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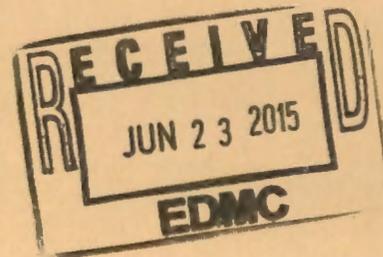
SGW-58795  
Revision 1

# Monthly Groundwater Meeting March 2015 with Ecology

Prepared for the U.S. Department of Energy  
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy  
under Contract DE-AC06-08RL14788

 **CH2MHILL**  
Plateau Remediation Company  
P.O. Box 1600  
Richland, Washington 99352



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**APPROVED**

*By Ashley R Jenkins at 6:58 am, Jun 10, 2015*

Release Approval

Date

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**MEETING MINUTES****Monthly Groundwater Meeting March 2015 with Ecology****Attendees:**

D. Hildebrand	DOE
B. Faught	CHPRC
D. Goswami	Ecology
J. Ayres	Ecology
J. Ni	CHPRC
L. Brouillard	CHPRC
A. Lee	CHPRC
G. Thomas	CHPRC
D. Crumpler	Ecology
R. Mackley	PNNL
C. Arola	CHPRC
Z. Jackson	Ecology
G. Hanson	CHPRC

**CC:****From: B. Faught****Date: March 25, 2015**

This meeting was held in the Ecology office, room 3B, from 2:30 to 4:30 PST, March 25, 2015. A summary of the discussion follows.

**Objective:**

The objective of this meeting was discuss current RCRA groundwater status (open monthly agenda items), review the RCRA Monitoring Plan Template for revising the current plans, brief Ecology on the changes to the monitoring plan for 216-A-37-1, and discuss DOE's schedule for revising the 11 proposed monitoring plans.

Ecology also added discussion of their planned/upcoming groundwater monitoring well inspection.

**Discussion:**

- Opening Remarks – D. Hildebrand
- RCRA Monitoring Plan Template – J. Ni
  - Discussion on developed template language for RCRA SAPS (currently only interim status and SWL, a State permitted site).
  - Consistent language for QAPP – all will be Appendix A.
  - Background sampling frequency – specifically regarding new well installations and the need to develop additional background information (quarterly sampling) when it already exists or can we/should we use the current results as background information?
- Discussion Regarding Upcoming Monitoring Well Inspections – All
  - RCRA Facilities – groundwater monitoring network well inspections are expected to begin in May.
  - Inspections will include looking at existing installed wells, sampling (duplicate sampling, as appropriate), and review of current monitoring plans and related data report.
  - Inspection schedule may impact the planned work to revise the proposed RCRA monitoring plans. Ecology wants input on which monitoring plans to do, and when and if such needs to be done.
- Review of 216-A-37-1 Monitoring Plan – L. Brouillard
  - Comments/Questions for resolution attached below.
  - *Note: Presentation attached as Appendix A.*
- Discussion Regarding DOE Process for Monitoring Plan Revisions – All
  - Updates to plans will be for those needing updates because of condition changes, e.g., well network, flow direction, etc.
  - Reviews to occur on an annual basis and revisions, if needed.
- LERF March Detection Monitoring Results – G. Thomas
  - This discussion did not occur. CHPRC working with DOE to get a formal letter transmitted to Ecology.
- Schedule/Status for Upcoming or Submitted Quarterly Reports – G. Hanson
  - SGW-58475 Rev 0, *Post-Closure Corrective Action Groundwater Monitoring Report for the 183H Solar Evaporation Basins and the 300 Area Process Trenches: January – June 2014* was transmitted from RL to Ecology and placed into the AR via 15-AMRP-0077 on 02/11/2015.
  - SGW-58483 Rev. 0, *WMA C April through June 2014 Quarterly Groundwater Monitoring Report* was delivered to RL 3/19/2015. (Transmitted to Ecology and AR via 15-AMRP-0114 dated 04/02/2015.)
  - SGW-58542 Rev. 0, *WMA C July through September 2014 Quarterly Groundwater Monitoring Report*, was delivered to RL 03/23/2015 for distribution to Ecology and AR.
  - SGW-58600 Rev. 0, *Post-Closure Corrective Action Groundwater Monitoring Report for the 183H Solar Evaporation Basins and the 300 Area Process Trenches: July – December 2014*, was

delivered to RL 03/11/2015. (Transmitted to Ecology and AR via 15-AMRP-0108 dated 03/24/2015.)

