NOTICE

All drawings located at the end of the document.

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DOCUMENT MODIFICATION REQUEST (DMR)

Refer to 1-A01-PPG-001 for Processing Instructions.
Print or **Type** All Information (Except Signatures)

1. Date	25.
February 8, 1995	DMR. No. 95-DMR- ERM -0022 (line 2/10/95)

2. Existing Document Number/Revision	3. New Document Number or Document Number if it is to be changed with this Revision
21100-WP-OU 05.1/Rev 10	N/A
4. Originator's Name/Phone/Page/Location Mark R. Wood/8784/5904/080-641	5. Document Title: FINAL PHASE I RFI/RI WORK PLAN FOR OPERABLE UNIT 5 WOMAN CREEK PRIORITY DRAINAGE, Volume III - Text to Technical Memorandum No. 15 - Amended Field Sampling Plan

6. Document Type ☐ Procedure
X Other Work Plan

7. Document Modification Type (Check only one)
☒ New ☐ Revision ☐ Intent Change x Nonintent Change ☐ Editorial Correction ☐ Cancellation

8. Item	9. Page	10. Step	11. Proposed Modifications
1	3-6	3.1.2.2	Second paragraph, third sentence, replace nineteen with twenty and insert revised Figure 3.1.2.2-1 into appendix under Figures. Third paragraph, first sentence, replace nineteen with twenty.
2	3-7	3.1.2.2	First paragraph, top of page, last sentence, replace Two with Three.
3	3-10	3.1.2.3	First bullet item, replace five deep bedrock with six bedrock.
4	3-11	3.1.2.3	First paragraph, insert revised Table 3.1.2-1, pages 1 of 4, 3 of 4, and 4 of 4 into appendix under Tables. Second paragraph, first sentence, replace Three with Six. Sixth sentence revise as follows. Three of the geotechnical borings will be converted to LHSU monitoring wells with the same purpose as stated above and to evaluate the potential presence of an inferred fault trace in the area of the Old Landfill. After last sentence of paragraph, add the following sentences. A third geotechnical boring and monitoring well will be installed at the west end of the temporary fill road (Figure 3.1.2.2-1) to screen a separate possible water bearing interval observed on the geophysical log from the adjacent deep bedrock monitoring well. Geotechnical sampling will be performed across the slide plane observed at this location, otherwise coring will only be performed on the interval below the surface casing seperating the UHSU from the LHSU. No additional geophysical logs will be required as the log of the adjacent borehole is adequate.

12. Justification (Reason for Modification, EJO#, TP#, etc.)

On the basis of the geophysical log from boring 57194, a deep bedrock monitoring well located at the west end of the temporary fill road, an additional LHSU monitoring well is proposed to evaluate a second possible water bearing interval identified. Another attempt to collect a shelby tube sample from the slide plane identified at this location will be made. The DOE-RFFO counterpart, Kurt Muenchow, verbally concurs with the scope of this Document Modification Request.

If modification is for a new procedure or a revision, list concurring disciplines in Block 13, and enter N/A in Blocks 14 and 15. If modification is for any type of change or a cancellation, organizations are listed in Block 13, then Concurror prints, and signs in Block 14, and dates in Block 15.

13. Organization	14. Print and Sign (if applicable)	15. Date (if applicable)
EQS		2.9.95
OU5 FS Team	for RCyganowicz 2-9-95	
OU5 PM	2-9-95	

16. Originator's Supervisor (print/sign/date):
Ed Mast/ 2/8/95

17. Assigned SME/Phone/Page/Location:	18. Cost Center	19. Charge Number	20. Requested Completion Date	21. Effective Date
Mark R. Wood/8784/5904/080-641 MRW	3120	98647900	February 10, 1995	2/10/95

22. Accelerated Review?	23. ORC Review: Not Required
Yes ☐ No x	

24. Responsible Manager (print, sign, date):
Ed Mast/ 2/8/95

received in DCF for final distribution 2/9/95 lmc

REVIEWED FOR CLASSIFICATION/UCNI
BY NA
DATE NA

The second task consists of reviewing topographic maps prior to the slump. If a topographic map of an appropriate scale and contour interval (2-foot) cannot be located, large scale stereo pair aerial photographs may be used to estimate pre-slump topography.

