

R-012-205.1

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**REVISED SAMPLING AND ANALYSIS PLAN**

**12-01-1990**

**DOE/USEPA**

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**ENCLOSURE**

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**ATTACHMENT 1**

**REVISED SAMPLING AND ANALYSIS PLAN**

## ATTACHMENT 1

## 8.0 SAMPLING AND ANALYSIS PLAN

Sampling Objectives

As identified in Section 4.0, extensive soil and groundwater sampling has been previously conducted in the vicinity of the Plant 1 Pad. Additional sampling is proposed to be conducted to support the Plant 1 Pad Removal Action to achieve the following objectives:

Characterize the concentrations of HSL constituents in the soils to be excavated to the west of the Plant 1 Pad.

Complete a hazardous waste determination of soils west of the Plant 1 Pad.

Complete a hazardous waste determination on containerized waste materials generated incidental to completing the construction activities associated with the Removal Action.

Ensure defined soil concentration based build-over criteria are attained during the Removal Action.

Provide long-term monitoring of the Removal Action system to ensure continued protection of human health and the environment.

To achieve the sampling objective, samples are proposed to be collected prior to and during the construction phase of the Removal Action, and as a part of a long-term monitoring program.

Pre-excavation Soil Sampling

To determine the possible presence of HSL constituents in the soils proposed to be excavated west of the Plant 1 Pad, eighteen additional soil samples, 0-6 inches in depth, are being collected from an approximately 150 by 500 foot area which fully encompasses the excavation. These samples are being collected at the intersects of an approximately 75 x 100 foot matrix as shown in Figure 2-2 in Attachment 2. The array includes six points along the west edge of the pad and westward parallels at about 75 and 150 feet from the pad. These samples will be collected in accordance with the RI/FS QAPP. Samples will be analyzed by a non-QAPP laboratory because of the backlog at the RI/FS laboratory. The proposed laboratory participates in the EPA CLP quality control program and has recently undergone a Quality Assurance audit by FMPC.

If non-naturally occurring HSL's are identified in a sample, the location will be resampled. Four additional samples will be collected at a distance of ten feet from the location in the four principle compass directions. In addition, the original location will be resampled at 0-6 inches and 6-12 inches in depth. Analyses will be limited to contaminants of concern. Based upon resample results, the problem area will be excavated, as required, to a distance of five feet in the four principle compass directions. Soil in the vicinity of the sample(s) will be excavated, containerized, and managed as potentially hazardous waste. Identification, in this case, is the laboratory sensitivity for the specific analyte.

If naturally occurring HSL's are detected above background concentrations (Shocklette, H.T., and Boerngen, J.G., "Elemental Concentrations in Soils and Other Surficial Materials of the Conterminous United States", USGS Professional Paper 1270, 1984), the location will be resampled. Four additional samples will be collected at a distance of ten feet from the location in the four principle compass directions. In addition, the original location will be resampled at 0-6 inches and 6-12 inches in depth. Analyses will be limited to contaminants of concern. Based upon resample results, the problem area will be excavated, as required, to a distance of five feet in the four principle compass directions. Soil in the vicinity of the sample(s) will be excavated, containerized, and managed as potentially hazardous waste. If previous data show that the specific constituent is not present in a leachable form (i.e. EP Toxicity), then those soils need not be containerized.

### Construction-Related Sampling

#### Instrument Measurements

During excavation portable instrument measurements will be taken for organic vapors and for radiological contaminants. Any measurable organic vapor concentrations and/or radiological indications of greater than 100 pCi/g of uranium, will be cause for associated soils to be containerized and managed consistent with pertinent ARARs. Soils will continue to be excavated and containerized until there is no indication of organic compounds and radiation measurements are indicative of less than 100 pCi/g.

When the base of the excavation is established, a walk-over survey will be performed with a 2x2 NaI(Tl) scintillation detector. The probe will be moved in a serpentine manner over the area with the detector close to the surface. Any indications of activity greater than 15 percent above background will be excavated until measurements indicate that the residual soils in the area are at background levels.

