

MEETING NOTES
Waste Management Area A-AX: Additional Sampling Discussion

MEETING DATE: September 29, 2020

LOCATION: Microsoft Teams Meeting

ATTENDEES:

Jim Alzheimer (Ecology)	Deanna Klages (WRPS)	Beth Rochette (Ecology)
Mike Barnes (Ecology)	Jon Lindberg (Ecology)	Kim Schuyler (Freestone)
Marcel Bergeron (WRPS)	Rod Lobos (DOE-ORP)	Marysia Skorska (Ecology)
Becky Blackwell (DOE-ORP)	Scott Luke (WRPS)	Sarah Springer (CHPRC)
Damon Delistraty (Ecology)	Jeff Lyon (Ecology)	Cindy Tabor (WRPS)
Jim Field (WRPS)	Mahmud Rahman (INTERA)	Robin Varljen (WRPS)
Doug Hildebrand (DOE-RL)	Julie Robertson (Freestone)	

BACKGROUND INFORMATION: Between January and August 2017, representatives of the Washington State Department of Ecology (Ecology), the U.S. Environmental Protection Agency (EPA), the U.S. Department of Energy Office of River Protection (DOE-ORP), the U.S. Department of Energy Richland Operations Office (DOE-RL), Washington River Protection Solutions (WRPS), and CH2MHILL Plateau Remediation Contractor (CHPRC) participated in a series of meetings to develop data quality objectives (DQOs) for Waste Management Area (WMA) A-AX vadose zone soil. The results of those meetings are documented in *Data Quality Objectives for Vadose Zone Characterization at Waste Management Area A-AX* (RPP-RPT-60227, Rev. 0; henceforth called the DQO Report). Since that time, WRPS, DOE-ORP, and Ecology have continued working together to define additional DQOs and data needs for WMA A-AX, as documented in meeting notes and revisions to the DQO Report.

1.0 PURPOSE OF MEETING

This meeting was called to provide the agencies that participated in the WMA A-AX DQO process an opportunity to discuss additional sampling for the RCRA Facility Investigation/Corrective Measure Study (RFI/CMS) for the vadose zone at WMA A-AX (Step 7 of the DQO process, Develop the Plan for Obtaining Data).

Cindy Tabor stated that ultimately, the goal of the vadose zone sampling effort at WMA A-AX is defined in the DQO Report and is to ensure the appropriate vadose zone soil characterization data are collected to support corrective measure decisions for WMA A-AX.

2.0 BACKGROUND

Ms. Tabor began the meeting by acknowledging that the agencies had not yet agreed on a definition for the boundary for the WMA A-AX soil investigation. She stated that the parties were working toward defining that boundary, but that this meeting would focus on sampling that is needed to complete characterization of soils within the 241-A Tank Farm and 241-AX Tank Farm (A Farm and AX Farm) fencelines.

Ms. Tabor provided a summary of WMA A-AX soil sampling efforts going back to 2014, sharing the information provided in Attachment 1. Characterization activities include the following:

1. In 2014 and 2015, before the DQO process was performed, samples were collected from three depths at each of the four locations in AX Farm. Data resulting from this effort were summarized in a presentation given in 2016; the presentation appears as Appendix B of the DQO Report.
2. Sampling occurred in Focus Area 1 in accordance with Revision 0 of the DQO Report. The Focus Area 1 effort investigated potential leaks from Tanks 241-A-104 and 241-A-105. Samples were taken at five locations selected using a judgmental sampling approach. Three shallow samples and seven deep samples were taken from each location.
3. Sampling is occurring in Focus Area 2 in accordance with Revision 1 of the DQO Report. The Focus Area 2 effort is investigating whether well corrosion in the southwest area of A Farm was associated with A Farm tank waste releases. Samples are being taken at three locations. Two of the locations are inside A Farm (D0005/D0006 and D0007/D0008). The third location is one large-diameter hole located outside the A Farm fenceline (D0012). Sample locations were selected using a judgmental sampling approach. Three shallow samples and seven deep samples are being taken from each location. Sampling is currently underway at D0008 and Ms. Tabor noted that a meeting will be scheduled in October to discuss sampling depths at D0006.

3.0 ADDITIONAL SAMPLING DISCUSSION

Introduction

Ms. Tabor introduced the sampling discussion. She stated that the unsampled area within the fenceline and outside the focus areas is ~12,000 square meters in A Farm and ~11,000 square meters in AX Farm. The recommended approach for the remaining sampling uses a predominantly random sample design. The design reflects information about potential tank waste releases, other unplanned releases to the environment, input from Ecology, and a letter from the Nez Perce Tribe that suggested that Tanks 241-A-103 (A-103), 241-AX-102 (AX-102), and 241-AX-104 may have leaked (Nez Perce letter, to Jeff Lyon, Ecology, from Jack Bell, "Data Quality Objectives for the Waste Management Area A-AX Phase 2 RCRA Facility Investigation/Corrective Measures Study," dated June 30, 2017). Additionally, the sample design incorporated information in the following guidance documents:

