MEETING NOTES
WMA S-SX Sample Interval Selection Meeting – D0602 and D0616

Meeting Date: April 23, 2025

Location: Virtual Meeting via Microsoft Teams

Attendees:

Kristin Singleton (H2C)
Mikey McGuire (H2C)
Deanna Klages (H2C)
Jeremy Lynn (H2C)
Richard Mahood (H2C)
Rebecca Blackwell (DOE)
Ellen Whittney (H2C)
Jackson Davis (Ecology)
Luissa Johnston (Ecology)
Cathrene Glick (Ecology)
Jonathan Rogers (Ecology)
Kim Schuyler (Freestone)

Background:
This meeting was part of the continuing effort to ensure communication between the Washington State Department of Ecology (Ecology), the U.S. Department of Energy (DOE), and Hanford Tank Waste Operations and Closure (H2C) representatives regarding the field work associated with RPP-PLAN-65977, *Phase 2 RCRA Facility Investigation/ Corrective Measures Study Work Plan for Waste Management Area S-SX*, Appendix D, *Sampling and Analysis Plan.*

Purpose of Meeting:
This meeting was called to provide field status information, review geophysical logging data results from direct pushes D0601 and D0615, and to select judgmental sampling depths for direct pushes D0602 and D0616. D0601 and D0602 are located in the 241-S Tank Farm (S Farm). D0615 and D0616 are located in the Eastern Polygon.

Discussion:
Kristin Singleton (H2C) started the meeting by stating that fieldwork is continuing. K. Singleton presented an updated map of the planned and actual field locations for all locations at S Farm and the Eastern Polygon (Attachment 1).

K. Singleton presented a handout (Attachment 2) then provided a field status update:

<u>S Farm (Exposure Area 1)</u>

- 10 of 10 shallow pushes have been sampled and decommissioned as of 03/18/2025.
- 3 of 5 deep pushes in have been sampled and decommissioned as of 04/07/2025.
- Logging has been completed for 5 of 5 deep pushes as of 04/07/2025.

<u>SX Farm (Exposure Area 2):</u>

- No sampling has been performed as of 4/7/2025.

<u>Eastern Polygon (Exposure Area 3)</u>

- 1 of 6 shallow pushes have been sampled and decommissioned as of 04/07/2025.
- 0 of 1 deep push has been sampled and decommissioned as of 04/07/2025.
- Logging has been completed for 1 of 1 deep push as of 04/07/2025.

Sample Selection at D0602:

K. Singleton provided the reasons for deep sample collection at D0602:

- Determine if contamination in vadose zone soil is present in the WMA S-SX study area.
- Investigate Tank 241-S-102 Riser Waste Loss and Water Release from Salt Well Line (SL-119)
- Supplement existing information from C8400 sampling between 54 and 128 ft bgs.

K. Singleton displayed the geophysical logging data from D0601 (Attachment 3) with the proposed sample depths for D0602. Logging data included moisture (blue line), gross gamma (dark red line), temperature (bright red), cesium-137, and natural background radionuclide results for potassium, uranium, and thorium. K. Singleton presented a table (Attachment 4) outlining the analytical soil sampling results from C8400 that exceeded Hanford background values. The recommended sample intervals and rationale (identified in Table 3 of Attachment 2) were discussed. K. Singleton identified that the subsurface sample intervals should be over-driven by 1 ft, resulting in a sample depth interval of 3 ft. Over-driving the sampling tool helps to recover more sample material.

K. Singleton opened the discussion with the meeting attendees on whether any additional sampling intervals are needed.

- Cathrene Glick (Ecology) asked why there is a proposed sample from 107 to 109 ft bgs when it's not required by the SAP, and the depth interval between 92 and 94 ft bgs is more interesting. Kim Schuyler (Freestone) responded that the sampling interval from 107 to 109 ft bgs is fulfilling the lower Hanford formation unit 2 sampling interval. K. Schuyler referred to Attachment 4 and pointed out that previous sampling from 93 to 95 ft bgs was already completed, so additional sampling at this depth is not recommended. Jackson Davis (Ecology) asked if VOAs are being analyzed for at D0602. K. Schuyler said that VOAs are not required to be analyzed for at D0602, but PCBs will be analyzed for in the top 15 ft. J. Davis and C. Glick concurred with the proposed sampling interval from 107 to 109 ft bgs.

