. | Documentation of analytical results for:<br>☒Blanks<br>☒Standards<br>☒Duplicates<br>☒Spiked samples<br>☒Detectable limits for each parameter being analyzed | Yes |
| C. | Are approved statistical methods used? | Yes |
| D. | Are QC samples used to correct data? | Yes |
| E. | Are all data critically examined to ensure it has been properly calculated and reported? Is the DUSR submitted? Cat B deliverables? EDD? | Yes |
| **IV.** | **Conclusions** | |
| A. | Does the groundwater monitoring system, as designed and operated, allow for detection or assessment of any possible groundwater contamination caused by the facility? | Yes |
| B. | Do the sampling and analysis procedures permit the owner/operator to detect and, where possible, assess the nature and extent of a release of hazardous constituents to ground water from the monitored hazardous waste management facility? | Yes |
| **ADDITIONAL NOTES/RECOMMENDATIONS** | | |
| | | |