

**MEETING NOTES**  
**Data Quality Objectives for the Waste Management Area A-AX**  
**Phase 2 RCRA Facility Investigation/Corrective Measures Study**

**MEETING NUMBER:** WMA A-AX-DQO-2017-1

**MEETING DATE:** January 26, 2017

**LOCATION:** 3110 Port of Benton Boulevard, Richland, WA

**ATTENDEES:**

Jim Alzheimer (Ecology)	Jim Field (WRPS)	Dan Parker (WRPS)
Mike Barnes (Ecology)	Paul Gassman (WRPS)	Anna Radloff (WRPS)
Marcel Bergeron (WRPS)	Bob Hiergesell (WRPS)	Kristin Singleton (WRPS)
Jan Bovier (DOE-ORP)	Doug Hildebrand (DOE-RL)	Maria Skorska (Ecology)
Joe Caggiano (Ecology)	Scott Luke (WRPS)	Harold Sydnor (WRPS)
Bert Day (CHPRC)	Jeremy Lynn (CHPRC)	Cindy Tabor (WRPS)
Kathi Dunbar (WRPS)		

**BACKGROUND INFORMATION:** The meeting was called to promote discussions among Ecology, EPA, DOE Office of River Protection (ORP), and WRPS to develop data quality objectives (DQO) for the Phase 2 RCRA Facility Investigation (RFI)/Corrective Measures Study (CMS) for Waste Management Area (WMA) A-AX vadose zone soil. Representatives from DOE Richland Operations Office (RL) and the Central Plateau contractor (CH2MHILL Plateau Remediation Contractor [CHPRC]), were invited to participate to promote integration of available information related to waste sites and other projects associated with their scope of work into the WMA A-AX DQO process. A DQO process for the same purpose was started in 2011; but, suspended prior to completion in May 2011. Agreements and progress made as part of the 2011 effort will be leveraged in support of the current DQO process. This DQO process is a necessary step in planning soil investigation efforts in WMA A-AX to support development of the Phase 2 WMA A-AX work plan and sampling and analysis plan. The DQOs developed will be summarized in a report.

The meeting notes document lists of agreements and actions (including the status of actions).

**PURPOSE OF MEETING:** This meeting was called to restart the Phase 2 RFI/CMS DQO process for vadose zone soil investigation at WMA A-AX that was suspended in May of 2011.

**DISCUSSION FOR THIS MEETING:** The overall DQO process, WMA A-AX background information and current conditions were discussed. Meeting participants discussed and worked through Step 1, "State the Problem," of the DQO process and agreed on the Problem Statement. Discussions and work began on Step 2, "Identify the Goals of the Study;" but, was not completed prior to the meeting being adjourned.

The meeting began with brief introduction of participants, including name and their role in the process.

WRPS (Radloff) provided meeting participants with a brief overview of the purpose of the meetings. The primary points in this overview included statements that:

1. the purpose of these meetings is to restart the Phase 2 RFI/CMS DQO process for WMA A-AX vadose zone soil investigation that was suspended in May of 2011;
2. agreements and progress made during the 2011 DQO effort will be leveraged to attempt to gain efficiencies in the process; and

3. it is intended that agreements made in 2011 will be reviewed, updated and revised if needed, and concurrence gained from the team.

Ecology (Barnes) asked whether DOE-ORP was acknowledging the need for a Phase 2 RFI at WMA A-AX. DOE-ORP (Bovier) replied yes.

**Agreement 1:** DOE-ORP acknowledged the need for a Phase 2 RFI at WMA A-AX.

Ecology (Barnes) added that the 2011 meeting notes had been provided to Ecology by WRPS prior to the meeting. *NOTE: Meeting notes for the 2011 Workshop 1 are not available. Meeting notes for 2011 Workshops 2 through 7 were reviewed by and provided to Ecology in 2011. The meeting notes for 2011 Workshops 8 and 9 were provided as draft copies (not finalized before the 2011 DQO was suspended).*

The meeting was then handed over to WRPS (Luke), the DQO Facilitator, who began a presentation to kick-off the DQO process. The presentation (TOC-PRES-17-0187), provided as Attachment 1, started with the following introduction to the 2017 DQO effort:

- The DQO process will follow EPA/240/B-06/001:EPA QA/G-4, *Guidance on Systematic Planning Using the Data Quality Objectives Process* and Tank Operating Contract (TOC) procedure TFC-ENG-CHEM-C-16, *Data Quality Objectives for Sampling and Analysis*.
- The DQOs, agreements, and associated information that come out of the DQO process will be summarized in a DQO summary report.
- The goal of the process is to ensure the appropriate vadose zone soil characterization data needs are identified to support corrective measure decisions for WMA A-AX, recognizing the need to integrate characterization and closure actions with ongoing and nearby operations and waste site/groundwater remedial actions.
  - Ecology (Barnes) asked whether the team will be deciding the investigation area in detail (e.g., A-10 crib).
  - WRPS (Luke) responded that, yes, the spatial boundaries will be determined as part of Step 4 of the DQO process.
- The objectives of the DQO are to “define the WMA A-AX vadose zone characterization data necessary to guide planning to make vadose zone soil remedial decisions, support an evaluation of risks by direct contact and to ecological receptors, and support vadose zone groundwater integration;” “optimize a data collection program that will be described in the DQO report for Phase 2 RFI/CMS characterization of WMA A-AX;” and “support refining the preliminary conceptual contaminant distribution model.”
- A list of the primary members of the DQO Project Team and expectations of the team
  - DOE/RL (Hildebrand) stated the DQO Project Team should include a representative for the 200-IS-1 Operable Unit (OU).
  - CHPRC (Day) confirmed that, in addition to 200-EA-1 and 200-DV-1 OUs, she represents the 200-IS-1 OU.
- A summary of the general schedule and approach planned for the DQO process meetings was shared
  - WRPS (Radloff) clarified that the information represented a plan that may change as the process moves along.
  - WRPS (Hiergesell) asked what the anticipated frequency and dates for meetings were. Ms. Radloff responded that meetings would take place every two weeks, provided no

scheduling conflicts were encountered. There was general consensus among Team members to hold meetings every other Thursday from 10 am to Noon.

- Ecology (Barnes) stated he has a list of Key Documents from the 2011 DQO effort. He added that he believes the Woodward-Clyde report regarding conditions in tank 241-A-105 should be added to the list.

**Action 2017-01-26-01:** Ecology (Barnes) will provide the key document list for the 2011 DQO effort.

**Action 2017-01-26-02:** WRPS (Radloff) will locate the Woodward-Clyde document and verify whether it is available for public release.

As part of Step 1, "Problem Statement," general background information for nearby OUs, facilities, and releases was presented. The information presented and associated discussions are presented below.

200-EA-1 and 200-IS-1 OUs – CHPRC (Day) stated that a systematic planning process for Remedial Investigation (RI)/Feasibility Study (FS) and RFI/CMS is underway for both OUs.

200-DV-1 OU – CHPRC (Day) stated that the RI/FS & RFI/CMS Work Plan for the 200-DV-1 OU (DOE/RL-2010-112, *Remedial Investigation/Feasibility Study and RCRA Facility Investigation/Corrective Measures Study Work Plan for the 200-DV-1 Operable Unit*) was approved and characterization work has begun.

Ecology (Barnes) stated that Ecology is interested in knowing to which OU or WMA the following belong: 302-B Catch Tank, A-39 Crib, AX-155 Diversion Box, AY-151 Diversion Box, A-41 Crib, and 244-AR Vault being covered as part of an investigation. DOE-RL (Hildebrand) stated that 244-AR Vault is part of 200-IS-1. He added that, according to HNF-1744, A-39 Crib received approximately 20 Liters of waste containing 11 to 12 Curies of <sup>137</sup>Cs.

**Action 2017-01-26-03:** WRPS (Radloff) will obtain information regarding OU/WMA assignments for 302-B Catch Tank, A-39 Crib, AX-155 Diversion Box, AY-151 Diversion Box, A-41 Crib, and 244-AR Vault.

200-PO-1 OU – CHPRC (Lynn) stated that there was no significant change in groundwater:

- There was no significant change in groundwater conditions between 2011 and 2017.
- The RI was presented as a milestone within the 2011 DQO meeting. The draft RI report was initially issued in 2012 and has not been finalized.
- In 2015 an updated interim status groundwater sampling and analysis plan (DOE/RL-2015-49, *Interim Status Groundwater Quality Assessment Plan for the Single-Shell Tank Waste Management Area A-AX*) was drafted. Groundwater assessment sampling continues. Informal data results suggest groundwater contaminants remain the same as presented in 2011.
- Groundwater monitoring wells with corroded casing – Well 299-E25-237 was installed to replace 299-E25-236. Well 299-E25-41 had indications of corrosion during 2016 which has been confirmed by video-log.

A discussion followed regarding casing corrosion of some 200-PO-1 groundwater monitoring wells in the vicinity of WMA A-AX. Ecology (Barnes) stated it is Ecology's concern that sulfuric acid used to sluice 241-A-105 leaked and caused groundwater well casings to corrode. DOE-RL (Hildebrand) stated that

chlorine from "A Swamp" caused the groundwater well casing corrosion and further indicated that the replacement well 299-E25-237 was constructed with a PVC casing. Ecology (Caggiano) added that the casings of some drywells with 241-A Farm show signs of corrosion.

**Action 2017-01-26-04:** DOE-RL (Hildebrand) will provide the document reference for the casing corrosion study to Mr. Barnes.

Facilities and release information – WRPS (Field) provided a summary description of WMA A-AX that included the following:

- The single shell tanks (SSTs) in 241-A Farm (6) and 241-AX Farm (4) are 1,000,000-gallon capacity, 75-ft diameter, flat bottom tanks
- Losses of waste from tanks and equipment have contaminated the soil. Unplanned releases have been documented; but, not all releases have a basis to quantify.
- Planned releases to discharge facilities occurred between 1955 and 1975.
- The laterals that run underneath the 241-A Farms tanks were last logged in 2005
- Tanks 241-A-104 and 241-A-105 are classified as presumed leakers. Tanks 241-A-103, 241-AX-101 and 241-AX-102 have been reclassified as sound.