- K. Singleton mentioned that two additional samples were proposed. K. Schuyler said that the additional sampling interval from 62 to 64 ft bgs was to target anomalous high moisture content within a low gross gamma zone. J. Davis and C. Glick concurred with both additional sampling intervals.

K. Singleton asked if the meeting attendees agreed on the proposed sample depths. All concurred.

Table 1. Sample Depths Selected for D0601/D0602

Recommended Sample Depth (ft bgs)	Reason	Stratigraphy
0-1	Preplanned surface sample	Backfill
3.5-6.5	Preplanned sample interval	
11.5-14.5	Preplanned sample interval	
44-46	Predetermined sample at backfill- Hf2 contact	Hf2
62-64*	Additional sample to target moisture peak in a low gamma, natural potassium, uranium, and thorium interval	

Table 1. Sample Depths Selected for D0601/D0602

Recommended Sample Depth (ft bgs)	Reason	Stratigraphy
107-109	Predetermined sample at bottom of the Hf2/ moisture and gamma peaks coincide	
124-126	Predetermined sample at the Hf2-CCUz contact/ moisture peak	CCUz
135-137*	Additional sample to target high moisture and gamma	
151-153	Predetermined sample at the CCUz-CCUc contact	CCUc

Backfill = 0-44; Hf2 = 44-124; CCUz=124-151; CCU_C= 151- total depth
*Additional sampling interval based on geophysical logging results.

bgs = below ground surface
Hf2 = Hanford formation unit 2
CCUz = Cold Creek unit silt
CCUc = Cold Creek unit caliche

Sample Selection at D0616:

K. Singleton provided the reasons for deep sample collection at D0616:

- Determine if contamination in vadose zone soil is present in the WMA S-SX study area.
- Investigate 216-S-15 Pond fluid discharge and 216-S-3 Crib discharge.

K. Singleton displayed the geophysical logging data from D0615 (Attachment 3) with the proposed sample depths for D0616. Logging data included moisture (blue line), gross gamma (dark red line), temperature (bright red), cesium-137, and natural background radionuclide results for potassium, uranium, and thorium. The recommended sample intervals and rationale (identified in Table 4 of Attachment 2) were discussed. K. Singleton identified that the subsurface sample intervals should be over-driven by 1 ft, resulting in a sample depth interval of 3 ft. Over-driving the sampling tool helps to recover more sample material. K. Schuyler added that analysis for organic constituents will be performed on shallow and deep soil samples at this direct push location.

K. Singleton opened the discussion with the meeting attendees on whether any additional sampling intervals are needed.

- C. Glick asked what the excavation depth was for the 216-S-3 Crib. Jeremey Lynn (H2C) responded that the crib bottom is around 38 ft bgs, but the actual crib isn't spatially large.

- C. Glick asked if sampling intervals at 50 ft bgs or 80 ft bgs should be considered. J. Davis asked if there is a borehole log for D0615 that is available to review. K. Schuyler answered that borehole logs are not generated for direct pushes due to the drilling method, and instead drilling rates are provided. K. Schuyler asked Richard Mahood (H2C) if there was anything unusual seen during the drilling of D0615. R. Mahood referred to the field notes and read off the following drilling rates:
    - 33 to 37 ft bgs (1 min 15 sec)
    - 37 to 41 ft bgs (1 min)
    - 41 to 45 ft bgs (4 min 40 sec)

- 45 to 49 ft bgs (6 min 48 sec)
- 49 to 53 ft bgs (7 min 34 sec)

C. Glick requested that an additional sample be collected from 49 to 51 ft bgs to target a possible facies change which could lead to contamination being hung up within this zone.

K. Singleton asked if the meeting attendees agreed on the proposed sample depths. All concurred.

Table 2. Sample Depths Selected for D0615/D0616

Recommended Sample Depth (ft bgs)	Reason	Stratigraphy
0-1	Preplanned surface sample	Backfill
3.5-6.5	Preplanned sample interval	
11.5-14.5	Preplanned sample interval	
25-28*	Additional sample to target gamma and moisture peaks as well as cesium-137 (close to the backfill-Hf1 contact)	
42-44	There is a predetermined sample at backfill-Hf2, but since there is no backfill-Hf2 contact, this depth interval will instead capture the Hf1-Hf2 contact.	Hf2
49-51*	Additional sample to target a possible facies change which could potentially contain contamination.	
107-109	Predetermined sample at bottom of the Hf2/ moisture and gamma peaks coincide	
124-126	Predetermined sample at the Hf2-CCUz contact	CCUz
156-158	Predetermined sample at the CCUz-CCUc contact	CCUc