For the third task, the subsurface geometry shall be obtained from boreholes. Locations of existing boreholes do not provide adequate areal distribution to characterize the subsurface geometry. Therefore, based on the overall visible width of the existing failures and the accessibility, twenty boreholes will be located in IHSS 115 as shown in Figure 3.1.2.2-1. Soil samples will be collected in accordance with SOP GT.2, Drilling and Sampling Using Hollow-Stem Auger Techniques until weathered bedrock is encountered: at which time the sampler will be switched from a drive sampler over to a Shelby tube-type sampler. The borings will be advanced 2-ft. into unweathered bedrock; at which time, the site geologist will determine whether to case the hole in accordance with SOP GT.3, Isolating Bedrock from Alluvium with Grouted Surface Casing, or abandon the hole in accordance with SOP GT.5, Plugging and Abandonment of Boreholes. Boreholes and soil samples will be logged in accordance with SOP GT.1, Logging Alluvial and Bedrock Material. All locations will be surveyed in accordance with SOP GT.17, Land Surveying (0.1 foot accuracy).

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Five of the twenty geotechnical boreholes, to be located in the principal landslide failure areas, may require surface casing in order to advance the boring for the following three reasons: one, to confirm the presence of unweathered bedrock; two, to prevent the potential for cross contamination between the Upper Hydrostratigraphic Unit (UHSU) and the Lower Hydrostratigraphic Unit (LHSU); and three, to confirm that there are no more landslide rupture planes at depth. Six-inch or eight-inch nominal diameter, schedule 80, PVC casing will be installed as the surface casing. Information obtained from the boreholes will provide input for both the stability analysis and the groundwater modeling. Depth-to-bedrock data will be used

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to revise the bedrock topography in OU5. Three of the cased geotechnical borings will be converted to unweathered bedrock monitoring well, see Section 3.1.2.3.

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To facilitate the access of the hollow-stem auger drill rig to the geotechnical borings located in the central landslide area, the subcontractor will coordinate with EG&G Construction Management, Heavy Equipment and Labor, Trucking, and Ecology and Watershed Management for the purpose of constructing a temporary fill road. The temporary fill road will be located as shown on Figure 3.1.2.2-1. The temporary fill road will be placed without excavating or disturbing the existing hillside to allow level access for the drill rig to the boring location. Heavy Equipment and Labor and Trucking will provide the necessary heavy equipment consisting of, but not limited to, a front-end loader, dump truck, and bulldozer. Clean fill material will be provided by Heavy Equipment and Labor and compacted in place with the bulldozer or front-end loader. Ecology and Watershed Management will clear the access route and provide direction regarding reseeding and revegetating the fill material at completion of the task. Access to the temporary fill road will be blocked by trenching at the east end of each fill material placement area upon completion of the task.

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Core samples will be retained in core boxes and logged in accordance with SOP GT.1. Logging Alluvial and Bedrock Material. Core samples will not be submitted for environmental chemical analysis. However, if field screening indicates the potential for contaminants, environmental samples will collected for analysis for OU5 target analytes (Table 3.1.2-1). Soil cuttings generated from within IHSS 115 will be composite sampled, one per four drums, and managed in accordance with the following SOPs: FO.8, Handling of Drilling Fluids and Cuttings; FO.10, Receiving, Labeling, and Handling Environmental Material Containers; FO.23, Management of Soil and Sediment Investigative Derived Materials (IDM); and FO.29, Disposition of Soil and Sediment Investigation Derived Materials. Boreholes located outside of IHSS 115 and adjacent

3.1.2.3 Groundwater Investigation

In order to more completely evaluate the presence and quality of groundwater at and downgradient of the Original Landfill, additional groundwater samples need to be collected and analyzed. Since the presence and quantity of groundwater appears to be limited, this task shall consist of three work elements:

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1) install and develop up to 9 piezometers, 5 mini-wells, and 6 bedrock (LHSU) monitoring wells (Figure 3.1.2.2-1);

2) measure water levels in all well points, mini-wells, piezometers, and monitoring wells that are along or north of Woman Creek, south of the south Buffer-Zone access road, east of the western edge of IHSS 115 (approximately CPT07393), and west of the eastern edge of IHSS 115 (approximately CPT05393) on a monthly basis for one year; and

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3) obtain samples from any location that is downgradient of the landfill if water level measurements indicate presence of a sufficient quantity of water.