- SGW-58665 Rev. 0, *Resource Conservation and Recovery Act – Groundwater Quarterly Report for April through June 2014* is in the clearance approval process. (Submitted to DOE 04/07/2015 for transmittal to Ecology and AR.)
- SGW-58561 Rev. 0, *WMA C October through December 2014 Quarterly Groundwater Monitoring Report* is in the clearance approval process. (Submitted to DOE 04/07/2015 for transmittal to Ecology and AR.)
- SGW-58719 Rev. 0, *Resource Conservation and Recovery Act – Groundwater Quarterly Report for July through September 2014* is being drafted for internal review.

**Actions:**

1. D. Hildebrand/G. Thomas to prepare and transmit formal letter regarding LERF March Detection Monitoring Results. (G. Thomas provided information to D. Hildebrand 04/02/2015.)
2. CHPRC to get RCRA monitoring plan template cleared for transmittal to Ecology.
3. J. Ayres to confirm next scheduled meeting and requested meeting for further RCRA monitoring plan discussion and SMILE presentation to Ecology groundwater team. *Meeting scheduled for April 8, 2015, 2:30-4:00 PM PST at Ecology, room 3A was cancelled 04/06/2015.*
4. G. Hanson to prepare meeting minutes, including compilation of 216-A-37-1 comments/questions for response.

**Agreements:**

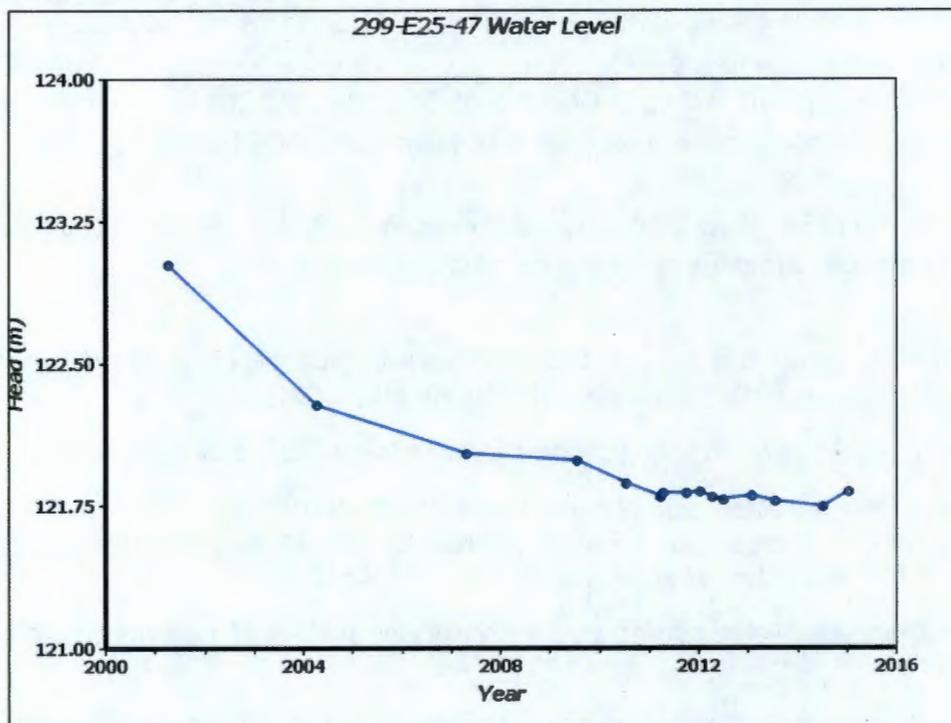
- RCRA monitoring plan Template will be shared with Ecology through DOE for comment and resolution.
- Ecology anticipates providing a 2-week prior notification for planned inspections.
- Next monthly meeting scheduled for April 21, 2015, 2:30-4:00 PM PST at Ecology, room 3B.