Backfill = 0-29; Hf1 = 29-42; Hf2 = 42-124; CCUz=124-156; CCU_C= 156- total depth
*Additional sampling interval based on geophysical logging results.

bgs = below ground surface
Hf1 = Hanford formation unit 1
Hf2 = Hanford formation unit 2
CCUz = Cold Creek unit silt
CCUc = Cold Creek unit caliche

REBECCA BLACKWELL Digitally signed by REBECCA BLACKWELL Date: 2025.07.16 07:34:33 -07'00'

DOE Project Manager (print) | DOE Project Manager (signature) | Date

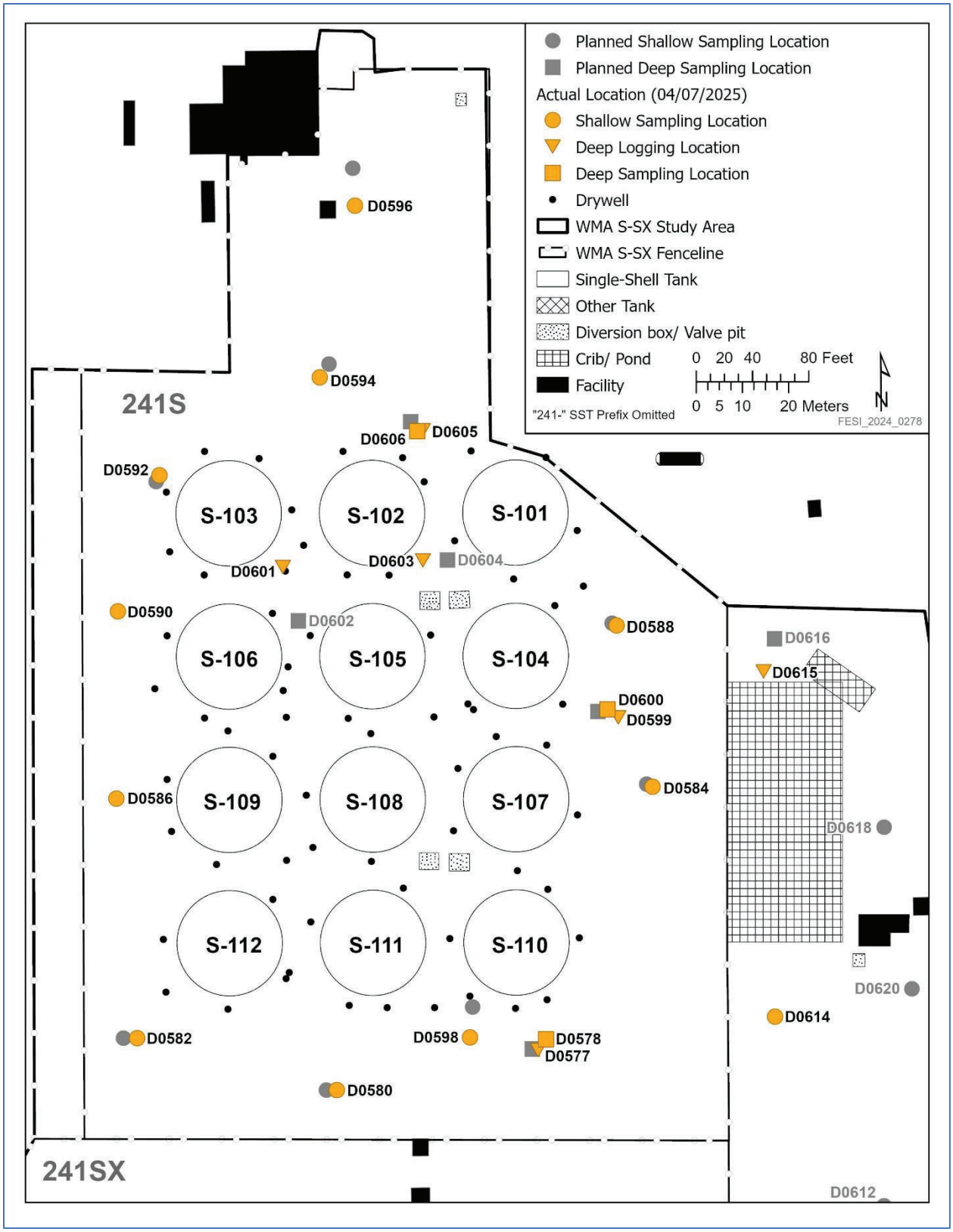
Elizabeth A. Rochette 2025.07.23 14:37:44 -07'00'