The purpose of installing the nine piezometers and five mini-wells is to further characterize the present or absence of groundwater. The nine piezometers to be installed will be constructed in the geotechnical boreholes (see Secion 3.1.2.2) where groundwater is encountered. The five proposed mini-well locations are placed in 1) bedrock lows that were identified during the CPT investigation (but water was not detected), and 2) between existing well points. Of the five mini-wells to be installed, four shall be installed downgradient of IHSS 115 and one shall be installed on the upper level part of the eastern end of IHSS 115 in the vicinity of borehole 50792. This latter location will be used for only water level input for the hydrogeologic model and not sampling. These mini-wells will be installed using a small all-terrain vehicle rig which does not produce soil cuttings. Composite soil samples will be collected during drilling in accordance with the procedures outlined in TM7 (EG&G, 1993e). In addition, discrete samples

will be collected at 2-foot intervals for VOC analyses. Analytical parameters for soil samples will be the same as specified in the OU5 Work Plan (see Table 3.1.2-1).

Six bedrock monitoring wells will be installed to evaluate the potential for hydraulic interaction between the groundwater from the Upper Hydrostratigraphic Unit (UHSU), consisting of alluvial and weathered bedrock materials, and the Lower Hydrostratigraphic Unit (LHSU), unweathered bedrock materials. The bedrock monitoring wells will be installed in an attempt to identify possible sandstone units, fracture zones, or other potential water bearing intervals in the LHSU. Figure 3.1.2.2-1 shows the location of the three bedrock monitoring well locations around IHSS 115 (the old landfill). There will be three wells installed, one upgradient and two downgradient. In addition, the bedrock wells are located near UHSU wells or mini-wells for evaluation of vertical hydraulic gradients. Three of the geotechnical borings will be converted to LHSU monitoring wells with the same purpose as stated above and to evaluate the potential presence of an inferred fault trace in the area of the Old Landfill. The first location to be converted is northeast of the former pond area (IHSS 196) and north of the borehole cluster 58393, 58493, and 58593 (Figure 3.1.2.2-1). The second location to be converted is the geotechnical boring location at the west end of the temporary fill road (Figure 3.1.2.2-1). These two locations will also have a shallow piezometer/monitoring well installed adjacent to the deep bedrock monitoring wells to collect additional geotechnical soil samples and to monitor for UHSU groundwater. A third geotechnical boring and monitoring well will be installed at the west end of the temporary fill road (Figure 3.1.2.2-1) to screen a separate possible water-bearing interval observed on the geophysical log from the adjacent deep bedrock monitoring well. Geotechnical sampling will be performed across the slide plane observed at this location, otherwise coring will only be performed on the interval below the surface casing separating the UHSU from the LHSU. No additional geophysical logs will be required as the log of the adjacent borehole is adequate.

Borings will be drilled in accordance with SOPS GT.2, Drilling and Sampling Using Hollow-Auger Drilling Techniques and GT.4, Rotary Drilling and Rock Coring. A 6-inch or eight-inch nominal diameter, schedule 80 PVC, surface casing will be grouted a minimum of 3 feet into unweathered

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bedrock in accordance with SOP GT.3, Isolating Bedrock from Alluvium with Grouted Surface Casing. Based on existing boring log information, this depth will be approximately 20 to 40 feet below ground surface. The borings will be advanced to an approximate depth of 150 feet of 15 feet past a potential water bearing interval, if the water bearing interval is encountered at a depth less than 150 feet. The borings will be geophysically logged, in accordance with SOP GT.15 Geophysical Borehole Logging using the following open hole logging techniques: neutron, natural gamma, gamma-gamma, density, induction, caliper, guard resistivity, and single point resistivity (the last two methods only if groundwater is encountered in the bedrock). A down hole video log of the open hole will be made provided the hole remains stable. On the basis of the recovered core and the geophysical logs, a screen interval will be selected and the monitoring well constructed in accordance with SOP GT.6, Monitoring Wells and Piezometer Installation. Well construction will consist of 2-inch nominal diameter, PVC, casing with 0.01-inch slotted screen. Screen length will be determined in the field.