**216-A-37-1 Discussion Comments:**

*D. Hildebrand*

- Is micro seismic integrated into our cross section development? If so please reference.
- Hanford. Cross sections please break Hanford subunits out:  
Hanford gravel upper unit, Sand middle unit, Hanford gravel lower unit
- Suggest we be consistent with WMA-C PA model development as we move to the A/AX farm PA work.
- Figures 2-4, 2-5, 2-6 add wells to basalt to show support for our interpretation and integrate geophysical work as appropriate (i.e., micro seismic, resistivity, TDEM, micro gravity work).
- Have we been using our integrated 3 D Leapfrog integrated interpretation?
- Table 3-2: add or convert to elevation. Keep saturated water column thickness.
- Well 299-E25-47 only has 2.7 meters water left. RL expects the water table may drop another 1.5 to 2.0 meters. If it is important to keep this well in our network we may want to consider early well replacement so we do not lose or cloud our analysis because of low water column to sample and create dirty water samples.

- Note in response to comment: The water table has not significantly decreased in 200 East Area over the past 5 years (figure below), and don't believe the water remaining in 299-E25-47 is an issue for a decade or more.



#### G. Hanson

- General: need verbiage consistency throughout figures, maps, etc., e.g., upgradient vs. up gradient. Believe it should be upgradient.
- Slide 4 Figure 2-3: use color to aid in discerning between stratigraphy
- Slide 15 Figure 2-15: Look at 3D from Leapfrog through Intera.
- Slide 17 Table 3-1: Total organic halogen – should this be total organic halides?
- Slide 18 Table 3-2: Add total well depth and elevation with respect to cross-sections. Verify screen bottom for Wells 299-E25-17 and 299-E25-19.

#### D. Goswami

- General comment: likes the analyses presented.
- Slide 5 – Figure 2-4: Drawing water from the cold creek, and wells are close but no gradient displayed. Any changes? No well but new interpretation.
- Slide 7 Figure 2-6: preferential flow path?
- Slide 8 Figure 2-7: low gradient – trend surface analysis?
- Slide 17 Table 3-1: Identify or flag new/proposed well and statement somewhere regarding new critical mean calculation.

#### Z. Jackson

- Well 299-E25-19 is this a Webster Well? Also 299-E25 17 and 299-E25-20?

Attachment A

216-A-37-1 Handout – L. Brouillard (CHPRC)