#### Soil Sampling

When the base elevations of the excavation are reached, a ten meter grid will be established and four soil samples will be collected from each

grid. Six-inch core samples will be collected using the procedures and requirements of the RI/FS QAPP. Samples will be composited at the FMPC laboratory to provide one composite for each 100 square meters. For this area, 480 samples will be composited to 120 samples. Aliquots of each of the 120 will be analyzed for total uranium and thorium at the FMPC laboratory. Twelve of the 120 samples (10 percent) will be randomly selected and sent to the RI/FS QAPP Laboratory for full HSL analysis. Twenty four (20 percent) will be randomly selected and sent to the RI/FS QAPP laboratory for full radiological analyses. All remaining samples will be archived for potential future analysis.

Buildover will be initiated when the average total uranium and thorium concentrations indicate concentrations below the NRC Branch Technical Position (BTP) criteria. These are further described in the following paragraph. If necessary, additional soil will be removed and the location resampled for total uranium and thorium until the BTP criteria are indicated. Upon receipt of the analytical results from the RI/FS QAPP laboratory, a complete assessment of the built over conditions will be made and reported in a Removal Action completion report.

Branch Technical Position Criteria

The Nuclear Regulatory Commission established soil concentrations based upon EPA criteria. Concentrations were modeled so that no member of the public would be expected to receive a radiation dose of one millirad per year to the lung or three millirads per year to the bone due to inhalation or ingestion. Plant 1 Pad is a controlled area and there is no public contact however this goal would be consistent with RI/FS objectives. Soil sample analytical results will be compared to the BTP concentrations which are:

Depleted Uranium.	35 pCi/g
Enriched Uranium	30
Natural Thorium	10
Natural Uranium Ores	10

Depleted uranium has been the principle form of uranium at FMPC and the goal of 35 pCi/g is expected to be appropriate. Upon receipt of complete analytical results, a complete assessment of all radionuclides present will be made.

Available sampling data indicate the average isotopic ratio for the soils in the vicinity of the Plant 1 Pad to be in the depleted range. The 35 pCi/g criteria is considered a conservative interim cleanup level as a result of the existing institutional controls in place at the Plant 1 Pad to limit exposure to these materials.

Construction Rubble Sampling

Excavated soils exhibiting an in-situ activity concentration in excess of 100 pCi/g of total uranium or where organic vapors are detected, including

removed concrete, collected sweepings, and soils deemed to contain elevated concentrations of HSLs will be containerized for storage and/or off-site shipment.

Representative samples will be collected from the containers to characterize the stored waste materials for purposes of determining the radiological properties of the materials and to complete a hazardous waste determination. Samples shall be collected and analyzed in a manner consistent with the protocols defined in the RI/FS QAPP and as supplemented by Part III of SW-846, 3rd Edition, Test Methods for Evaluating Solid Waste pertaining to the sampling of containerized materials.

Collected samples shall be analyzed for full TCLP, HSL constituents and full radiological parameters at the RI/FS QAPP laboratory unless there is prior concurrence for an alternate laboratory by USEPA and OEPA.

### Environmental Monitoring

To ensure the continued protection of human health and the environment, a long term environmental monitoring program will continue in the vicinity of the Plant 1 Pad. This program will be enhanced to focus more appropriately on the environmental conditions present at the Plant 1 Pad. The program will essentially have three key components, air, surface water and groundwater monitoring.

### Monitoring for Fugitive Dust Emissions

Portable air samplers will be placed at the perimeter of the open excavation and the soil stockpile to measure airborne particulate concentrations. Samples will be collected weekly and analyzed for gross alpha and gross beta concentrations at the FMPC laboratory. Engineering controls and additional health and safety measures will be instituted if elevated concentrations are detected.

### Surface Water Monitoring Program

During construction water samples will be taken of the stormwater run-off at the entrance to the storm sewer system (MH 200) on a monthly basis<sup>1</sup>.

Following construction activities, and during operations on the pad, the following water samples will be taken of the stormwater run-off on an approximately monthly basis depending on precipitation events until sample results indicate that quarterly sampling is sufficient.