Ecology (Barnes) stated that Ecology concurs with the reclassification of tanks 241-A-103, 241-AX-101 and 241-AX-102 as sound.

DOE-RL (Hildebrand) inquired about direct push and other activities that took place in the 2009/2010 timeframe. WRPS (Sydnor, Field, Radloff) responded that:

- geophysical logging of drywells in 241-AX Farm and 241-A Farm took place in 2014 and 2015, respectively; however, the planned logging was not completed in 241-A Farm.
- direct push activities designed to deploy deep electrode arrays for potential future 3-D resistivity studies in 241-AX and 241-A Farms took place in 2015; however, the activities were not completed in 241-A Farm.
- a surface geophysical exploration (SGE) took place in 241-A and 241-AX Farms in the 2010 timeframe

**Action 2017-01-26-05:** WRPS (Radloff) will provide the 2010 SGE report number to Mr. Hildebrand.

DOE-RL (Hildebrand) cautioned that field activities near the 242-A Evaporator should be timed not to occur during 242-A Evaporator campaigns. There is a steam package tied into seismic monitoring directly west of the evaporator. Certain field activities may cause vibrations that exceed the seismic monitoring threshold and shut down the evaporator.

Ecology (Caggiano) asked whether any groundwater wells located in the WMA A-AX fence line were currently being monitored. WRPS (Sydnor) responded that he does not believe any groundwater wells within WMA A-AX are currently monitored.

**Action 2017-01-26-06:** WRPS will verify the status of groundwater wells inside the WMA A-AX fence line.

Ecology (Caggiano) inquired whether there is a static liquid level in any of the tanks. WRPS (Field) responded that there is a static liquid level in tanks 241-A-102 and 241-A-103 only.

The discussion turned to A-105. Ecology (Barnes) stated that Ecology is interested in seeing how deep the release went. He stated that the SCDR (RPP-14430, *Subsurface Conditions Description of the C and A-AX Waste Management Areas*) states the released material did not travel very deep. WRPS (Field) stated that, based on lateral logging data, the <sup>137</sup>Cs appears to have traveled to the general depth of the laterals. Ecology (Caggiano) stated that the temperature log for the direct push boring to the northwest of 241-A-105 (C9369) shows high temperature to approximately 100 feet in depth.

Ecology (Barnes) asked how deep borings can be pushed in WMA A-AX. WRPS (Sydnor) responded that direct push has been successful to approximately 200 feet in WMA A-AX, and reaching deeper depth is likely possible.

The meeting moved on to presenting information regarding the process of developing preliminary conceptual models of contamination. WRPS (Bergeron) stated that development of preliminary conceptual models of contamination as part of the WMA A-AX Performance Assessment (PA) will follow similar process to that used for WMA C. General geologic and stratigraphic information was presented (see TOC-PRES-17-0187 for slides). Mr. Bergeron stated that it is intended that information collected as part of the RFI be used to refine the model(s) developed for the PA.

Ecology (Barnes) recommended that tank 241-A-105 residual waste be sampled. He added that what is in the tank, under the liner, and the condition of the concrete need to be known and understood prior to retrieval. WRPS (Radloff) stated that such information would be very useful to the RFI/CMS effort and, if available, will be considered for inclusion in the RFI/CMS report(s); however, sampling of tank residuals or concrete is outside the scope of this DQO. Ecology (Skorska) added that Ecology is looking for integration of the RFI/CMS efforts with waste retrieval efforts.

**Agreement 2:** Available tank waste and concrete condition information will be considered for inclusion in the RFI/CMS report(s).

Ecology (Barnes) requested that gathering evidence to confirm tanks 241-AX-102, 241-A-103, and 241-AX-104 are not leakers be considered as part of this DQO.

**Action 2017-01-26-07:** Discuss work to support/confirm tanks 241-AX-102, 241-A-103, and 241-AX-104 are not leakers as part of Step 7.

**Problem Statement:** The Problem Statement from the 2011 DQO effort was reviewed for update and acceptance. The Team accepted the Problem Statement without out change.

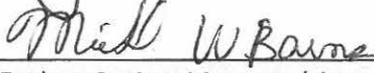
**Agreement 3:** Problem Statement – “Vadose zone contamination in and adjacent to the A-AX Tank Farms may pose a current and future risk to human health and the environment, including groundwater, that requires corrective action to support closure.”

Following concurrence on the Problem Statement, discussions moved to Step 2, Identify the Goal of the Study. Review began of the Principal Study Questions (PSQ) and Decision Statements (DS) from 2011. The general consensus of the group was to combine PSQs 3 and 4 and DSs 3 and 4 (see TOC-PRES-17-0187, slide 32, for 2011 PSQs and DSs). The meeting was adjourned without Team concurrence for PSQs and DSs.

**Action 2017-01-26-08:** WRPS (Luke) will combine PSQs 3 and 4 and DSs 3 and 4 for review by the Team.

**AGREEMENTS AND ACTIONS:** Agreements and actions are provided in the tables that follow.

**NEXT MEETING:** The next meeting will be held 1 March 2017 from 1:00 to 3:00 pm.

<u>JAN BOVIER</u> DOE Project Manager (print)	 DOE Project Manager (signature)	<u>3/22/2017</u> Date
<u>Michael W Barnes</u> Ecology Project Manager (print)	 Ecology Project Manager (signature)	<u>3/22/2017</u> Date

DATE	AGREEMENTS
01/26/2017	1. DOE-ORP acknowledged the need for a Phase 2 RFI at WMA A-AX.
01/26/2017	2. Available tank waste and concrete condition information will be considered for inclusion in the RFI/CMS report(s).
01/26/2017	3. Problem Statement: "Vadose zone contamination in and adjacent to the A-AX Tank Farms may pose a current and future risk to human health and the environment, including groundwater, that requires corrective action to support closure."

ACTIONS			
Action Number	Actionee	Description	Status
2017-01-26-01	Barnes	Provide the key document list for the 2011 DQO effort.	New
2017-01-26-02	Radloff	Locate the Woodward-Clyde document and verify whether it is available for public release.	New
2017-01-26-03	Radloff	Provide information regarding OU/WMA assignments for 302-B Catch Tank, A-39 Crib, AX-155 Diversion Box, AY-151 Diversion Box, A-41 Crib, and 244-AR Vault.	New
2017-01-26-04	Hildebrand	Provide the document reference for the casing corrosion study to Mr. Barnes.	New
2017-01-26-05	Radloff	Provide the 2010 SGE report number to Mr. Hildebrand	New
2017-01-26-06	Radloff	Verify the status of groundwater wells inside the WMA A-AX fence line.	New
2017-01-26-07	Team	Discuss work to support/confirm tanks 241-AX-102, 241-A-103, and 241-AX-104 are not leakers as part of Step 7	New

<b>ACTIONS</b>			
<b>Action Number</b>	<b>Actionee</b>	<b>Description</b>	<b>Status</b>
201701-26-08	Luke	Combine PSQs 3 and 4 and DSs 3 and 4 for review by the Team	New

Attachment 1

Data Quality Objectives (DQO) for Phase 2 Soil Characterization for WMA A-AX  
RCRA Field Investigation/Corrective Measures Study (RFI/CMS)

Meeting #2017-1

(TOC-PRES017-01887-00)

# INFORMATION CLEARANCE REVIEW AND RELEASE APPROVAL

## Part I: Background Information

Title: Data Quality Objectives for Phase 2 Soil Characterization for WMA A-AX RCRA Field Investigation/Corrective Measures Study	Information Category: <input type="checkbox"/> Abstract <input type="checkbox"/> Journal Article <input type="checkbox"/> Summary <input type="checkbox"/> Internet <input type="checkbox"/> Visual Aid <input type="checkbox"/> Software <input type="checkbox"/> Full Paper <input type="checkbox"/> Report <input checked="" type="checkbox"/> Other <u>Presentation</u>
Publish to OSTI? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Trademark/Copyright "Right to Use" Information or Permission Documentation <input type="checkbox"/> Yes <input checked="" type="checkbox"/> NA
Document Number: TOC-PRES-17-0187 Revision 0	Date: January 2017 <span style="float: right;">JRR</span> 02/16/2017
Author: Luke, Scott N	

## Part II: External/Public Presentation Information

Conference Name: WMA A-AX RFI/CMS Data Quality Objectives Meeting 1	
Sponsoring Organization(s): DOE/ORP	
Date of Conference:	Conference Location:
Will Material be Handed Out? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Will Information be Published? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float: right;"><i>(If Yes, attach copy of Conference format instructions/guidance.)</i></span>

## Part III: WRPS Document Originator Checklist

Description	Yes	N/A	Print/Sign/Date
Information Product meets requirements in TFC-BSM-AD-C-01?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Document Release Criteria in TFC-ENG-DESIGN-C-25 completed? (Attach checklist)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If product contains pictures, safety review completed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

## Part IV: WRPS Internal Review

Function	Organization	Date	Print Name/Signature/Date
Subject Matter Expert	WRPS		Luke, Scott N    Approved via att. IDMS data file.
Responsible Manager	WRPS		Rutland, Paul L    Approved via att. IDMS data file.
Other:			