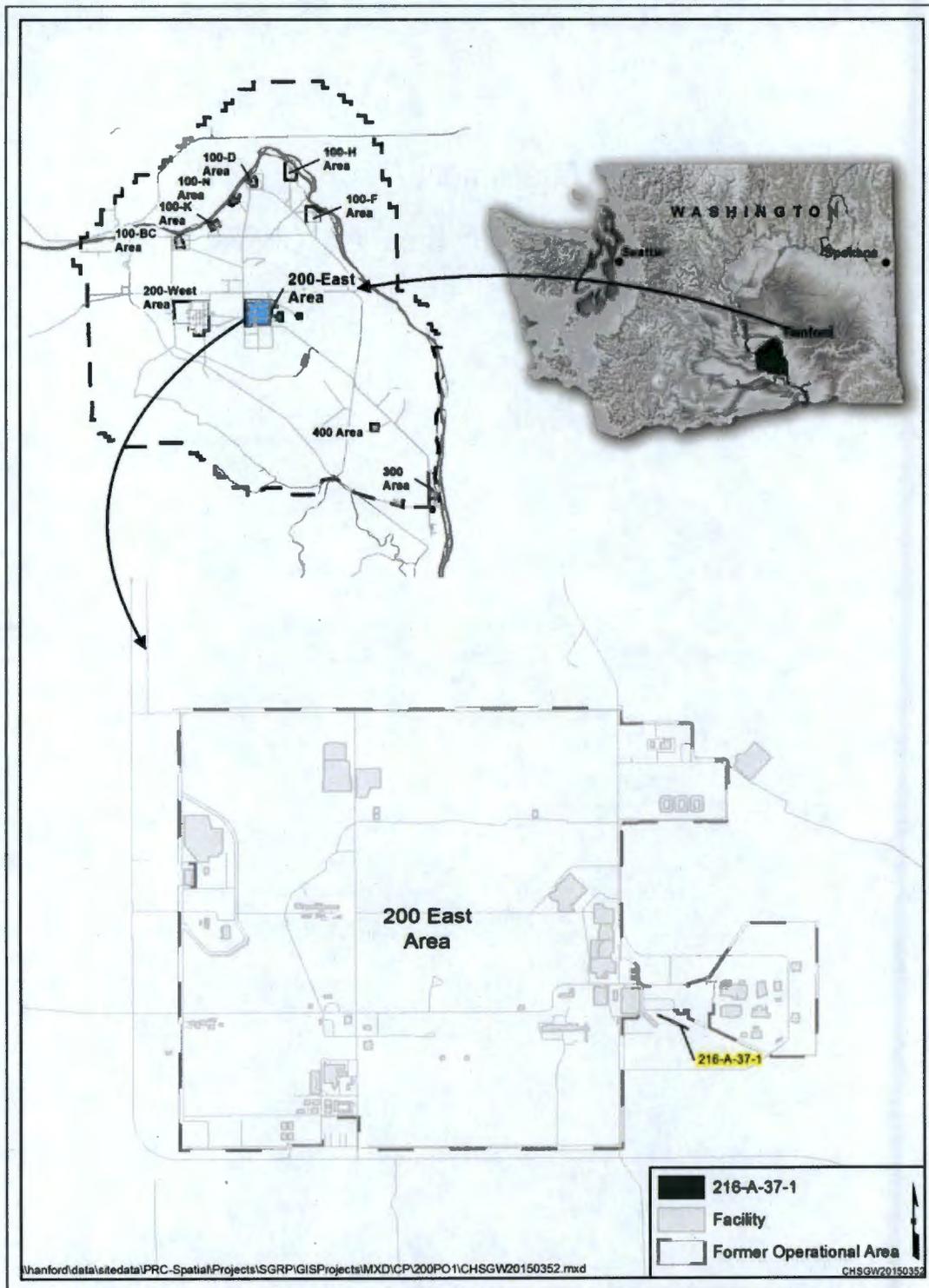


Figure 1-1. Location Map for 216-A-37-1 Crib

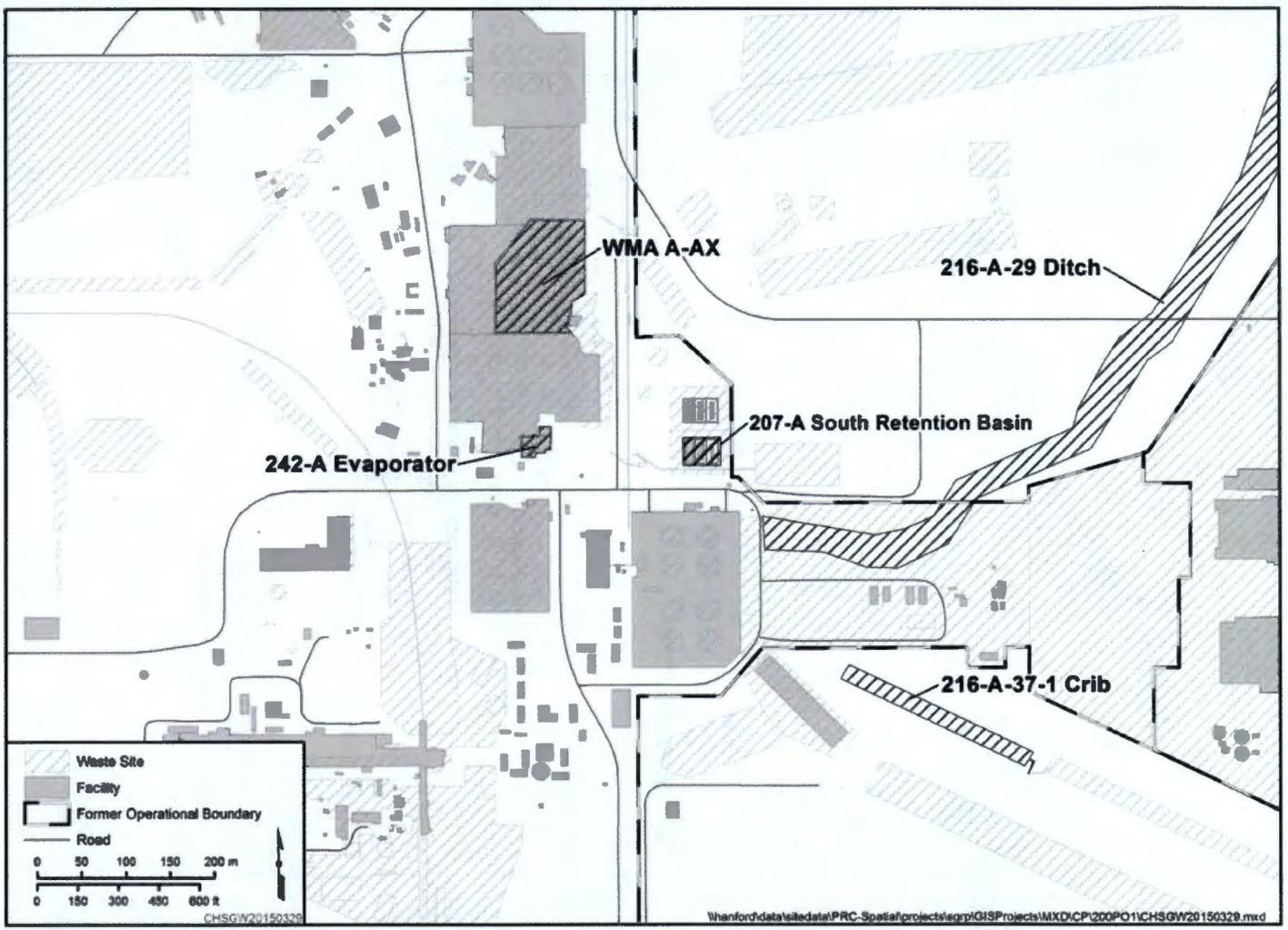