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Field activities will be conducted in accordance with the appropriate Environmental Restoration SOPs. Core samples will be retained in core boxes and logged in accordance with SOP GT.1, Logging in Alluvial and Bedrock Material. Composite soil samples of alluvial materials will be collected in accordance with the procedures specified in TM7 for boreholes at IHSS 133 (EG&G, 1993e). In addition, discrete samples will be collected at 2-foot intervals for VOC analyses. Soil cuttings generated from weathered bedrock will be composite sampled for OU5 target analytes, one per four drums, and managed in accordance with the following SOPs: FO.8, Handling of Drilling Fluids and Cuttings; FO.10, Receiving, Labeling, and Handling Environmental Material Containers; FO.23, Management of Soil and Sediment Investigative Derived Materials (IDM); and F).29, Disposition of Soil and Sediment Investigation Derived Materials. Core samples from the unweathered bedrock will not be collected for environmental chemical analyses, however, if field screening indicates the potential for contaminants, environmental samples will be collected for analysis for OU5 target analytes (Table 3.1.2-1). The boreholes for the bedrock monitoring wells are located outside of IHSS 115 and adjacent to wells drilled in 1993 that indicate no contamination, therefore, the soil cuttings generated

Table 3.1.2-1. Summary of Amended Field Sampling Plan
IHSS 115 (Original Landfill) and IHSS 196 (Filter Backwash Pond)
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EVALUATION	ACTIVITY	NO. OF SAMPLING LOCATIONS	SAMPLING FREQUENCY	ANALYTICAL PARAMETERS	FIELD QUALITY CONTROL SAMPLES/PROGRAM	APPLICABLE SECTION OF TEXT
Intrinsic Air Permeability Test Evaluation	Review soil gas survey vacuum pressures, borehole logs, and analytical results	NA	NA	NA	NA	3.1.2.1
	Resample at low vacuum pressures	TBD	TBD	1,1,1-TCA benzene carbon tetrachloride DCM TCE PCE	1 duplicate/10 samples 1 syringe blank/each syringe use instrument calibration at beginning and end of each day and every 8 hours	
Geotechnical Evaluation	Review information regarding existing slump	NA	NA	NA	NA	3.1.2.2
	Evaluate pre- and post-slump surface geometry	NA	NA	NA	NA	
	Evaluate subsurface geometry/geotechnical properties	20 hollow-stem auger (HSA) boreholes with up to 9 piezometers installed, page 3 of 4)	continuous core	field screening core logging	NA	
			discrete soil sample every third sampler (approx. 6 feet)	natural moisture content	NA	
			1 sample from last 2 feet of alluvium above bedrock	natural moisture content, natural density (dry and moist), grain-size distribution, and Atterberg limits	NA	

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Table 3.1.2-1. Summary of Amended Field Sampling Plan
IHSS 115 (Original Landfill) and IHSS 196 (Filter Backwash Pond)
Page 3 of 4

EVALUATION	ACTIVITY	NO. OF SAMPLING LOCATIONS	SAMPLING FREQUENCY	ANALYTICAL PARAMETERS	FIELD QUALITY CONTROL SAMPLES/PROGRAM	APPLICABLE SECTION OF TEXT
GEOTECHNICAL EVALUATION (CONT.)	Evaluate Subsurface geometry/geotechnical properties (cont.)		Soil samples of shear zone/weathered bedrock	Selected samples	8 - ICU (ASTM D4767-88) 2 - Consolidation (ASTM D2435-90) 10- Atterberg Limits (ASTM D4318-93) 5- Gradation (ASTM D1140-92)	3.1.2.2
			Soil samples of unweathered bedrock	Selected samples	3- Drained Direct Shear (ASTM D3080-90)	
		9 piezometers (HSA borehole advanced as discussed on preceding page)	monthly quarterly for one year	water level TCL VOCs, SVOCs, Pest. & PCBs, TAL Metals, and Radionuclides	replicate measurements as specified in SOP GW.01 1 dup/10 samples, 1 rinsate/20 samples or minimum of 1 rinsate/day and associated trip blank	
	Waste and core characterization	20 HSA boreholes and 6 deep bedrock monitoring wells	1 drum composite per 4 drums (approx. 1 drum per 10 ft. of borehole)	TCL VOCs, SVOCs, Pest. & PCBs, TAL Metals, and Radionuclides	1 dup/10 samples, 1 rinsate/20 samples or minimum of 1 rinsate/day and associated trip blank	
	Back calculate strength parameters and calculate long-term stability by method of slices.	NA	NA	NA	NA	
Groundwater Investigation	Install and sample mini-wells	5	2-foot discrete soil samples	TCL VOCs	1 dup/10 samples, 1 rinsate/20 samples or minimum of 1 rinsate/day and 1 trip blank per field crew per day per cooler	3.1.2.3
			6-foot composite soil samples or alternative composites as specified in TM7	SVOCs, Pesticides & PCBs, TAL Metals, and Radionuclides		

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Table 3.1.2-1. Summary of Amended Field Sampling Plan
IHSS 115 (Original Landfill) and IHSS 196 (Filter Backwash Pond)