- OSWER Publication 9285.7-081, 1992, *Supplemental Guidance to RAGS: Calculating the Concentration Term*, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.
 - Suggests a minimum of 10 sample locations per tank farm
- NUREG-1575, 2000, *Multi-Agency Radiation Survey and Site Investigation Manual*, Rev. 1, U.S. Environmental Protection Agency, U.S. Department of Energy, U.S. Department of Defense, and U.S. Nuclear Regulatory Commission, Washington, D.C. (also listed as EPA/402/R-97/016 and DOE/EH-0624)
 - Suggests a minimum of eight samples, plus an additional 20% per tank farm to protect against data issues, for a total of 10 samples per tank farm

- EPA/540-R-00-007, 2000, *Soil Screening Guidance for Radionuclides: User's Guide*, Office of Radiation and Indoor Air, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.
 - Suggests a minimum of six sample locations per tank farm, and deep sampling at two to three of these locations per tank farm for possible highest contamination areas.

Ms. Tabor stated that the recommended sample design is 10 sample locations per tank farm, with deeper sampling at two to three of these locations per tank farm, preferably in areas where there is a higher likelihood of finding contamination.

Process for Development of Sample Design

Kim Schuyler identified the steps taken to develop the recommendation for each tank farm.

- Step 1. Generate a random sampling grid for each tank farm.
- Step 2. Adjust randomly identified sample locations to account for infrastructure obstructions.
- Step 3. Evaluate input about tank waste releases, other releases, and from Ecology and the Nez Perce to identify any need for judgmental sampling (e.g., deep samples).
- Step 4. Generate sample depth recommendations:
 - Three shallow samples [taken from < 15 ft below ground surface (bgs)] from each location
 - Seven deep samples (taken from > 15 ft bgs) from each of the proposed deep sample locations. Deep sample depth intervals will be selected after evaluating logging data from twinned borehole with Ecology.

Development of A Farm Sample Design

The steps taken to develop recommendations for A Farm were described by Ms. Schuyler.

- Step 1. Generated initial sample locations based on a regularly shaped gridded area. Due to the irregular shape of the portion of A Farm that is both within the fenceline and outside previously sampled areas, only nine random locations were identified. See Attachment 2.
- Step 2. Past ground penetrating radar surveys identified a significant amount of underground infrastructure at A Farm, as shown in Attachment 3. Some of the random sample locations were plotted in locations where it would be impossible to sample due to infrastructure interference (e.g., above tanks and piping). These locations were moved to the next closest area where sampling should be feasible.
- Step 3. The letter from the Nez Perce points to cesium-137 contamination in logs from drywells 10-03-01, 10-03-07, 10-02-03 as an indicator of a release from Tank A-103. However, *Hanford 241-A and 241-AX Tank Farms Leak Inventory Assessment Report* (RPP-ENV-37956, Rev. 3) classifies this tank as “sound” and suggests that contamination in drywell 10-03-07

(southwest of A-103) may be from a non-tank source. Therefore, the recommendation is that Sample 6 location be sampled only at shallow depths.

Spectral gamma data for several drywells around A-103 indicate the presence of small amounts of cesium-137 at 80 ft bgs and below. The cesium is thought to be associated with drag-down of shallow contamination when the well depths were extended (*Field Investigation Report for Waste Management Areas C and A-AX*, RPP-35484, Rev. 1). To investigate this area, the recommendation is that Sample 2 location be sampled at both shallow and deep intervals.

A Farm Sample 7 location is near an area of interest. In 1965 there was a leak from an underground line by the 241-A-152 Diversion Box. Documentation is unclear about the exact location of this leak. Near Sample 7 location there is also some lead shielding and shotcrete, yet there is no documentation of a spill at that location. Additionally, in 1978, a raw water line leaked ~60,000 gallons in the area. Therefore, the recommendation is to take both shallow and deep samples at Sample 7 location.

Installation of a tenth borehole southeast of A-103 and adjacent to drywell 10-03-04 (where contamination was identified at depth) is recommended as an addition to the nine locations identified in previous steps. There are limited surface and subsurface obstructions (infrastructure) at this location, and analysis of both shallow and deep samples from this location might provide valuable information about A-103.

Step 4. Referring to Attachment 4, Ms. Schuyler summarized the recommended A Farm sample design as follows.

- Sample at nine randomly selected sample locations (with minor location adjustments due to infrastructure interferences) plus one additional “judgmental sample” location of interest.
- Take three shallow samples (from < 15 ft bgs) at each of the 10 locations.
- Take seven deep samples (from > 15 ft bgs) at each of three locations (Sample 2 and 7 locations and the judgmental location southeast of A-103).

Discussion of A Farm Sample Design

Beth Rochette stated that the locations identified for deep sample collection were not selected randomly. This should be considered during the data evaluation process. Ms. Tabor agreed.

Jeff Lyon asked what the source of information about contamination is. Ms. Tabor responded that the information came from RPP-ENV-37956 and borehole logging.