Figure 2-1. Site Map for the 216-A-37-1 Crib and Surrounding Facilities

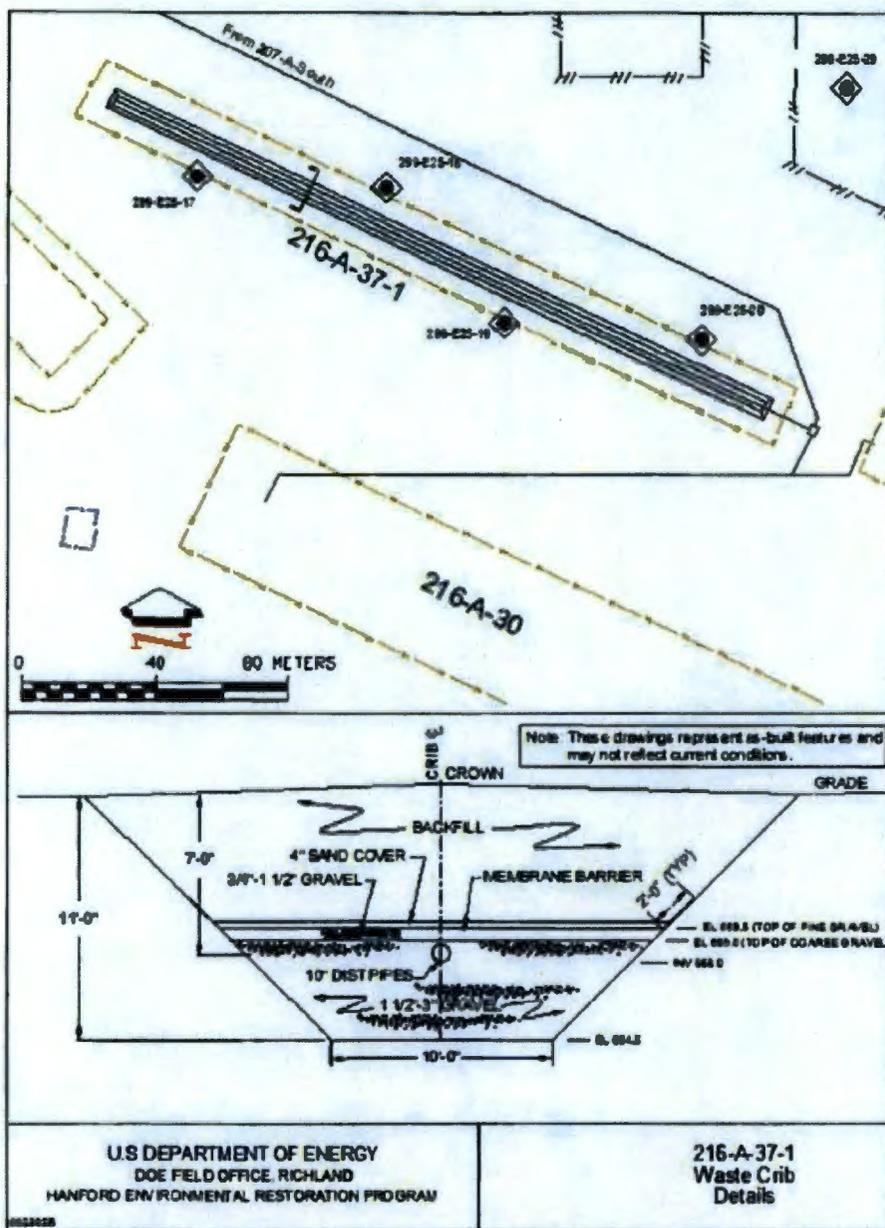


Figure 2-2. Construction Diagram for the 216-A-37-1 Crib.