## Part V: IRM Clearance Services Review

Description	Yes	No	Print Name/Signature
Document Contains Classified Information?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	If Answer is "Yes," ADC Approval Required  _____ Print Name/Signature/Date
Document Contains Information Restricted by DOE Operational Security Guidelines?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Reviewer Signature:  _____ Print Name/Signature/Date
Document is Subject to Release Restrictions? <i>If the answer is "Yes," please mark category at right and describe limitation or responsible organization below:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Document contains: <input type="checkbox"/> Applied Technology <input type="checkbox"/> Protected CRADA <input type="checkbox"/> Personal/Private <input type="checkbox"/> Export Controlled <input type="checkbox"/> Proprietary <input type="checkbox"/> Procurement – Sensitive <input type="checkbox"/> Patentable Info. <input type="checkbox"/> OUO <input type="checkbox"/> Predecisional Info. <input type="checkbox"/> UCNi <input type="checkbox"/> Restricted by Operational Security Guidelines <input type="checkbox"/> Other (Specify) _____
Additional Comments from Information Clearance Specialist Review?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Information Clearance Specialist Approval  <div style="border: 1px solid green; padding: 2px; display: inline-block; text-align: center;">                         APPROVED  <small>By Julia Raymer at 3:12 pm, Feb 16, 2017</small> </div> _____ Print Name/Signature/Date

**When IRM Clearance Review is Complete – Return to WRPS Originator for Final Signature Routing (Part VI)**

## INFORMATION CLEARANCE REVIEW AND RELEASE APPROVAL

### Part VI: Final Review and Approvals

Description	Approved for Release		Print Name/Signature
	Yes	N/A	
WRPS External Affairs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Approved via att. IDMS data file.
WRPS Office of Chief Counsel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Approved via att. IDMS data file.
DOE – ORP Public Affairs/Communications	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Approved via att. IDMS data file.
Other: ORP SME & General Counsel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Approved via att. IDMS data file.
Other:	<input type="checkbox"/>	<input type="checkbox"/>	

Comments Required for WRPS-Indicate Purpose of Document:

Presentation to aid discussions for WMA A-AX Phase 2 RCRA Facility Investigation/Corrective Measures Study (RFI/CMS) Data Quality Objectives (DQO) kick-off meeting.

**APPROVED**  
By Julia Raymer at 3:14 pm, Feb 16, 2017

**Approved for Public Release;  
Further Dissemination Unlimited**

#### Information Release Station

Was/Is Information Product Approved for Release?  Yes  No

If Yes, what is the Level of Release?  Public/Unrestricted  Other (Specify) \_\_\_\_\_

Date Information Product Stamped/Marked for Release: 2/16/2017

Was/Is Information Product Transferred to OSTI?  Yes  No

**Forward Copies of Completed Form to WRPS Originator**

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January 24, 2017

Data Quality Objectives (DQO) for  
PHASE 2 Soil Characterization for WMA A-AX  
RCRA Field Investigation/Corrective Measures Study  
(RFI/CMS)

Meeting # 2017-1

# Agenda

- **Introduction**
- **DQO Goal and Objectives**
- **DQO Project Team**
- **DQO Process**
- **WMA A-AX DQO Process**
- **DQO STEP1 – PROBLEM STATEMENT**
- **DQO STEP 2 – DECISION STATEMENTS**

# Introduction

- These workshops resume the DQO process begun in 2011 for WMA A-AX soil characterization to support the WMA A-AX Phase 2 RFI/CMS.
- For the 2011 DQO effort:
  - Participants included representatives from DOE (ORP, RL), involved contractors (WRPS, CHPRC), and regulators (Ecology)
  - Work progressed through DQO Step 6 (tolerable limits on decision error) of the 7-step DQO process.
  - Agreements reached among the parties and the progress made were documented in the meeting notes.
- This DQO will follow EPA/240/B-06/001:EPA QA/G-4, *Guidance on Systematic Planning Using the Data Quality Objectives Process* and Tank Operating Contract (TOC) procedure TFC-ENG-CHEM-C-16, *Data Quality Objectives for Sampling and Analysis*.

# Introduction (cont.)

“The workshops provide a forum for Ecology, DOE-ORP, and WRPS to identify soil investigation needs to support development of the Phase 2 WMA A-AX RFI/CMS work plan and sampling and analysis plan. This process also involves representatives from DOE-RL and Central Plateau contractor, CHPRC, integrating their input into the DQO process for waste sites and other projects associated with their scope of work around WMA A-AX.”

**Note:** The above statement was used as introductory background information for all 2011 meeting notes.

- Discussion and agreements will be documented in meeting minutes. Minutes will be sent out to the team for concurrence. Approved minutes will be entered into the Administrative Record.
- From the meeting minutes and other information a DQO report for Phase 2 soil characterization for WMA A-AX RFI/CMS, will be generated. The DQO report will use the Phase 2 DQO report for WMA-C (RPP-RPT-38152) as a template.

# DQO Goal and Objectives

## The DQO goal:

“The goal of the WMA A-AX DQO process is to ensure the appropriate data needs are identified to support corrective measure decisions for WMA A-AX, recognizing the need to integrate characterization and closure actions with ongoing and nearby operations and waste site/groundwater remedial actions. In support of that goal, the meeting participants agreed that the WMA A-AX DQO process should address soil in the A-AX tank farms, as well as soil associated with A-AX components not addressed by other projects, but not soil associated with other projects. Ultimately, the parties intend that all areas of contaminated soil will be addressed as part of a cleanup process.”

**Note:** During Workshop #2 of the 2011 DQO, the parties agreed that the above goal statement would be captured in the WMA A-AX documentation.

# DQO Goal and Objectives (cont.)

## DQO objectives:

- Define the WMA A-AX vadose zone characterization data necessary to guide planning to make vadose zone soil remedial decisions, support an evaluation of risks by direct contact and to ecological receptors, and support vadose zone groundwater integration.
- Optimize a data collection program that will be described in the DQO report for Phase 2 RFI/CMS characterization of WMA A-AX.
- Data will be used to support refining the preliminary conceptual contaminant distribution model.

# DQO Project Team

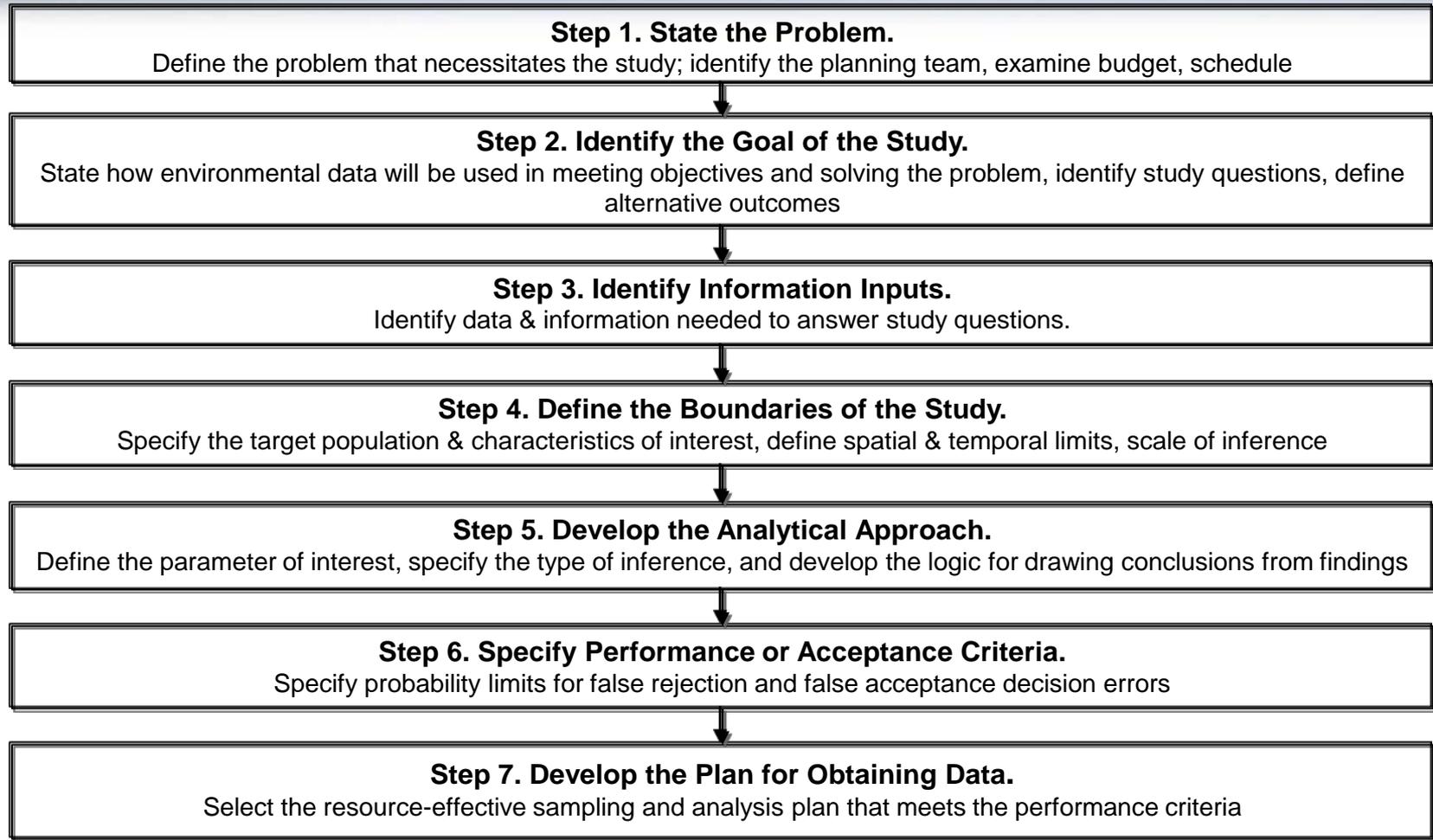
Organization	Name	Function/Decision Authority
U.S. Department of Energy – Office of River Protection (ORP)	Jan Bovier	ORP Project Lead
U.S. Department of Energy – Operations Office (RL)	Doug Hildebrand	RL Lead - Integration with 200-EA-1 and Groundwater OUs
Washington State Department of Ecology (Ecology)	Mike Barnes Jeff Lyon Joe Caggiano Elizabeth Rochette Marysia Skorska Jim Alzheimer	Lead WMA A-AX DQO Tank Farms Project Manager Technical Support Technical Support Technical Support Technical Support
Washington River Protection Solutions	Scott Luke Paul Rutland Anna Radloff Jim Field Andrea Hopkins Kristin Singleton/Marcel Bergeron Harold Sydnor Kathi Dunbar Paul Gassman/Steve McKinney Bob Hiergesell Duc Nguyen	DQO Facilitator Vadose Zone Project Director Project Lead Leak Assessments and Process Knowledge Regulatory Compliance Risk Assessment Field Characterization/Sampling and Analysis QA Lab Interface WMA A-AX PA Integration DQO Oversight
CHPRC	Bert Day Curt Wittreich	200-EA-1 and Deep Vadose Zone Integration Groundwater OU Integration

# DQO Project Team (cont.)

As the technical support team for this DQO you will be asked to:

- Evaluate and reconfirm the WMA A-AX decisions made in the 2011 DQO workshops.
- Identify the data needed to support corrective measures and final closure decision making for WMA A-AX.
- Identify project and global technical challenges in executing the characterization efforts at WMA A-AX to support the RFI/CMS decision process and help identify solutions for overcoming those technical challenges.