Marysia Skorska asked what benefit sampling at Sample 1 location would provide. She suggested consideration of an area north of Sample 7 location instead. Ms. Tabor stated that Sample 1 location was identified as a result of the random gridding of A Farm, a process driven by the EPA soil sampling guidance documents cited earlier in the meeting. Ms. Tabor stated that Ecology had an action from prior meetings to identify other potential WMA A/AX focus areas of interest, and no other areas had been identified within the fenceline, so the recommendation for additional sampling relies on the use of random sampling per EPA guidance. Ms. Tabor acknowledged that a lot of information was being

provided in a short time. She said that the information would be documented in meeting notes, and she asked the Ecology representatives to review the meeting notes and provide feedback.

Dr. Rochette asked for clarification of the area of concern. Ms. Tabor confirmed that the area under consideration is inside the fenceline but excludes areas evaluated during Focus Area 1 and Focus Area 2 planning.

Damon Delistraty asked Ms. Tabor to discuss how the randomly selected locations were identified. Mahmud Rahman stated that the locations were generated by a random sample generator, were then triangulated for distance between locations, and then were gridded. It was noted that the initial random Sample 5 and 6 locations had to be adjusted due to infrastructure interferences.

Development of AX Farm Sample Design

The steps taken to develop recommendations for AX Farm were described by Ms. Schuyler.

Step 1. As at A Farm, the area of interest is the area within the fenceline and that excludes the areas addressed by Focus Areas 1 and 2. The random sample generator identified 10 random sample locations as shown in Attachment 2.

Step 2. As a result of infrastructure interferences shown in Attachment 3, randomly selected Sample 4 location was adjusted slightly.

Ms. Schuyler noted that none of the locations in A Farm or AX Farm can be finalized until a new ground penetrating radar survey is conducted, and that retrieval activities may also impact proposed sample locations. If further adjustments are needed, relevant information will be discussed with Ecology.

Step 3. The sample design was adjusted to reflect concerns identified in the 2017 Nez Perce letter and prior findings of contamination at AX Farm. Sample 7 location in AX Farm is near contamination seen in drywell 11-04-01 near Tank AX-102. Historical gamma logs show contamination to ~ 65 ft bgs. Ms. Schuyler stated that the contamination seen at the drywells may be a result of releases associated with the 241-AX-A and 241-AX-B valve pits. The recommendation is to take both shallow and deep samples at Sample 7 location to investigate this area. Collection of both shallow and deep samples is also recommended at Sample 4 location in the area between the four AX Farm tanks.

Deep samples already collected north and southwest of the Tank AX-102 did not find contamination. No additional deep sampling was recommended.

Step 4. Referring to Attachment 4, Ms. Schuyler summarized the recommended A Farm sample design as follows.

- Sample at 10 randomly selected sample locations.
- Take three shallow samples (from < 15 ft bgs) at each of the 10 locations.
- Take seven deep samples (from > 15 ft bgs) at both Sample 4 and 7 locations.

Discussion of AX Farm Sample Design

Mr. Lyon asked why sampling was undertaken in 2014-2015. Ms. Tabor responded that it was driven by *Hanford Federal Facility Agreement and Consent Order* Milestone M-045-56 regarding interim measures. She said that the investigation provided geophysical logging data to ~250 ft bgs and three samples from each of the four locations in AX Farm. She added that the results of that investigation were captured in a presentation given in 2016, which is provided in Appendix B of the DQO Report.

General Discussion of Additional Sampling

Mr. Lyon asked whether any deep samples were collected as part of the Phase 1 RFI at WMA A-AX. Mike Barnes said that no deep samples were collected.

Mr. Lyon asked whether the diagrams shown at this meeting would be included in the DQO Report. Ms. Tabor responded that they would be incorporated into meeting notes, the DQO Report, and eventually into the future WMA AX RFI/CMS work plan.

Mr. Lyon asked what the process is to define the overall boundary for the WMA A-AX soil investigation. Ms. Tabor said that the focus of this meeting was the area inside the fenceline of A Farm and AX Farm, that the overall boundary for the soil investigation was not defined yet, and that boundary discussions need to continue. She said this meeting would allow DOE to move forward on the portion inside the fencelines. Mr. Lyon asked how the need for random sampling would be addressed if additional areas outside the fencelines need to be incorporated into the effort. Ms. Tabor identified that until additional areas are identified, the methodology would not be known. However, DOE might recommend additional judgmental sampling, like the proposed sampling during installation of the PW-2 groundwater well by Catch Tank 241-A-302B.

Summary

Ms. Tabor stated that Ecology had an action from prior meetings to identify other potential WMA A/AX focus areas of interest, and no other areas had been identified within the fenceline. As a result, the recommendation for additional sampling used a predominantly random sampling approach based on EPA guidance. Ms. Tabor summarized the recommendations for additional sampling within the WMA A-AX fencelines as follows.