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<sup>1</sup>All water samples will need to be taken consistent with the weather conditions. If there has not been a storm event during the given time frame, no sample will be taken due to the lack of stormwater runoff.

- at the inlet to the storm sewer system (MH 200)
- at the storm sewer MH 11

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All samples of the stormwater run-off will be analyzed at the FMPC laboratory for total uranium and total thorium. Samples will be collected in a manner consistent with the RI/FS QAPP. Collected samples will be transferred to the FMPC Laboratory for analysis in accordance with the Analytical Laboratories Quality Assurance Plan, October 1987.

#### Groundwater Monitoring Program

The existing groundwater monitoring program will be enhanced to provide additional monitoring in the vicinity of the Plant 1 Pad to identify any changes in groundwater quality so as to ensure the continued protection of human health and the environment. Groundwater monitoring will be performed in both the perched water and the regional aquifer underlying the Plant 1 Pad.

Groundwater quality sampling and water level data, collected at the indicated frequency from following wells, will provide a comprehensive monitoring program for the continued operation of the Plant 1 Pad.

#### Glacial Overburden

	Quarterly			
1055*	1334	1340	1347	1350
1303	1335	1341	1348	1361
1305	1336	1342*	1349	
	1337	1343		
	1338	1344		
	1339*	1345*		

#### Semi-annual

1351 through 1360

#### Sand and Gravel Aquifer

Quarterly	
Upgradient	Downgradient
2010	2055*
3010	3055

\* Wells to be sampled prior to any construction activities.

Data obtained from wells which are sampled quarterly will be used to establish baseline seasonal variations. Once seasonal variations have been established, the frequency may decrease to semi-annual. Any change in frequency will be supported by data and communicated to USEPA and OEPA.

As previously indicated, extensive sampling has been performed to date in these wells. To augment this baseline data, one round of samples will be withdrawn from the listed wells (noted with asterisks above) prior to construction activities for full Hazardous Substance List (HSL) analysis. These samples will be analyzed in a manner consistent with the FMPC RI/FS Quality Assurance Project Plan (QAPP).

Routine samples will be analyzed for the parameters listed in Table 8-1. Any additional constituents in significant concentrations from in the HSL analysis will be added to the list in Table 8-1 for both that well and for vicinity wells.

All groundwater samples will be collected in a manner consistent with the protocols and procedures defined in the RI/FS QAPP.

Analysis of semi-annual and quarterly samples will be completed in the FMPC Analytical Laboratory in accordance with the Analytical Laboratory Quality Assurance Plan, October 1987. In the event organic compounds are added to Table 8-1 as a result of the HSL sampling event, these analyses will be performed at a laboratory as defined in the RI/FS QAPP.

**TABLE 8-1  
GROUNDWATER ANALYTICAL PARAMETERS**

Total Uranium	Nitrate
Isotopic Uranium	Selenium
Total Thorium	Silver
Isotopic Thorium	Arsenic
Barium	Cadmium
pH	Chromium (total)
Specific Conductance	Fluoride
TOX	Lead
TOC	Sulfide
	Mercury

This monitoring and sampling program will be performed in conjunction with sampling and analysis activities under Operable Unit 3 of the ongoing RI/FS and resultant final remedial actions. The scope of this monitoring and sampling program will not interfere with any activity in this area.

As stated in the Consent Agreement, if the DOE determines that any activities or work being implemented under this Consent Agreement may create an imminent threat to human health or the environment from the release or threat of release of a hazardous substance, pollutant, contaminant, or hazardous constituent, it may stop any work or activities for such period of time as needed to respond and take whatever action is necessary to abate the danger.



1955

100' (TYP)

75' (TYP)

APPROX. SAMPLE LOCATIONS

SCRAP MATERIAL

SCRAP MATERIAL

GATE

GATE

GATE

GATE

WALLS

TANKS

GATE

TIME-14:25:36  
DATE-Feb. 28, 1991

PRE-EXCAVATION  
SOIL SAMPLE LOCATIONS

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