# DQO Process



**Note:** Figure adapted from EPA QA/G4, Figure 2, Data Quality Objective Process.

# WMA A-AX DQO Process

- Conduct working meetings to resume the Phase 2 WMA A-AX DQO begun in 2011.
- Leverage prior DQO Step 1 through 6 agreements and progress and then will complete DQO Step 7.
- **The 1<sup>st</sup> meeting will kickoff the DQO process and address DQO Steps 1 and 2:**
  - Present updated background information.
  - Review Step 1 and 2 agreements, and action items as documented in 2011 meeting notes.
  - Update Step 1 (Problem Statement) and Step 2 (Decision Statement) output, as necessary.
  - Obtain concurrence with Step 1 and Step 2 output.
- **The 2<sup>nd</sup> meeting will address DQO Steps 3 and 4:**
  - Discuss and update step-specific information/output from last meeting, as necessary.
  - Review Step 3 (Data Needs) and 4 (Study Boundaries) agreements and action items as documented in 2011 meeting notes.
  - Update Step 3 and Step 4 outputs, as necessary.
  - Obtain concurrence with Step 3 and Step 4 output.
- **The 3<sup>rd</sup> meeting will address Steps 5 and 6:**
  - Discuss and update step-specific information/output from prior meetings, as necessary.
  - Review Step 5 (Decision Rules) and 6 (tolerable limits for decision error) agreements and action items as documented in 2011 meeting notes.
  - Update Step 5 and Step 6 outputs, as necessary.
  - Obtain concurrence with Step 5 and Step 6 output.

# WMA A-AX DQO Process

- **The 4<sup>th</sup> meeting will begin DQO Step 7 (Develop the Plan for Obtaining Data):**
  - Discuss and update step-specific information/outputs from prior meetings, as necessary.
  - Overview Step 7.
  - Begin Step 7 discussions.
- **The 5<sup>th</sup> meeting will continue DQO step 7:**
  - Continue Step 7 discussions.
  - Update step information/output, as necessary, based on discussions.
- **The 6<sup>th</sup> meeting will complete DQO step 7:**
  - Continue Step 7 discussions.
  - Update step information/output and ensure all DQO action items are addressed.
  - Finalize and obtain Step 7 output concurrence.

# DQO Step 1- Problem Statement

- DQO Step 1, Problem Statement, was addressed in the 2011 DQO and documented in DQO workshop notes.
- The objective of a Problem Statement is to clearly define the problem (the reason data are required) so the focus of the project will be unambiguous.
- Background information on nearby Operable Units, facilities, and releases:
  - 200-EA-1 Operable Unit (200 East Area OU) [Bert Day, CHPRC]
  - 200-DV-1 Operable Unit (Deep Vadose Zone OU) [Bert Day, CHPRC]
  - Operable 200-IS-1 (Pipelines) [Bert Day, CHPRC]
  - 200-PO-1 Operable Unit (Groundwater) [Lee Brouillard, CHPRC]

# DQO Step 1- Problem Statement (cont.)

Background information on nearby Operable Units, facilities, and releases (cont.):

- Documentation related to A-AX investigations (Jim Field, WRPS)
  - Subsurface Conditions Description Report (RPP-14430, 2003)
  - Field Investigation Report (RPP-35484, 2008)
  - Hanford Soil Inventory Model (RPP-26744, 2005)
  - Leak Inventory Report (RPP-ENV-37956, 2014) / Leak Cause and Location (RPP-RPT-54912, 2013)
  - Tank Integrity Assessments for A-103 (RPP-ASMT-42278, 2009), AX-102 (RPP-ASMT-42628, 2014) and AX-104 (RPP-ASMT-57574, 2014)
  - WMA A-AX Residuals and Soils Inventory data packages (In Progress)
- Currently available A-AX data (Jim Field, WRPS)
  - In-Tank surveillance data
  - Drywell logging data
  - Lateral logging data (A farm)
  - Leak Detection Pits (AX farm)
  - Direct Push logging and samples

# DQO Step 1- Problem Statement (cont.)

## Background information on nearby Operable Units, facilities, and releases (cont.):

- Releases in the vicinity of A-AX
  - Tanks: A-104, A-105
  - A-01B sluice pit, AX-101 surface spill.
  - A/AX farm Surface
  - UPRs:
    - Inside A Farm complex - 200-E-131 (includes UPRs 200-E-47, -48, -59, -115, and -119)
    - Close but outside the fence – UPRs 200-E-18 and 200-E-42
  - Cribs, Trenches, Drains, Basins (~800 million gal released, mostly condensate/cooling water)
- Near-by Process Facilities
  - 242-A Evaporator
  - 204-AR Unloading building
  - 244-AR Vault
  - 241-A-431, Ventilation facility
- General A-AX Area Status
  - Surrounded by DSTs
  - Evaporator and DST pipelines near A-AX are still active.
  - Water lines within A-AX closed off.
  - Ongoing A-AX infrastructure upgrades (retrieval construction, electrical, ventilation, ducts, stacks, Evaporator vaults and lines) will impact access for characterization activities.

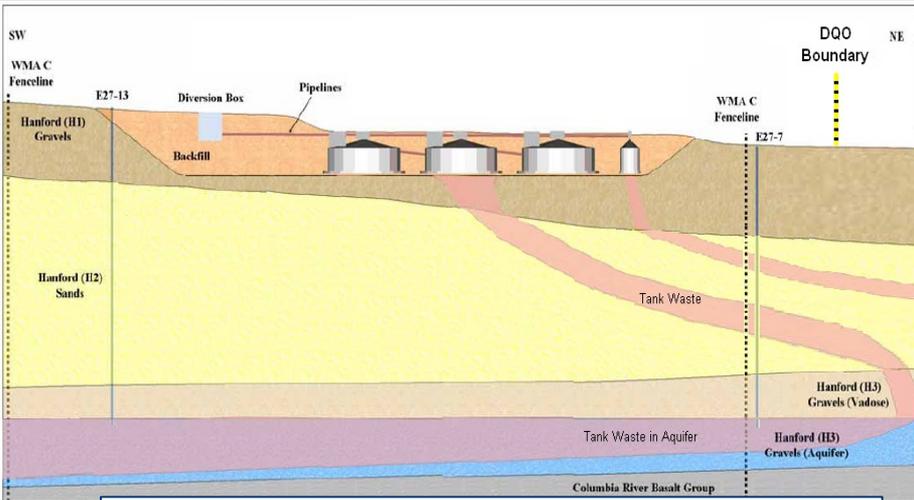
# DQO Step 1- Problem Statement (cont.)

## Preliminary conceptual models of contamination

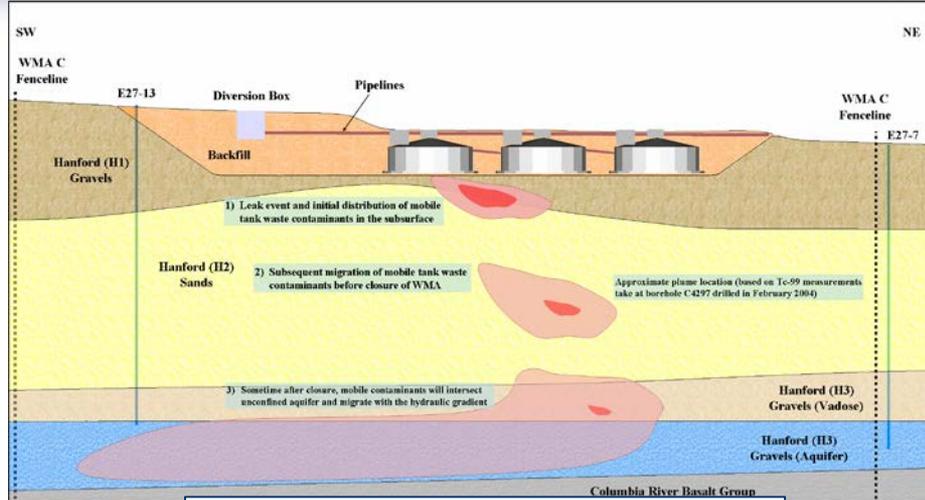
- Development of preliminary conceptual models of contamination will follow a similar process as was done in the WMA C PA
- During the Natural System scoping session for WMA C PA (May 2010), regulators and stakeholders expressed an interest in the development of alternative conceptual models of the subsurface of the WMA C.
- The need for this kind of representation in the PA had been consistently advocated by Oregon, the Nez Perce Tribe, and some members of Ecology staff.