- 241-AX Farm will have 10 random sample locations
 - Three shallow (<15 ft) samples will be collected at all 10 locations.
 - Two of the 10 locations will also have 7 deep (>15 ft) samples collected
- 241-A Farm will have 9 random sample locations
 - Three shallow (<15 ft) samples will be collected at all 9 locations.
 - Two of the 9 locations will also have 7 deep (>15 ft) samples collected
- One judgmental location will have three shallow (<15 ft) and 7 deep (>15 ft) samples will be collected at this location.

Ms. Tabor asked the Ecology representatives to review the proposal, which will be documented in meeting notes, and provide feedback.

Mr. Lyon and Rod Lobos agreed that the goal in the end is that the WMA A-AX DQO process will provide for all the data required to support the WMA A-AX RFI/CMS process. Ms. Skorska stated that DOE needs to develop the conceptual site model in the RFI, and that the objective of the conceptual site model is to allow for identification of data gaps. She said that more sampling might be needed. Ms. Tabor agreed that a conceptual site model and work plan need to be developed and that additional data might need to be collected if data gaps were identified. She stated that the agencies should continue to work together to address the concerns.

Mr. Hildebrand reflected on Attachment 4, noting that the proposed sample design calls for quite a bit of sampling, and that the recommended sample locations are less than 50 m apart so are closely spaced.

4.0 ACTIONS AND AGREEMENTS

No new agreements were reached. No new actions were taken.

Ms. Tabor stated that Ecology comments on the September 1 meeting notes were due yesterday, that she had received no comments, and that they would be issued for signature shortly.

During the discussion of the actions, the attendees agreed to make the following change to the description of Action 2017-04-13-02: Delete the sentence referring to Action 2017-08-07-09, to eliminate the circular reference.

Table 1. Actions (3 pages)			
Action Number	Actionee	Description	9/29/2020 Status
2017-03-30-03	Lyon/Lobos	Ecology and DOE-ORP will identify whether there are other potential WMA A/AX focus areas of interest and their level of interest in other focus areas relative to the Tanks A-104/105 focus area. 8/31/17: Ecology identified the areas near Tanks A-103, AX-102, and AX-104 as being of interest. Retain as open item for draft DQO summary report.	Close. Action to be combined into 2017-04-13-02.
2017-04-13-02	Lobos/Lyon	Discuss how DQO Step 4, define the boundaries of the study, will be addressed for the whole of WMA A-AX.	Open. DOE proposes to segment 200-E-131 and limit the WMA A-AX RFI/CMS scope to locations inside the fenceline and the soil around the 241-A-302B Catch Tank.
2017-08-07-09	Lobos/ Hildebrand	To support Action 2017-04-13-02, DOE representatives will meet to discuss how to address areas outside the WMA A-AX fenceline that are not yet identified in the 200-IS-1 Operable Unit.	Close. DOE representatives have met to discuss areas outside the fenceline and outside the 200-IS-1 operable unit. Action to be combined into 2017-04-13-02.

Table 1. Actions (3 pages)

Action Number	Actionee	Description	9/29/2020 Status
2017-08-31-08	Lobos/ Hildebrand/ Lyon	Ecology, DOE-ORP, and WRPS will continue discussions about WMA A-AX Decision Rule and Performance Criteria text on data evaluation (e.g., use of 95% UCL).	Open. Refer to Section 6.2 in DQO Report Rev. 1, which states: "Use of acceptable levels will be documented during the development of the WMA A-AX RFI/CMS Phase 2 Work Plan. Additionally, cumulative risk calculations will be documented during the development of the WMA A-AX RFI/CMS Phase 2 Work Plan."
2019-03-05-01	Tabor	Provide a comparison of the analytical moisture measurements and the geophysical logging results.	Open. Applies to Focus Area 1. Still waiting on final laboratory reports.
2019-03-05-03	Tabor	Provide Ecology with final laboratory report when it is released.	Open. Applies to Focus Area 1. Still waiting on final laboratory reports.
2019-03-05-05	Hildebrand	Report back on RL discussions about management of pipelines just outside tank farm fencelines as a part of 200-IS-1 OU.	Close. Investigation of pipelines outside the WMA A-AX soil investigation boundary will be addressed by an operable unit. Action to be combined into 2017-04-13-02.
2020-09-01-01	Tabor	Send the following information to ECY (Lyon, Menard, Welsch): <ul style="list-style-type: none"> • Information about 244-AR Vault • 200-E-131 information shown at meeting • Snip from HMAPS showing southeastern boundary of WMA A-AX and waste sites/structures crossing the purple segment of 200-E-131. 	Close. Information provided by Email from Cindy Tabor on 9/3/2020.
2020-09-01-02	Lyon, Menard, Welsch	Following receipt of information identified in Action 2020-09-01-01, discuss internally the following items to prepare for a follow-on meeting with DOE about the boundary to be addressed in the WMA A-AX soil RFI: <ul style="list-style-type: none"> • Segmentation of waste site 200-E-131 • Exclusion of 2607-ED septic tile field from WMA A-AX investigation • Closure of 244-AR Vault • WMA A-AX RFI soil investigation boundary definition. 	Close. Internal Ecology meeting held to support 9/16/2020 meeting between DOE and Ecology.