Ecology Project Manager (print) | Ecology Project Manager (signature) | Date

Attachment 1

Map of Planned and Actual Field Locations within the 241-S Tank Farm and Eastern Polygon

(2 pages including cover sheet)


Planned Shallow Sampling Location
Planned Deep Sampling Location
Actual Location (04/07/2025)
Shallow Sampling Location
Deep Logging Location
Deep Sampling Location
Drywell
WMA S-SX Study Area
WMA S-SX Fenceline
Single-Shell Tank
Other Tank
Diversion box/ Valve pit
Crib/ Pond
Facility
0 20 40 80 Feet
0 5 10 20 Meters
"241-" SST Prefix Omitted
FESI_2024_0278
241S
241SX
S-103
S-102
S-101
S-106
S-105
S-104
S-109
S-108
S-107
S-112
S-111
S-110
D0596
D0594
D0606
D0605
D0592
D0601
D0603
D0604
D0590
D0602
D0588
D0616
D0615
D0600
D0599
D0584
D0586
D0618
D0620
D0614
D0582
D0598
D0578
D0577
D0580
D0612

Attachment 2

Handout

(5 pages including cover sheet)

WMA S-SX Sample Depth Meeting
[D0601/ D0602 and D0615/D0616]
[04/23/2025]

Purpose of this Meeting:

- Field status summary
- Select judgmental sampling depths for D0602
- Select judgmental sampling depths for D06016

Background Information:

This characterization is being performed to collect samples for the WMA S-SX study area according to RPP-PLAN-65977, *Phase 2 RCRA Facility Investigation/ Corrective Measures Study Work Plan for Waste Management Area S-SX*, Appendix D, *Sampling and Analysis Plan.* RPP-PLAN-65977 identifies 39 sampling locations.

- **S-Farm (Exposure Area 1) – 15 sample locations**
  - At every sample location, one surface sample and two additional shallow samples will be collected. Three shallow samples will be collected at every sample location.
  - Five of the 15 locations, four deep samples will be collected down to a depth of ~150 ft bgs or refusal, with up to two additional samples based on geophysical logging.

- **SX-Farm (Exposure Area 2) – 17 sample locations**
  - Ten surface samples will be collected at the 10 locations outside of the interim surface barrier. Two shallow samples will be collected at every location.
  - Eight of the 17 locations, four deep samples will be collected down to a depth of ~150 ft bgs or refusal, with up to two additional samples based on geophysical logging.

- **East Polygon (Exposure Area 3) – 7 sample locations**
  - At every sample location, one surface sample and two additional shallow samples will be collected. Three shallow samples will be collected at every sample location.
  - One of the 7 locations, four deep samples will be collected down to a depth of ~150 ft bgs or refusal, with up to two additional samples based on geophysical logging.

WMA S-SX Sample Depth Meeting [D0601/ D0602 and D0615/D0616] [04/23/2025]

Field Status Summary:

Sampling:

S Farm (Exposure Area 1):

- All 10 shallow pushes have been sampled and decommissioned as of 3/18/2025.
- 3 of 5 deep pushes have been sampled and decommissioned as of 4/7/2025.
  - D0578
  - D0600
  - D0606

SX Farm (Exposure Area 2):

- No sampling has been performed as of 4/7/2025.

Eastern Polygon (Exposure Area 3):

- 1 of 6 shallow pushes have been sampled and decommissioned as of 4/7/2025.
  - D0614
- 0 of 1 deep push has been sampled and decommissioned as of 4/7/2025.