# DQO Step 1- Problem Statement (cont.)

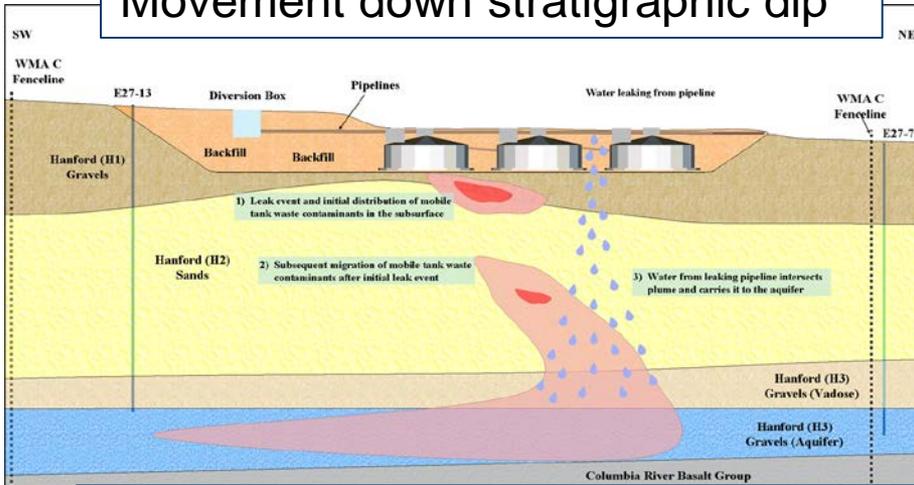
## Example conceptual models of contamination



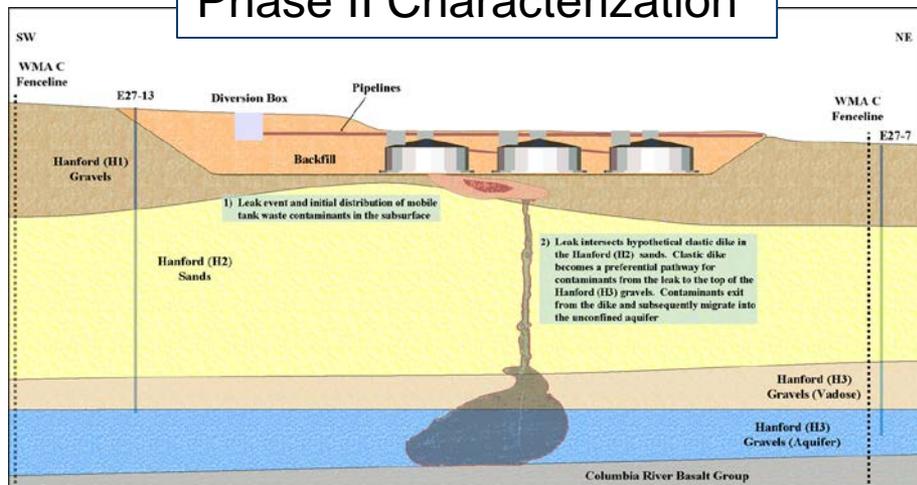
Movement down stratigraphic dip



Phase II Characterization



Increased recharge during operations



Preferential pathways

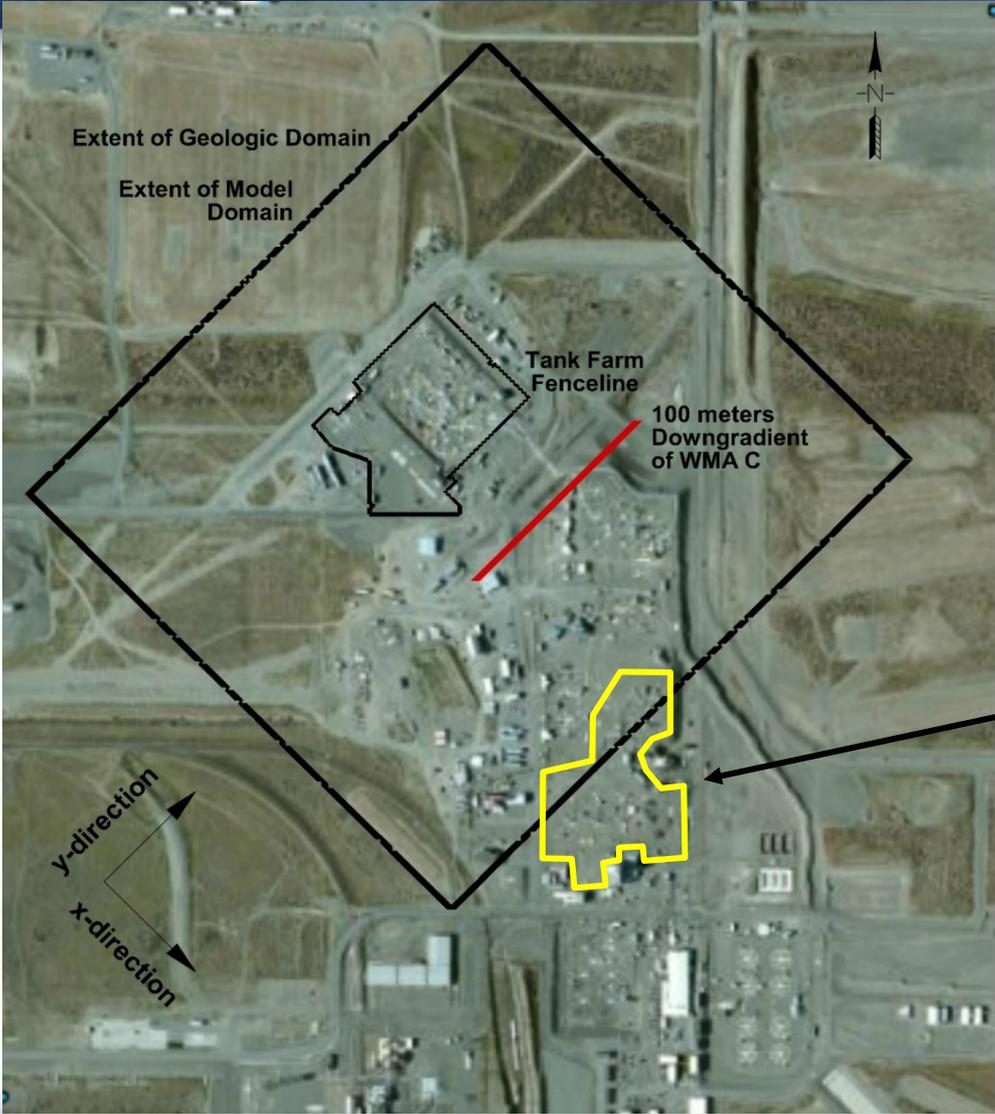
# DQO Step 1- Problem Statement (cont.)