Table 1. Actions (3 pages)			
Action Number	Actionee	Description	9/29/2020 Status
2020-09-01-03	Tabor	Schedule follow-on meeting between DOE and ECY to discuss the boundary to be addressed in Step 4 of the WMA A-AX soil DQO.	Close. A follow-on meeting was scheduled for 9/16/2020.
2020-09-01-04	Lobos/Lyon	Address CMS scope/definitions.	Open.

Rodrigo Lobos
DOE Project Manager (print)

Rodrigo Lobos
DOE Project Manager (signature)

Date

Jeffery J Lyon
Ecology Project Manager (print)

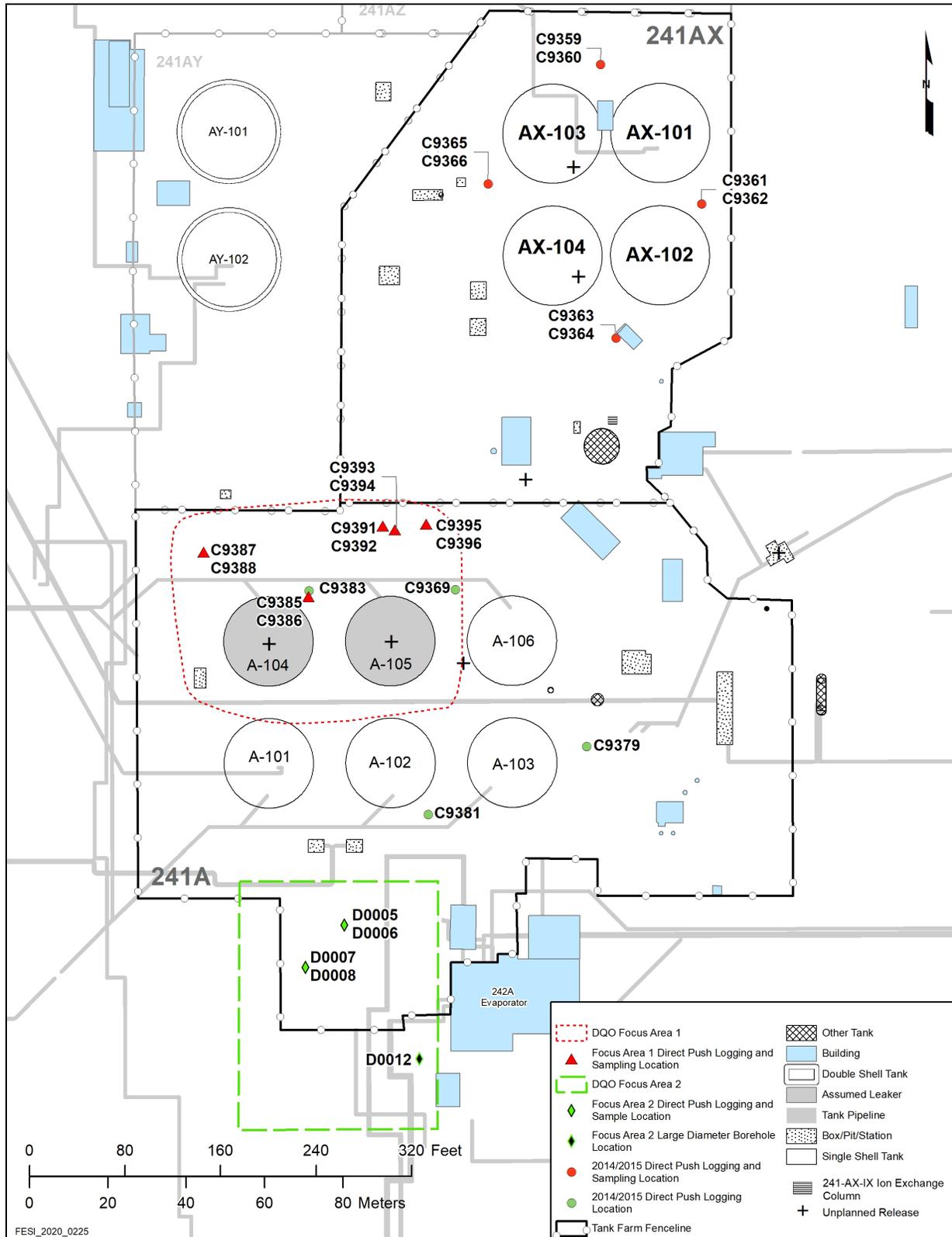
Ecology Project Manager (signature)

11-13-20
Date

Attachment 1

**WMA A-AX Characterization During 2014/2015 and at
Focus Area 1 and Focus Area 2 (2014 to Present)
(3 pages)**

Location of WMA A-AX Characterization Activities During 2014/2015 and at Focus Area 1 and Focus Area 2



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**Summary of WMA A-AX Characterization Activities During 2014/2015 and at
Focus Area 1 and Focus Area 2**