Logging:

Table 1: Direct Push Logging Holes Information

Location	Proposed Depth (ft bgs)	Actual Depth (ft bgs)	Logged	Decommissioned
S Farm (Exposure Area 1)				
D0577	~150	160	Complete 12/10/2024	Complete 1/14/2025
D0599	~150	160	Complete 12/16/2024	Complete 2/24/2025
D0601	~150	154	Complete 3/24/2025	--
D0603	~150	160	Complete 3/18/2025	--
D0605	~150	160	Complete 3/5/2025	Complete 4/3/2025
Eastern Polygon (Exposure Area 3)				
D0615	~150	160	Complete 3/27/2025	--

-- = to be determined

General Notes:

The preplanned shallow sample depths are 0-1 ft, 4-6 ft, and 12-14 ft per the SAP. Shallow sample intervals were increased by 1 ft. Rationale will be discussed during sample depth interval discussion for D0602 and D0616.

Four deep samples per location will be collected at lithologic changes and within targeted lithologic units: 1) (backfill/Hf2 contact, 2) bottom of Hf2, 3) Hf2/CCUz contact, 4) CCUz/CCUc). Up to two additional samples will be collected based on geophysical logging results.

WMA S-SX Sample Depth Meeting [D0601/ D0602 and D0615/D0616] [04/23/2025]

SELECTION OF SAMPLING DEPTHS FOR D0602

Information Evaluated to Help Determine Possible Sample Depths at D0602:

- Geophysical logging data from D0601. Data includes gross gamma, moisture, spectral gamma, temperature and cesium-137 concentrations.

Reason for Deep Sampling:

- Determine if contamination in vadose zone soil is present in the WMA S-SX study area.
- Investigate Tank 241-S-102 Riser Waste Loss and Water Release from Salt Well Line (SL-119)
- Supplement existing information from C8400 sampling between 54 and 128 ft bgs.

Table 2: Direct Push C8400 Sampling Summary

Core ID	Sample Depth (ft bgs)	HEIS Number (Composite Parts)	Date Collected	Sample Analyses Performed
C8400	54-56	B3FYY0 (B2FYP4, B2FYP5, B2FYP6, B2FYY0)	8/12/2011	% water, % solids, alkalinity, anions/acids, bulk density, cyanide, pH, technetium-99, metals, radionuclides
	93-95	B2FYY1	8/15/2011	
	126-128	B2FYY2	8/18/2011	

See additional handout for sample results above Hanford background.

Note: Analysis for PCBs will be performed on only shallow soil samples.

Table 3: Sample Depth Recommendations for D0601/D0602

Judgmental		Stratigraphy
Recommended Sample Depth (ft bgs)	Reason	
0-1	Preplanned surface sample	Backfill
3.5-6.5	Preplanned sample interval	
11.5-14.5	Preplanned sample interval	
44-46	There is a predetermined sample at backfill- Hf2 contact	
62-64	Additional sample to target moisture peak in a low gamma, natural potassium, uranium, and thorium interval	Hf2
107-109	Predetermined sample at bottom of the Hf2/ Moisture and gamma peaks coincide	
124-126	Predetermined sample at the Hf2-CCUz contact	CCUz
135-137	Additional sample to target high gamma and moisture	
151-153	Predetermined sample at the CCUz-CCUc contact	CCUc

Note: The SAP outlines four predetermined samples per sampling location that will be collected at lithologic changes and within targeted lithologic units (backfill/Hf2 contact, bottom of Hf2, Hf2/CCUz contact, and the CCUz/CCUc contact).

Backfill = 0-44; Hf2 = 44-124; CCUz=124-151; CCUc= 151- total depth

bgs = below ground surface
Hf2 = Hanford formation unit 2
CCUz = Cold Creek unit silt
CCUc = Cold Creek unit caliche

WMA S-SX Sample Depth Meeting [D0601/ D0602 and D0615/D0616] [04/23/2025]

SELECTION OF SAMPLING DEPTHS FOR D0616

Information Evaluated to Help Determine Possible Sample Depths at D0616:

- Geophysical logging data from D0615. Data includes gross gamma, moisture, spectral gamma, temperature and cesium-137 concentrations.

Reason for Deep Sampling:

- Determine if contamination in vadose zone soil is present in the WMA S-SX study area.
- Investigate 216-S-15 Pond fluid discharge and 216-S-3 Crib discharge.

Note: Analysis for organic constituents (VOCs/ SVOCs) will be performed on shallow and deep soil samples.