## Location of WMA A-AX in 200 East Area



WMA A-AX is adjacent to WMA C and is very similar hydrogeologically

# DQO Step 1- Problem Statement (cont.) Extend Geologic Model from WMA C to A/AX



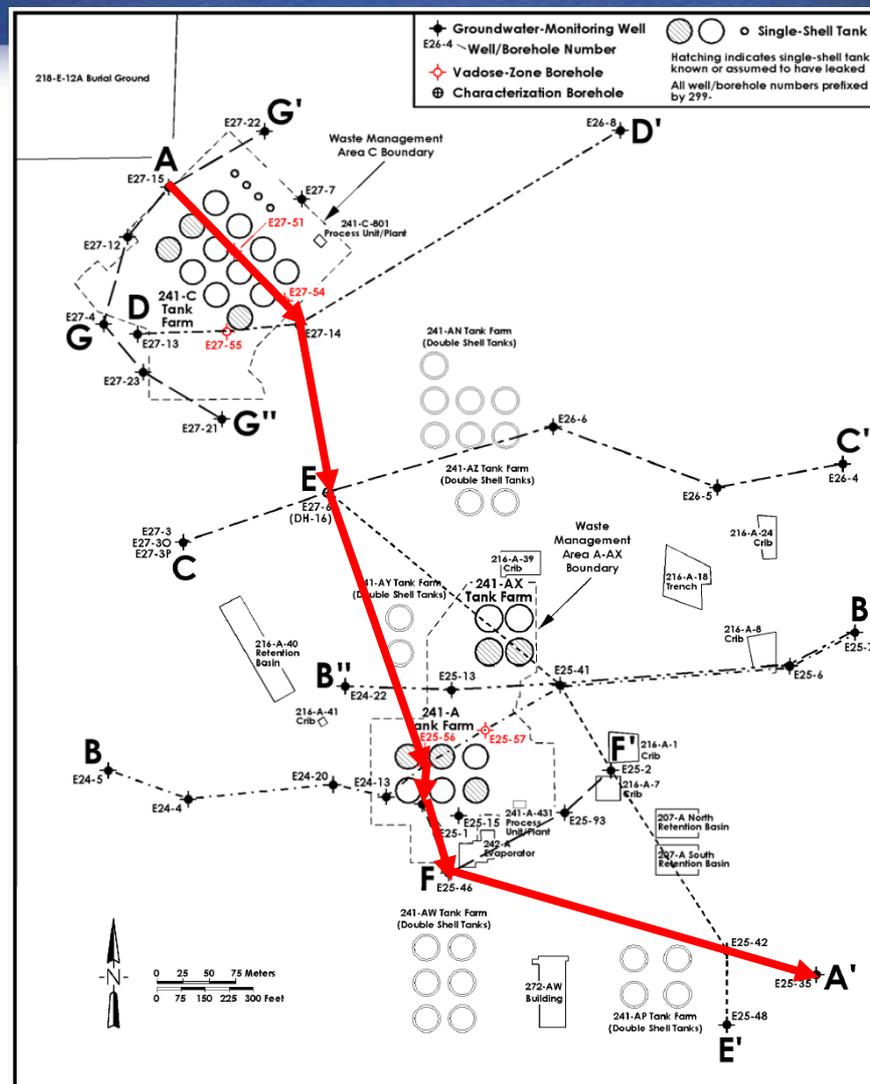
Approximate Location of WMA A/AX



# DQO Step 1- Problem Statement (cont.)

## Stratigraphy Between WMAs A/AX and C

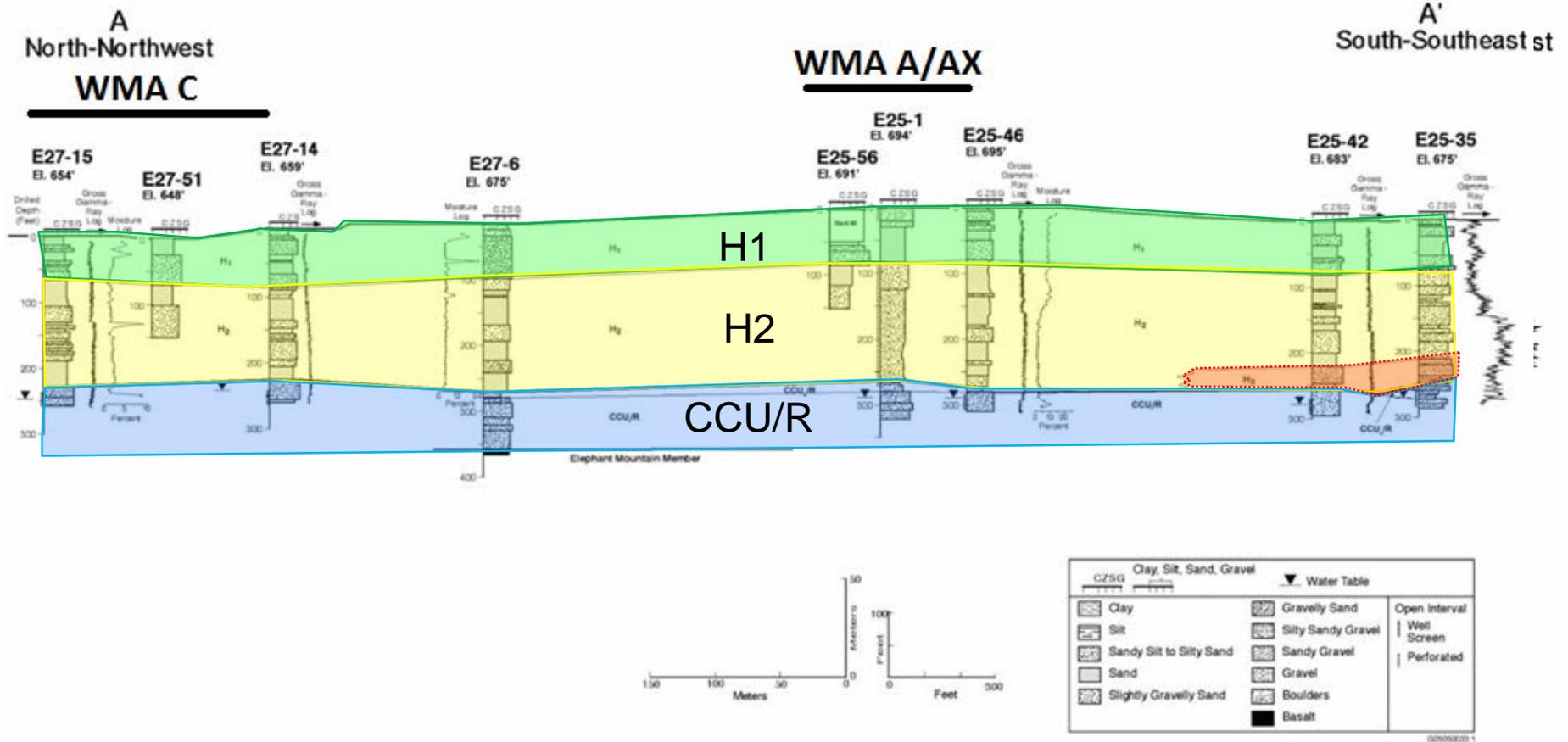
- Stratigraphy between WMAs A/AX and C – **A-A'**
- Stratigraphy within WMA A/AX
  - B-B'
  - E-E'



Source: PNNL-15955, Geology Data Package for the Single-Shell Tank Waste Management Areas at the Hanford Site

2004/DCL/A-AX-C/001 (03/31)

# DQO Step 1- Problem Statement (cont.) Stratigraphy Between WMAs A/AX and C

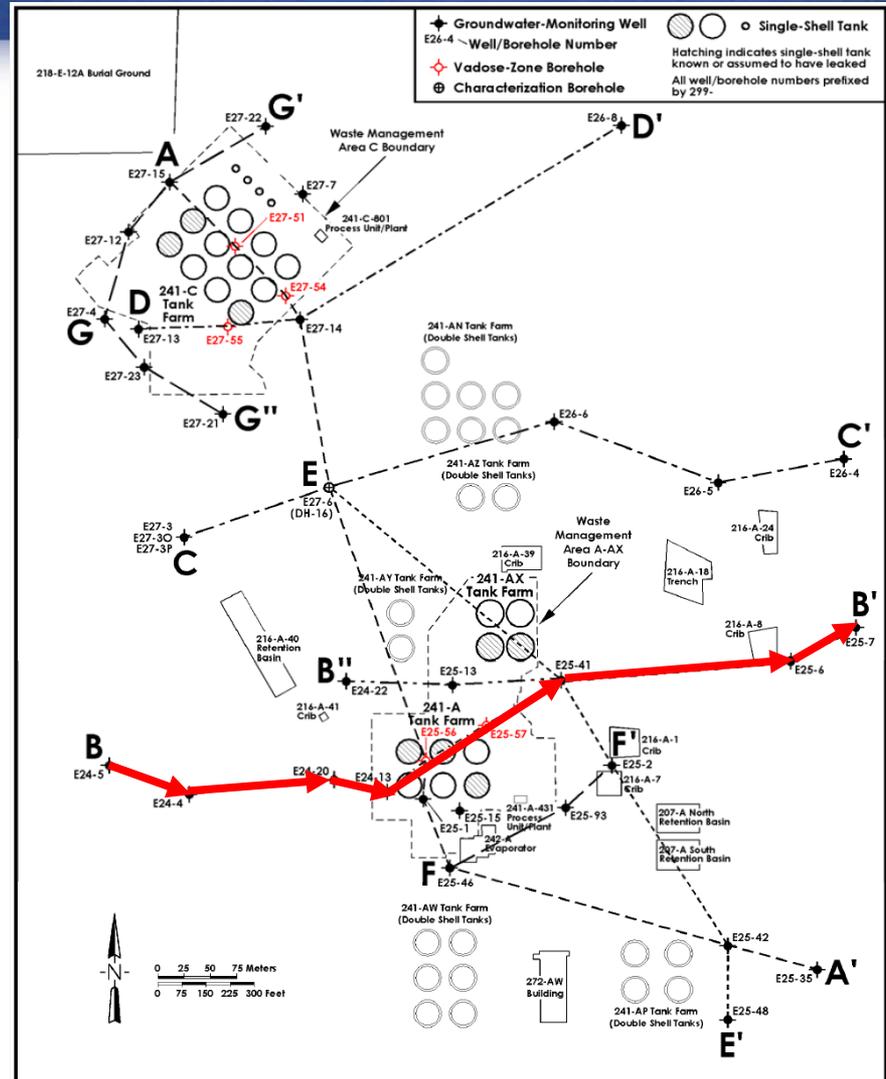


Source: PNNL-15955, Geology Data Package for the Single-Shell Tank Waste Management Areas at the Hanford Site

# DQO Step 1- Problem Statement (cont.)

## Stratigraphy in WMA A/AX

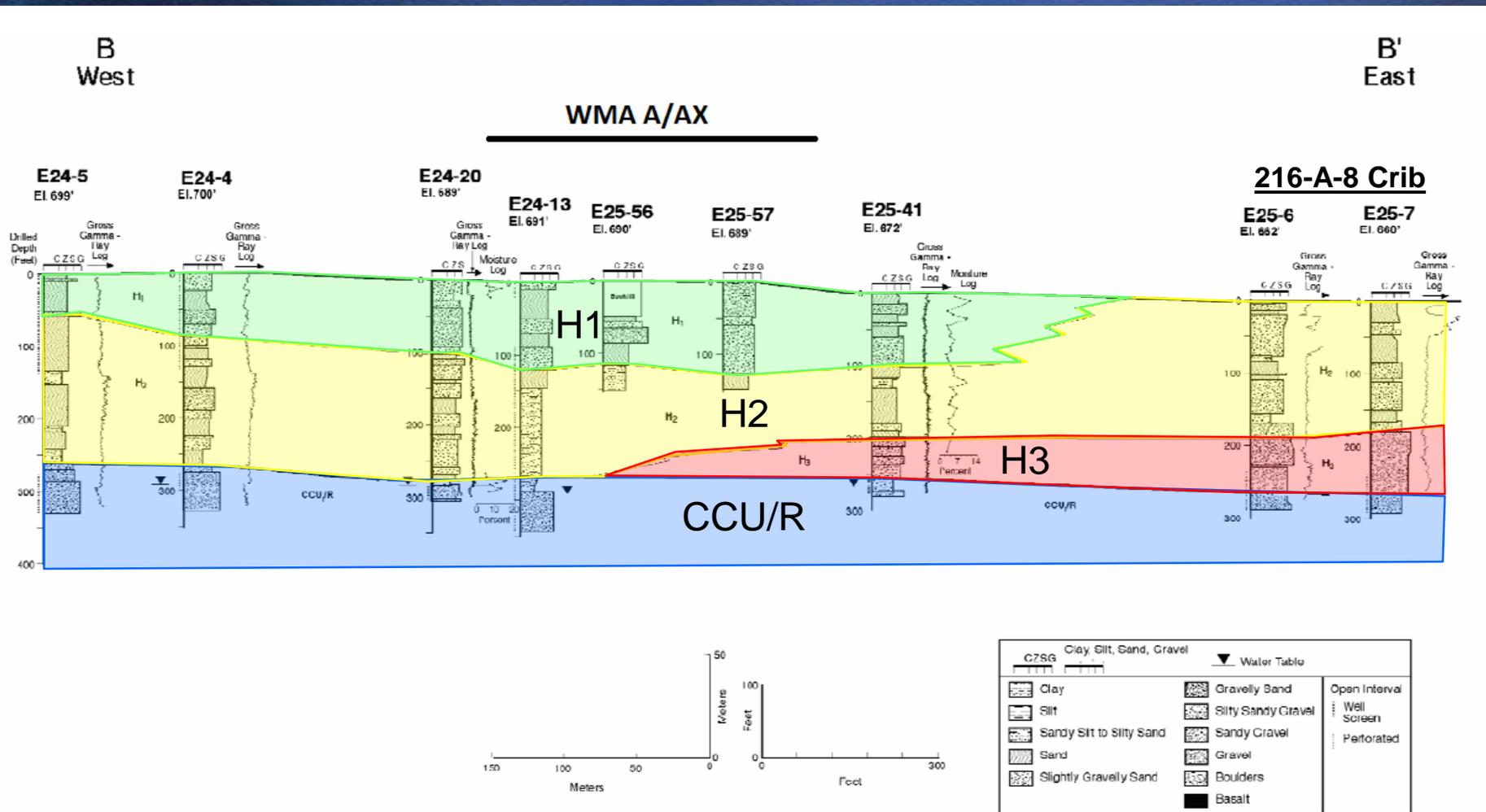
- Stratigraphy between WMAs A/AX and C – A-A'
- Stratigraphy within WMA A/AX
  - B-B'
  - E-E'