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EVALUATION	ACTIVITY	NO. OF SAMPLING LOCATIONS	SAMPLING FREQUENCY	ANALYTICAL PARAMETERS	FIELD QUALITY CONTROL SAMPLES/PROGRAM	APPLICABLE SECTION OF TEXT
Groundwater Investigation	Install and sample mini-wells (cont.)		Groundwater - quarterly	TCL VOCs, SVOCs, Pesticides & PCBs, TAL Metals, and Radionuclides	1 dup/10 samples, 1 rinsate/20 samples or minimum of 1 rinsate/day and 1 trip blank per field crew per day per cooler	3.1.2.3
	Measure water levels	46	monthly	water level	replicate measurements as specified in SOP GW.01	
	Sample existing well points	TBD	quarterly	TCL VOCs, SVOCs, Pesticides & PCBs, TAL Metals, and Radionuclides	1 dup/10 samples, 1 rinsate/20 samples or minimum of 1 rinsate/day and 1 trip blank per crew per day per cooler	
	Characterize bedrock LHSU and install monitoring wells	6	continuous core-field screen Groundwater - quarterly	TCL VOCs, SVOCs, Pesticides & PCBs, TAL Metals, and Radionuclides	1 dup/10 samples, 1 rinsate/20 samples or minimum of 1 rinsate/day and 1 trip blank per crew per day per cooler	
	Aquifer tests	1	once	NA	NA	
Storm Sewer Sampling	Collect samples from storm sewer outfall	1	quarterly	TCL VOCs, TAL Metals, Radionuclides, and Water Quality Parameters	1 dup/10 samples, 1 rinsate/20 samples or minimum of 1 rinsate/day and associated trip blank, one per crew per day	3.1.2.4
Air Monitoring	RAAMP Monitoring	Monitoring will be conducted as specified in RAAMP documentation.				3.1.2.5
	OU5 Ambient Air Samplers	3	bi-weekly samples composited monthly	Radionuclides	As specified in SOP AP.13	
	Wind Resuspension - Evaluate Applicability of OU3 Wind Tunnel Study	TBD	TBD	TBD	TBD	
	OU5 Wind Tunnel Study	TBD	TBD	TBD	TBD	
	Evaluation of Gas Volatilization	TBD	TBD	TBD	TBD	

NA = Not Applicable TBD = To Be Determined

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WATER TREATMENT PLANT
124
460
444
654
440
6040
N
N748,000
196
INDICATED CORRECTED LOCATION OF FORMER PONDS
OLD OUTFALL PIPE
MANHOLE
115
DRAINAGE DITCH
SURFACE DISTURBANCE EAST OF LANDFILL
APPROXIMATE LOCATION TEMPORARY ROAD FILL PLACEMENT
OLD METAL FLUME
SOUTH INTERCEPTOR DITCH (1981)
SPOIL FROM SID CONSTRUCTION
BERM
FILL MATERIAL POST-SID CONSTRUCTION
WOMAN CREEK
E2,081,000
E2,083,000
5980
5960
5940
5920
6000

MAP LEGEND

- STREAMS DITCHES DRAINAGE FEATURES
- PAVED ROADS
- DIRT ROADS
- ORIGINAL LANDFILL AND SURFACE DISTURBANCE, PRE - SID
- LANDFILL AND DISTURBANCE POST - SID
- 60993 MONITORING WELL LOCATION
- 50392 BOREHOLE LOCATION
- 62893 WELL POINT LOCATIONS
- CPT05293 CONE PENTROMETER TESTING (CPT) LOCATIONS

PROPOSED GEOTECHNICAL LOCATIONS

- HOLLOW STEM AUGER (HSA) BOREHOLES

PROPOSED LOCATIONS FOR GROUNDWATER INVESTIGATION

- MINI-WELLS FOR WATER LEVELS AND QUALITY
- SMALL BOREHOLES w/ PIEZOMETERS FOR WATER LEVELS
- DEEP BEDROCK BOREHOLES/WELLS

0 100 200

SCALE: 1" = 200'

Drawn	NAM	2/9/95 Date
Checked		2/9/95 Date
Approved EG&G		Date
Approved DOE		Date

PROPOSED SAMPLING LOCATIONS FOR IHSS 115

TM15 - AMENDED FIELD SAMPLING PLAN

0U5 PHASE I RFI/RI IMPLEMENTATION

EG&G

FIGURE 3.1.2.2-1

3125-2326