Table 4: Sample Depth Recommendations for D0615/ D0616

Judgmental		Stratigraphy
Recommended Sample Depth (ft bgs)	Reason	
0-1	Preplanned surface sample	Backfill
3.5-6.5	Preplanned sample interval	
11.5-14.5	Preplanned sample interval	
25-28	Additional sample to target gamma and moisture peaks as well as cesium-137; close to backfill – Hf1 contact	
42-44	There is a predetermined sample at backfill- Hf2 contact, but since there is no backfill – Hf2 contact, this depth interval will instead capture the Hf1 – Hf2 contact.	Hf2
107-109	Predetermined sample at bottom of the Hf2/ Moisture and gamma peaks coincide	
124-126	Predetermined sample at the Hf2-CCUz contact	CCUz
156-158	Predetermined sample at the CCUz-CCUc contact	CCUc

Note: The SAP outlines four predetermined samples per sampling location that will be collected at lithologic changes and within targeted lithologic units (backfill/Hf2 contact, bottom of Hf2, Hf2/CCUz contact, and the CCUz/CCUc contact).

Backfill = 0-29; Hf1 = 29-42; Hf2 = 42-124; CCUz=124-156; CCUc= 156- total depth

bgs = below ground surface
Hf1 = Hanford formation unit 1
Hf2 = Hanford formation unit 2
CCUz = Cold Creek unit silt
CCUc = Cold Creek unit caliche

Attachment 3

Draft Geophysical Logs for 241-S Farm Location D0601 and Eastern Polygon Location D0615

(4 pages including cover sheet)