Source: PNNL-15955, Geology Data Package for the Single-Shell Tank Waste Management Areas at the Hanford Site

2004/DCL/A-AX-C/001 (03/31)

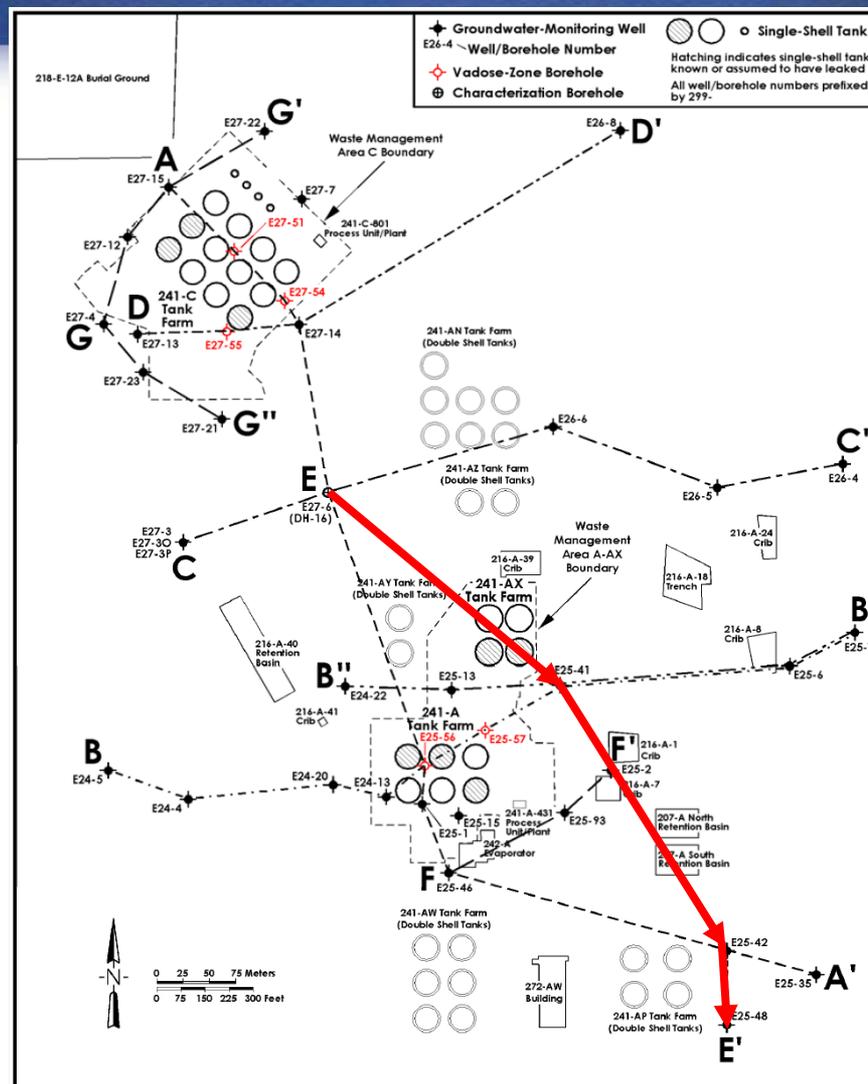
# Stratigraphy in WMA A/AX



Source: PNNL-15955, Geology Data Package for the Single-Shell Tank Waste Management Areas at the Hanford Site

# DQO Step 1- Problem Statement (cont.) Stratigraphy Between WMAs A/AX and C

- Stratigraphy between WMAs A/AX and C – A-A'
- Stratigraphy within WMA A/AX
  - B-B'
  - E-E'

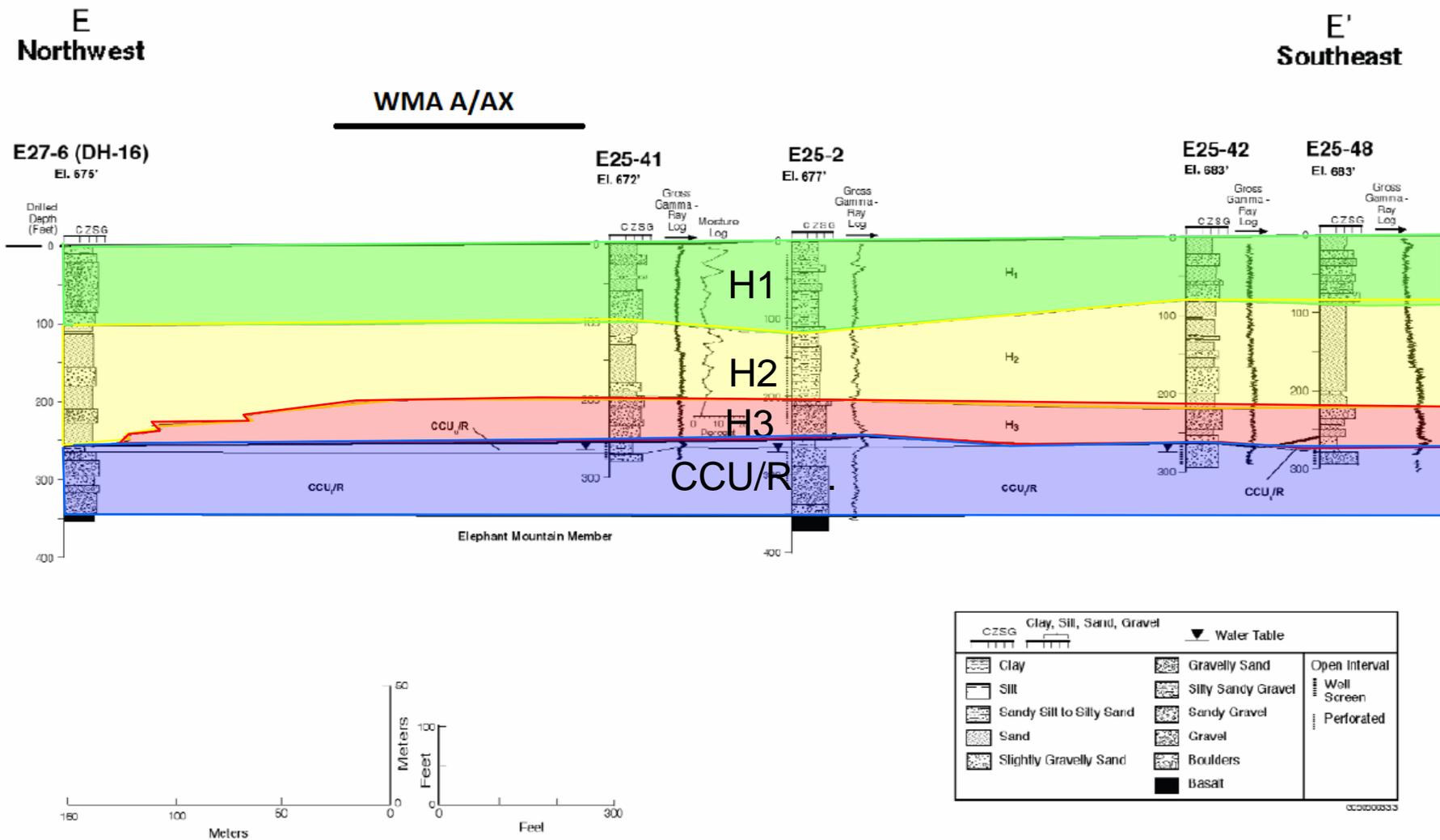


Source: PNNL-15955, Geology Data Package for the Single-Shell Tank Waste Management Areas at the Hanford Site

2004/DCL/A-AX-C/001 (03/31)

# DQO Step 1- Problem Statement (cont.)

## Stratigraphy Between WMAs A/AX and C



Source: PNNL-15955, Geology Data Package for the Single-Shell Tank Waste Management Areas at the Hanford Site