Push ID	Purpose	Sample depths (ft bgs ^a)		Campaign	Farm
C9360 (C9359)	sampling (logging)	50-52		2014/2015	AX Farm
		115-117			
		179.5-181.5			
C9362 (C9361)	sampling (logging)	52-54			
		125.5-127.5			
		202-204			
C9364 (C9361)	sampling (logging)	45.5-47.5			
		121-123			
		145.5-147.5			
C9366 (C9365)	sampling (logging)	99.5-101.5			
		143-145			
		182-184			
C9369	logging	-		2014/2015	A Farm
C9379	logging	-			
C9381	logging	-			
C9383	logging	-			
C9386	sampling	Surface		Focus Area 1	A Farm
		7-9			
		12-14			
		53-55			
		75-77			
		132-134			
		210-212			
		263-265			
		273-275			
		275-277			
C9388 (C9387)	sampling (logging)	Surface	-	Focus Area 1	A Farm
		9-11 ft pipe run	~4.1		
		15-17 ft pipe run	~8.3		
		63-65 ft pipe run	~48.9		
		124-126 ft pipe run	~95.2		
		141-143 ft pipe run	~106.2		
		161-163 ft pipe run	~123.5		
		184-186 ft pipe run	~136.4		
		203-205 ft pipe run	~148.7		
290-292 ft pipe run	~190.2				

**Summary of WMA A-AX Characterization Activities During 2014/2015 and at
Focus Area 1 and Focus Area 2**

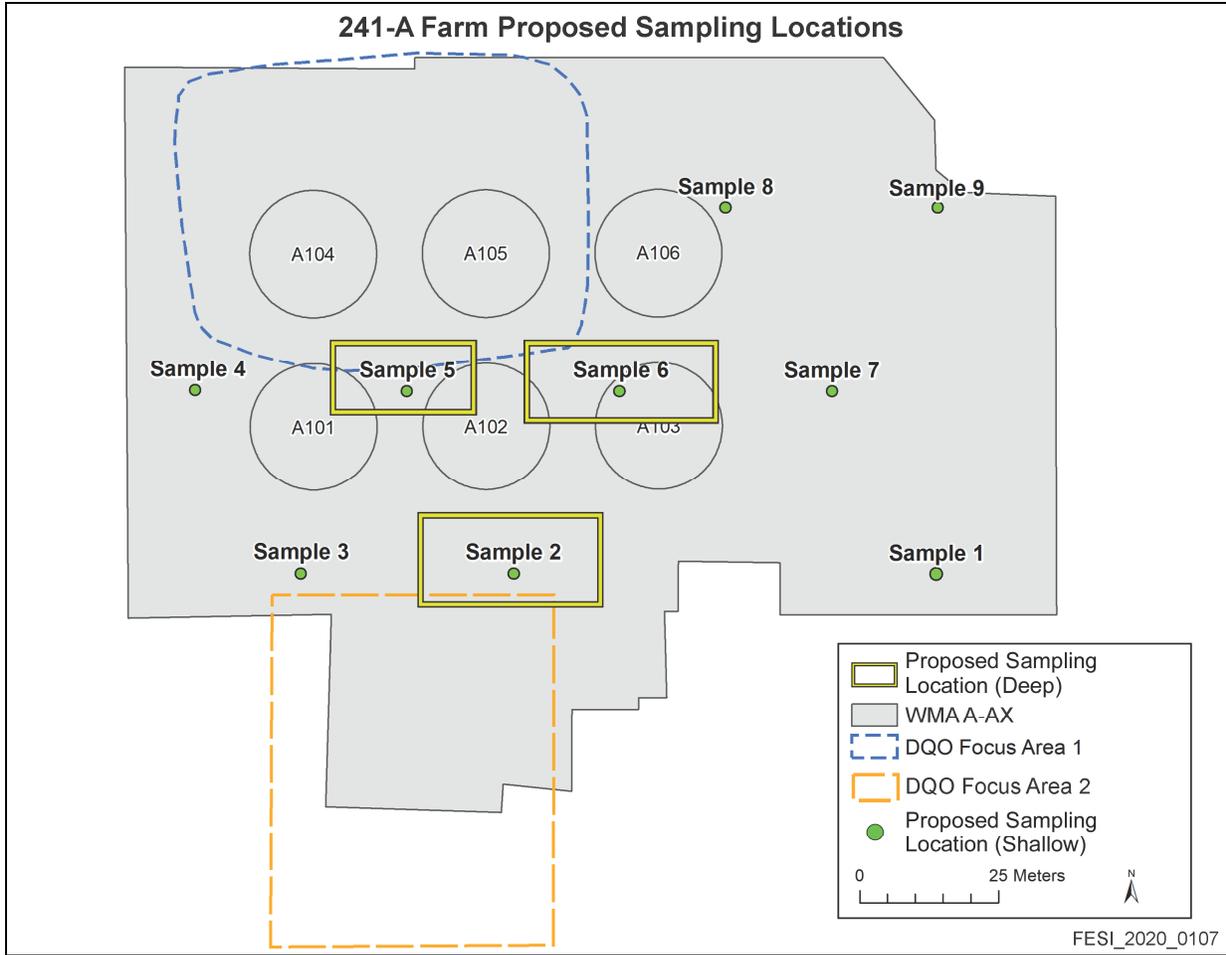
Push ID	Purpose	Sample depths (ft bgs ^a)		Campaign	Farm
C9392 (C9391)	sampling (logging)	Surface	-	Focus Area 1	A Farm
		8-10 ft pipe run	~7.8		
		14-16 ft pipe run	~13.1		
		54-56 ft pipe run	~46.6		
		60-62 ft pipe run	~51.7		
		113-115 ft pipe run	~93.5		
		158-160 ft pipe run	~125.4		
		190-192 ft pipe run	~145.8		
		254-256 ft pipe run	~179.0		
		262-264 ft pipe run	~181.9		
		266-268 ft pipe run	~183.3		
C9394 (C9393)	sampling (logging)	Surface	-	Focus Area 1	A Farm
		7-9 ft pipe run	~7.4		
		12-14 ft pipe run	~12.4		
		107-109 ft pipe run	~103.8		
		146-148 ft pipe run	~141.5		
		164-166 ft pipe run	~158.6		
		177-179 ft pipe run	~170.7		
		196-198 ft pipe run	~188.8		
		288-290 ft pipe run	~271.9		
293-295 ft pipe run	~276.2				
C9396 (C9395)	sampling (logging)	Surface	-	Focus Area 1	A Farm
		10-12 ft pipe run	~7.7		
		17-19 ft pipe run	~12.4		
		78-80 ft pipe run	~54.4		
		97-99 ft pipe run	~67.3		
		99-101 ft pipe run	~68.6		
		105-107 ft pipe run	~72.4		
		162-164 ft pipe run	~107.3		
176-178 ft pipe run	~114.9				
D0008 (D0007)	sampling (logging)	in progress completed		Focus Area 2	A Farm
D0006 (D0005)	sampling (logging)	not started (in progress)			
D0012	sampling	to be sampled in FY21			