ITDC-PRES-25-1990

Spectral Gamma and Moisture Survey

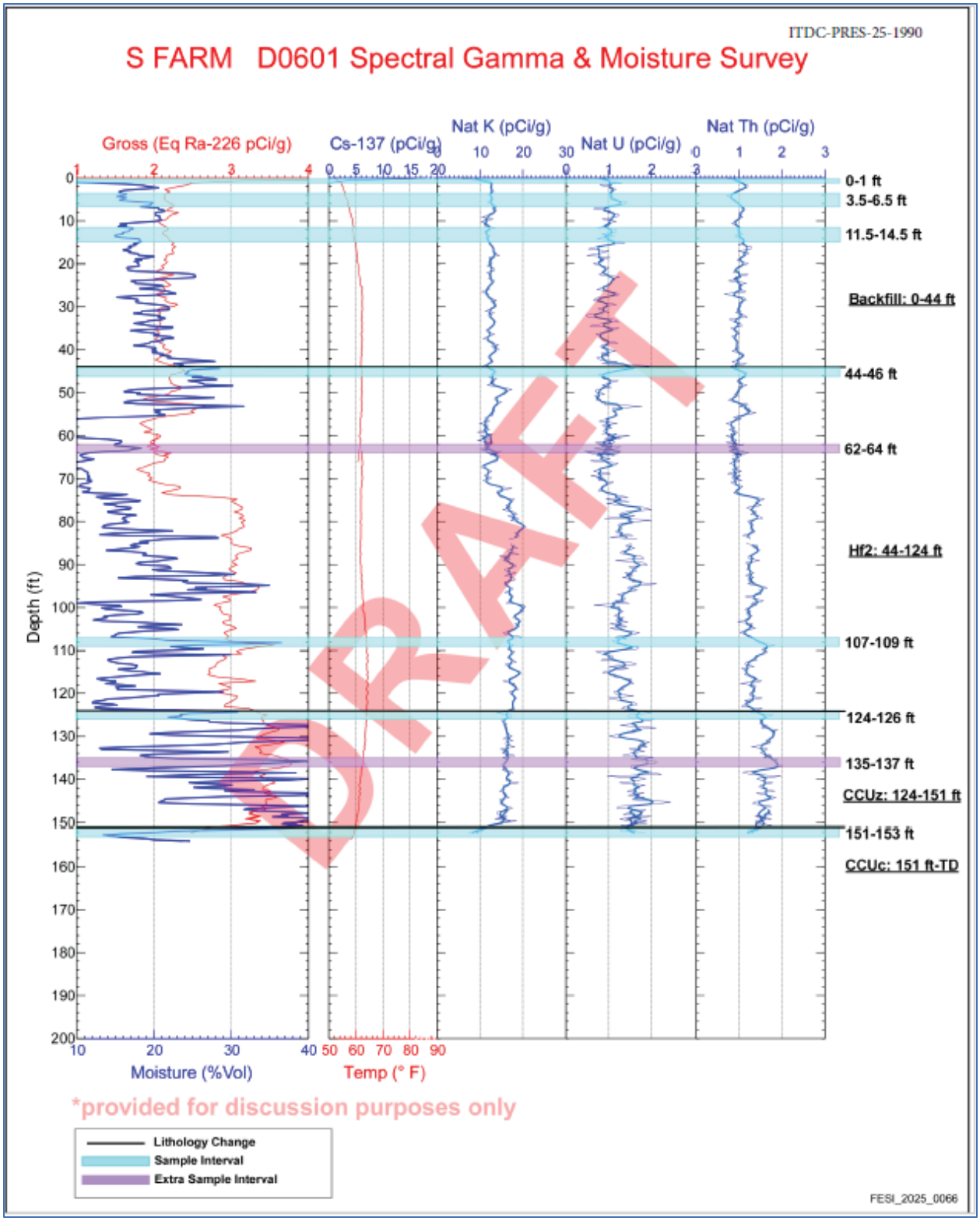
WMA S-SX D0601 and D0615

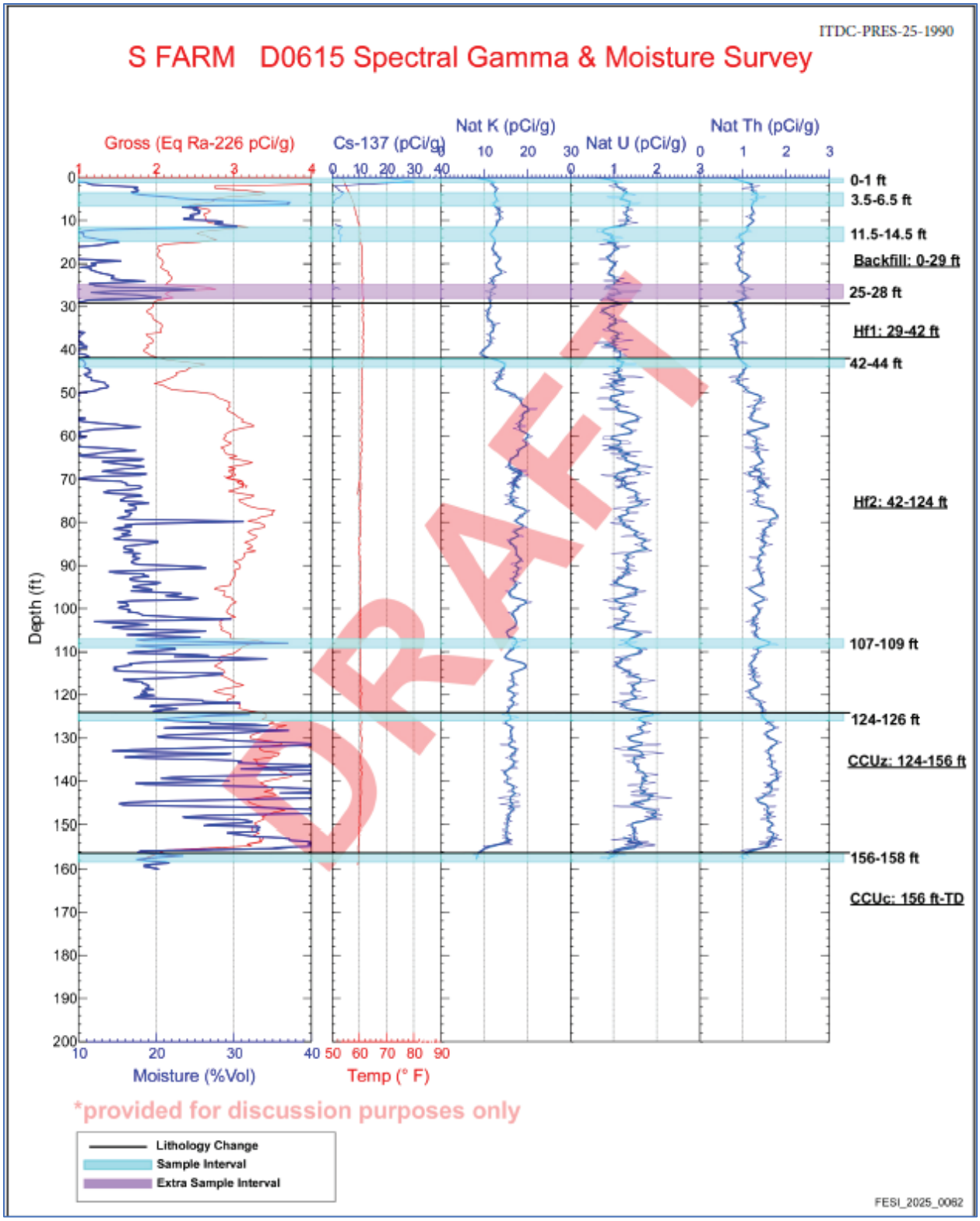
The attached draft geophysical logging data is associated with WMA S-SX direct push sampling and RPP-PLAN-65977, *Phase 2 RCRA Facility Investigation/ Corrective Measures Study Work Plan for Waste Management Area S-SX*.