# DQO Step 1- Problem Statement (cont.)

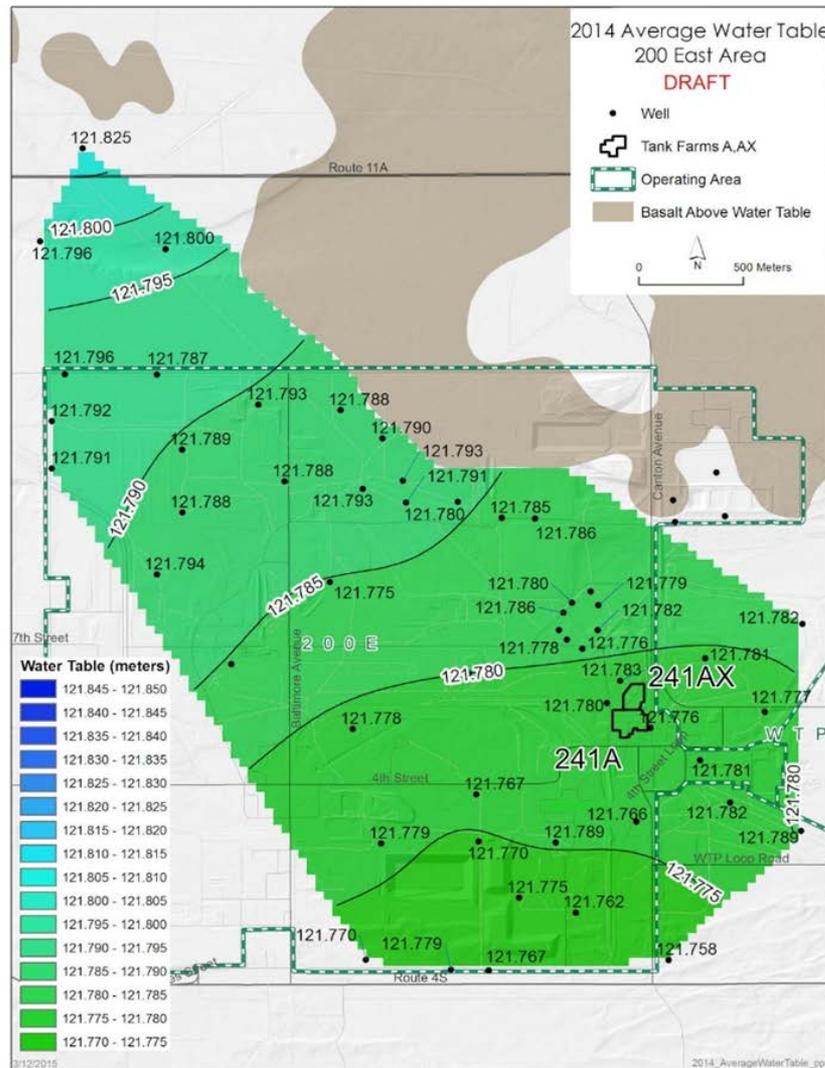
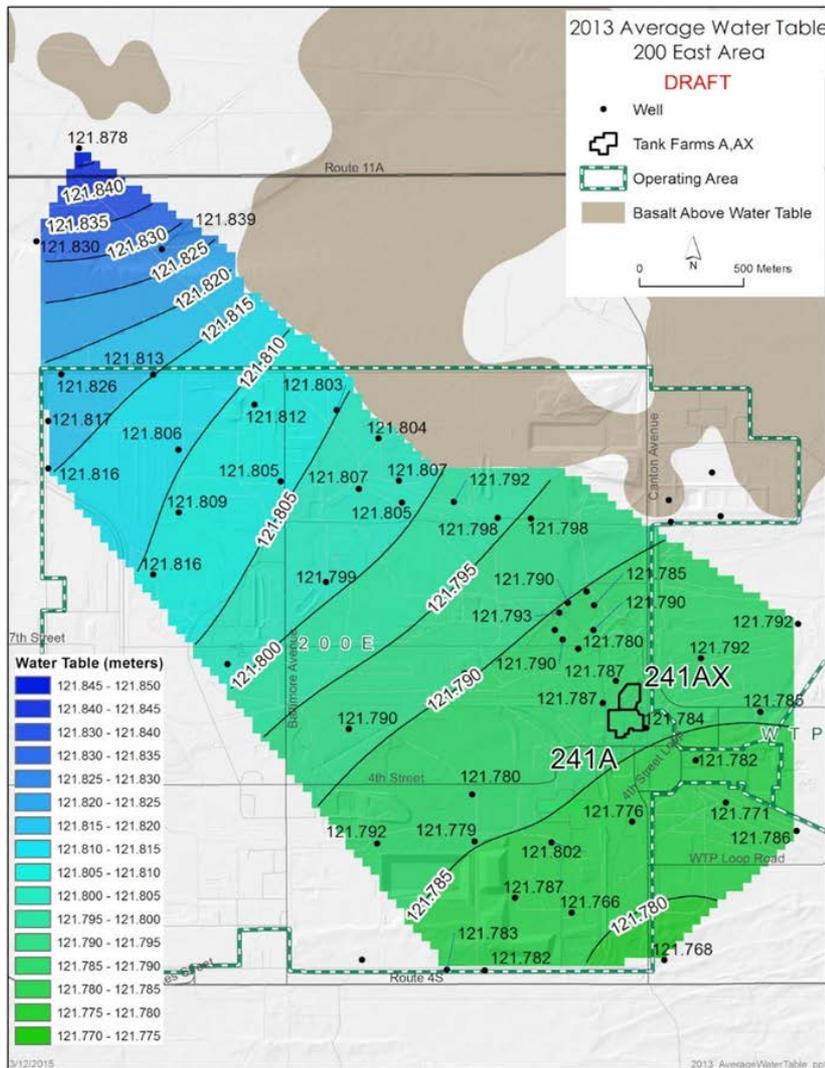
## Well/Borehole Control in the WMA A/AX area



- 8 direct-push boreholes
- 17 groundwater wells
  - (3 decommissioned)
- 89 dry wells
  - (1 decommissioned)

# DQO Step 1- Problem Statement (cont.)

## Groundwater Flow Beneath WMA A-AX



# DQO Step 1- Problem Statement (cont.)

With the objective of a Problem Statement in mind, the DQO scope was outlined as follows:

- The DQO process will address vadose zone contamination in and around A-AX tank farms.
- Data will be used to develop an assessment of risk to human health and the environment including the future risk to groundwater.
- Data will be used to evaluate alternatives in a CMS and in the selection of a proposed remedy.
- The corrective action decisions supported by the data collected under this DQO will be consistent with and support final closure of A-AX tank farms.
- This DQO will not address data requirements of SST residual waste sampling and analysis or other data required to address closure associated with ancillary equipment in the tank farm. These data requirements will be addressed in a separate DQO for the closure of the SST system.

**Note:** Action to include these scoping statements in the DQO summary report was accepted during 2011 Workshop #4 (Action A-AX-DQO-01).

# DQO Problem Statement (cont.)

Considering the DQO scope and objectives, and after review of available information, the concise statement of the problem was:

*“Vadose zone contamination in and adjacent to the A-AX tank farm may pose a current and future risk to human health and the environment including groundwater that requires corrective action to support closure.”*

**Note:** This Problem Statement was developed during 2011 Workshop #3 and formally accepted during Workshop #4.

# DQO Step 2 – Decision Statement

- DQO Step 2 identifies the decision(s) requiring new environmental data to address the problem (vadose zone soil contamination).
- Step 2 of the 2011 DQO:
  - Identified principal study questions (PSQs) that identify key unknown conditions that will reveal solutions to the problem. PSQs generally require data to be resolved.
  - The PSQ and the alternative actions normally are then combined into a decision statement but for this DQO they were not. (See the note below.)

**Note:** Action A-AX-DQO-4 was taken in Workshop #6 of the 2011 DQO to identify alternative actions in Step 5 (Decision Rules). The alternative actions were identified in Workshop #8.

# Step 2 – Decision Statement (cont.)

The PSQs that address the problem statement are focused on soil data collection:

1. Do the concentrations of radionuclide contaminants in vadose zone soils in and around WMA A-AX exceed acceptable levels?
2. Do the concentrations of nonradionuclide (chemical) contaminants in vadose zone soils in and around WMA A-AX exceed acceptable levels?
3. Do the available data reflect the nature and extent of contamination in the vadose zone that will allow us to make corrective action decisions?
4. What are the physical properties of the vadose zone soils that could affect contaminant movement in and near WMA A-AX?

**Notes:**

- a. The above PSQs were initiated in Workshop #4 and refined and agreed upon in Workshop #5 of the 2011 DQO effort.
- b. During DQO 2011 Workshop #5 discussions, two actions were taken to document team agreements:
  - Action A-AX-DQO-2 documents that information regarding groundwater contamination will be considered as the sampling design (Step 7) is developed.
  - Action A-AX-DQO-3 documents that features and events that could have influenced contaminant distribution need to be considered as the sampling design (Step 7) is developed.

# Step 2 – Decision Statement (cont.)

**Table 1. Summary of DQO Step 2 Information.**

Principal Study Question (PSQ)	Decision Statement
#1—Do the concentrations of radionuclide contaminants in vadose zone soils in and around WMA A-AX exceed acceptable levels?	#1—Determine whether the vadose zone radionuclide concentrations in and around WMA A-AX exceed acceptable levels.
#2 – Do the concentrations of nonradionuclide (chemical) contaminants in vadose zone soils in and around WMA A-AX exceed acceptable levels?	#2 – Determine if vadose zone nonradiological constituent concentrations in and around WMA A-AX exceed acceptable levels.
#3 – Does the available data reflect the nature and extent of contamination in the vadose zone that will allow us to make corrective action decisions?	#3 – Determine the nature and extent of contamination in the vadose zone that will allow us to make corrective action decisions.
#4– What are the chemical/physical properties of the vadose zone soils that could affect contaminant movement in and near WMA A-AX?	#4 – Determine the chemical/physical properties of vadose zone soils that could affect contaminant movement in and near WMA A-AX.

**Note:** These Decision Statements were agreed upon in 2011 Workshop #6.

## Final Workshop comments

The next workshop (Meeting #2017-2) will:

- Discuss comments on agreed upon Steps 1 and 2 or related information from the first workshop, as needed.
- Review Step 3 (Data Needs) and Step 4 (Study Boundaries) outputs from the 2011 DQO and related action items.
- Update step information as necessary with the goal of obtaining concurrence with Steps 3 and 4 output.