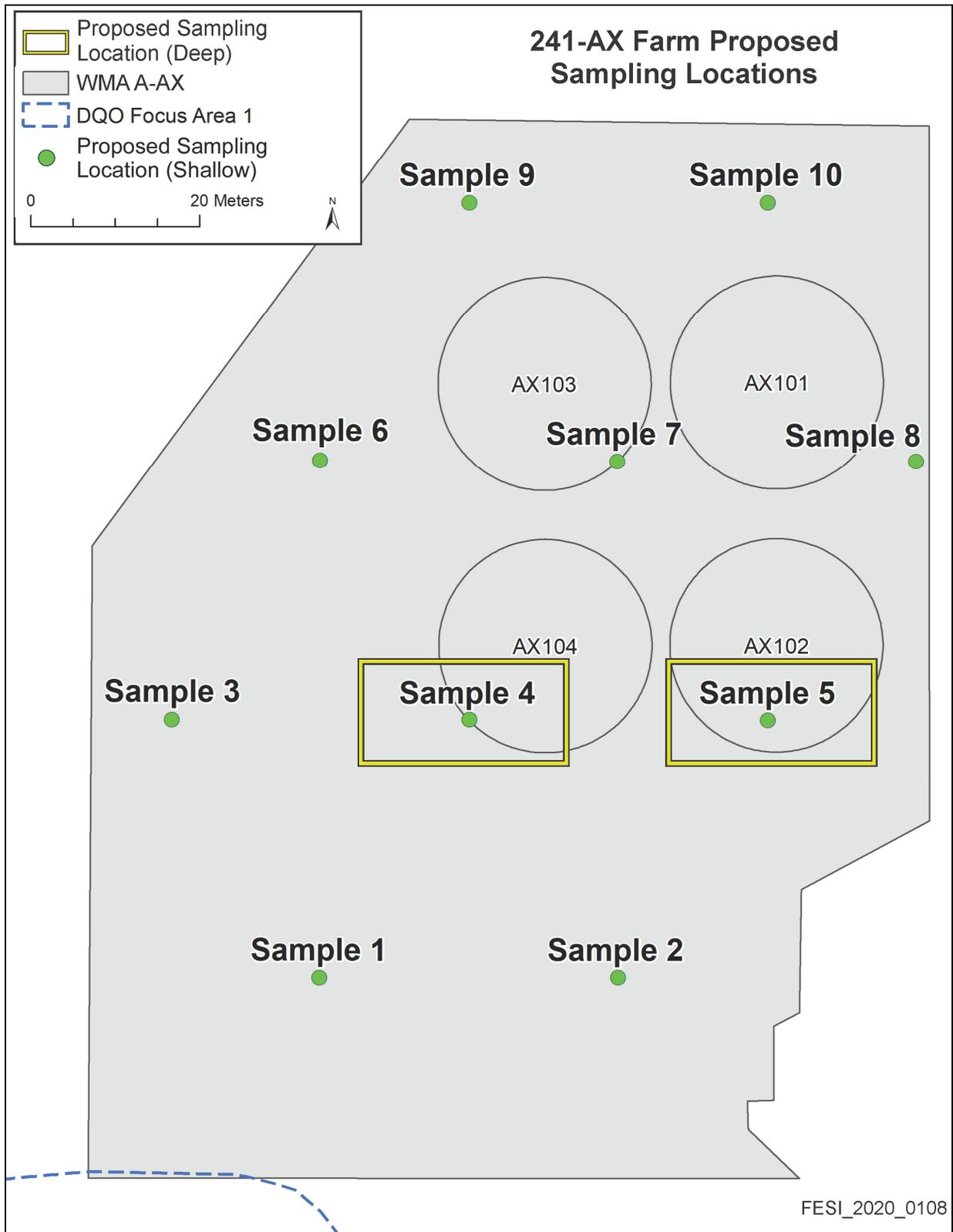
bgs = below ground surface

^a Sample depths are in ft bgs unless otherwise noted.

Attachment 2

**241-A and 241-AX Tank Farms Randomly-Selected Sample Locations
(2 pages)**