The draft spectral gamma and moisture survey data for D0601 and D0615 is for discussion purposes only. The final geophysical logging data can be found in the associated completion report following this direct push sampling effort.

DRAFT

Approved for Public Release;
Further Dissemination Unlimited


ITDC-PRES-25-1990
S FARM D0601 Spectral Gamma & Moisture Survey
Gross (Eq Ra-226 pCi/g)
Cs-137 (pCi/g)
Nat K (pCi/g)
Nat U (pCi/g)
Nat Th (pCi/g)
Depth (ft)
Moisture (%Vol)
Temp (° F)
0-1 ft
3.5-6.5 ft
11.5-14.5 ft
Backfill: 0-44 ft
44-46 ft
62-64 ft
Hf2: 44-124 ft
107-109 ft
124-126 ft
135-137 ft
CCUz: 124-151 ft
151-153 ft
CCUc: 151 ft-TD
DRAFT
*provided for discussion purposes only
Lithology Change
Sample Interval
Extra Sample Interval
FESI_2025_0066


ITDC-PRES-25-1990
S FARM D0615 Spectral Gamma & Moisture Survey
Gross (Eq Ra-226 pCi/g)
Cs-137 (pCi/g)
Nat K (pCi/g)
Nat U (pCi/g)
Nat Th (pCi/g)
Depth (ft)
Moisture (%Vol)
Temp (° F)
0-1 ft
3.5-6.5 ft
11.5-14.5 ft
Backfill: 0-29 ft
25-28 ft
Hf1: 29-42 ft
42-44 ft
Hf2: 42-124 ft
107-109 ft
124-126 ft
CCUz: 124-156 ft
156-158 ft
CCUc: 156 ft-TD
DRAFT
*provided for discussion purposes only
Lithology Change
Sample Interval
Extra Sample Interval
FESI_2025_0082

Attachment 4

Supplemental Analytical Data from Soil Samples Collected at C8400

(2 pages including cover sheet)

WMA S-SX Sample Depth Meeting
[D0601/D0602]
[04/23/2025]

Supplemental Data

Table 1: Analytical Results from Soil Samples Collected at Direct Push C8400 Above Hanford Background Values

Constituent of Interest	Depth Interval (ft bgs)	Result	Lab Qualifier	Hanford Background Value
Aluminum	126-128	**12,400 ug/g**	--	11800 mg/kg
Antimony	54-56	0.198 ug/g	--	0.13 mg/kg
	93-95	0.447 ug/g	--	
	126-128	**0.481 ug/g**	--	
Arsenic	93-95	**9.11 ug/g**	X	6.47 mg/kg
Chromium	54-56	**29 ug/g**	--	18.5 mg/kg
	93-95	24.6 ug/g	--	
	126-128	22.8 ug/g	--	
Lead	93-95	**11.1 ug/g**	--	10.2 mg/kg
Lithium	93-95	13.6 ug/g	--	13.3 mg/kg
	126-128	**14.3 ug/g**	--	
Nickel	54-56	**175 ug/g**	--	19.1 mg/kg
	126-128	20.8 ug/g	B	
Phosphate	126-128	**1.34 ug/g**	BN	0.785 mg/kg
Thallium	93-95	**0.226 ug/g**	CN	0.185 mg/kg
	126-128	0.21 ug/g	CN	

-- = not applicable
Bolded values mark the depth interval of the highest reported value for a constituent.

Note: Results were pulled from EDA on 04/09/2025.
1 ug/g = 1 mg/kg