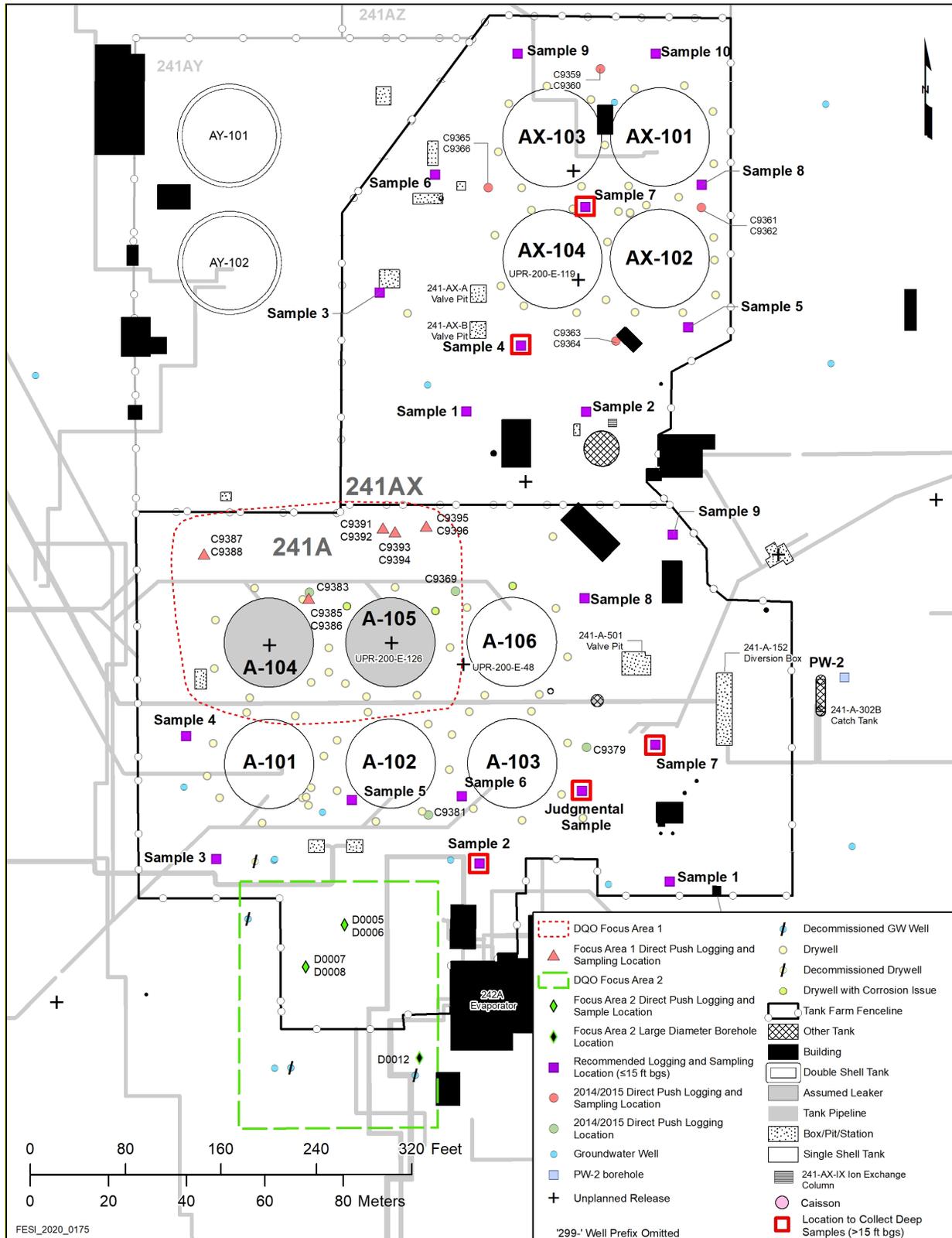
Attachment 3

Infrastructure Based on Ground Penetrating Radar Surveys

Attachment 4

Recommended Sampling Locations

Recommended Sampling Locations



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