The process condensate was mostly water containing small quantities of ammonia and inorganic constituents and trace quantities of volatile organics and radionuclides

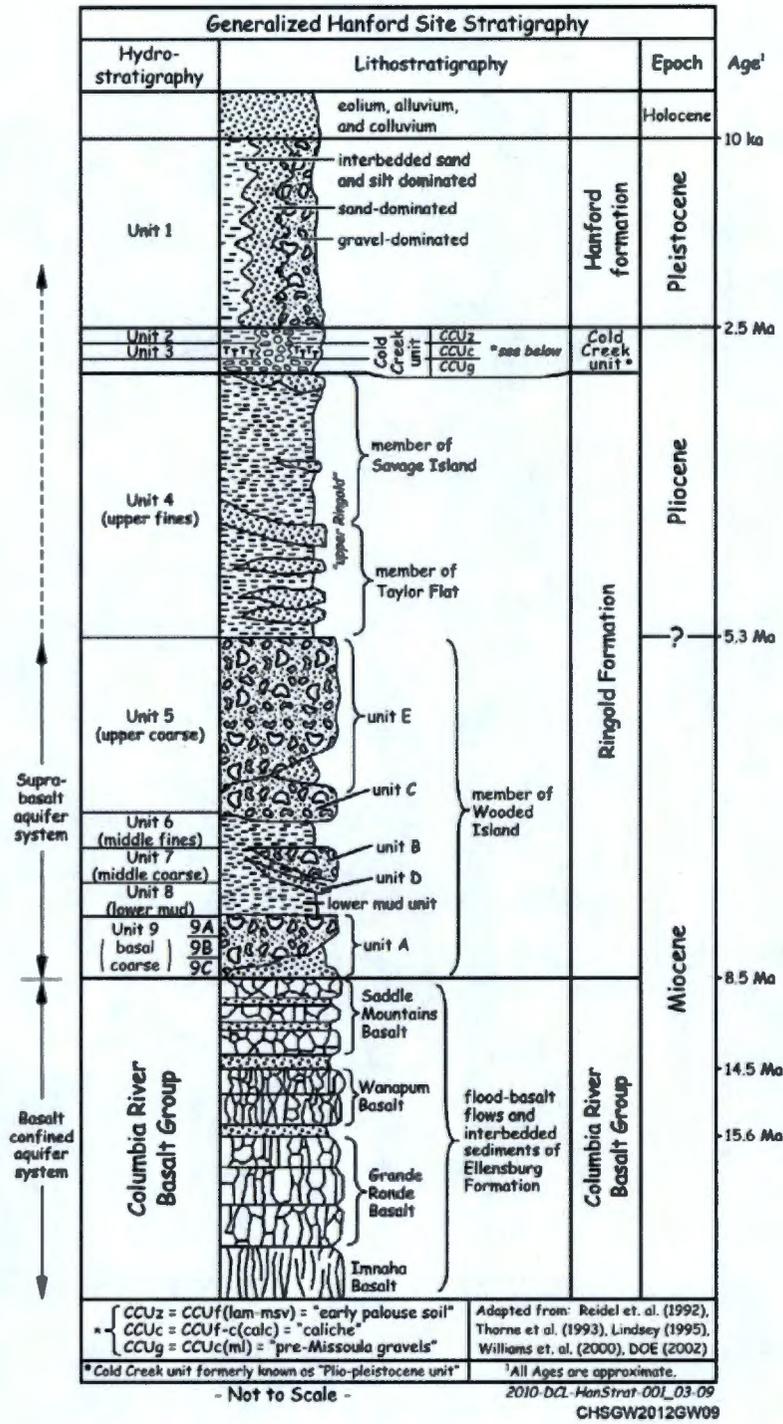


Figure 2-3. General Stratigraphy at the Hanford Site

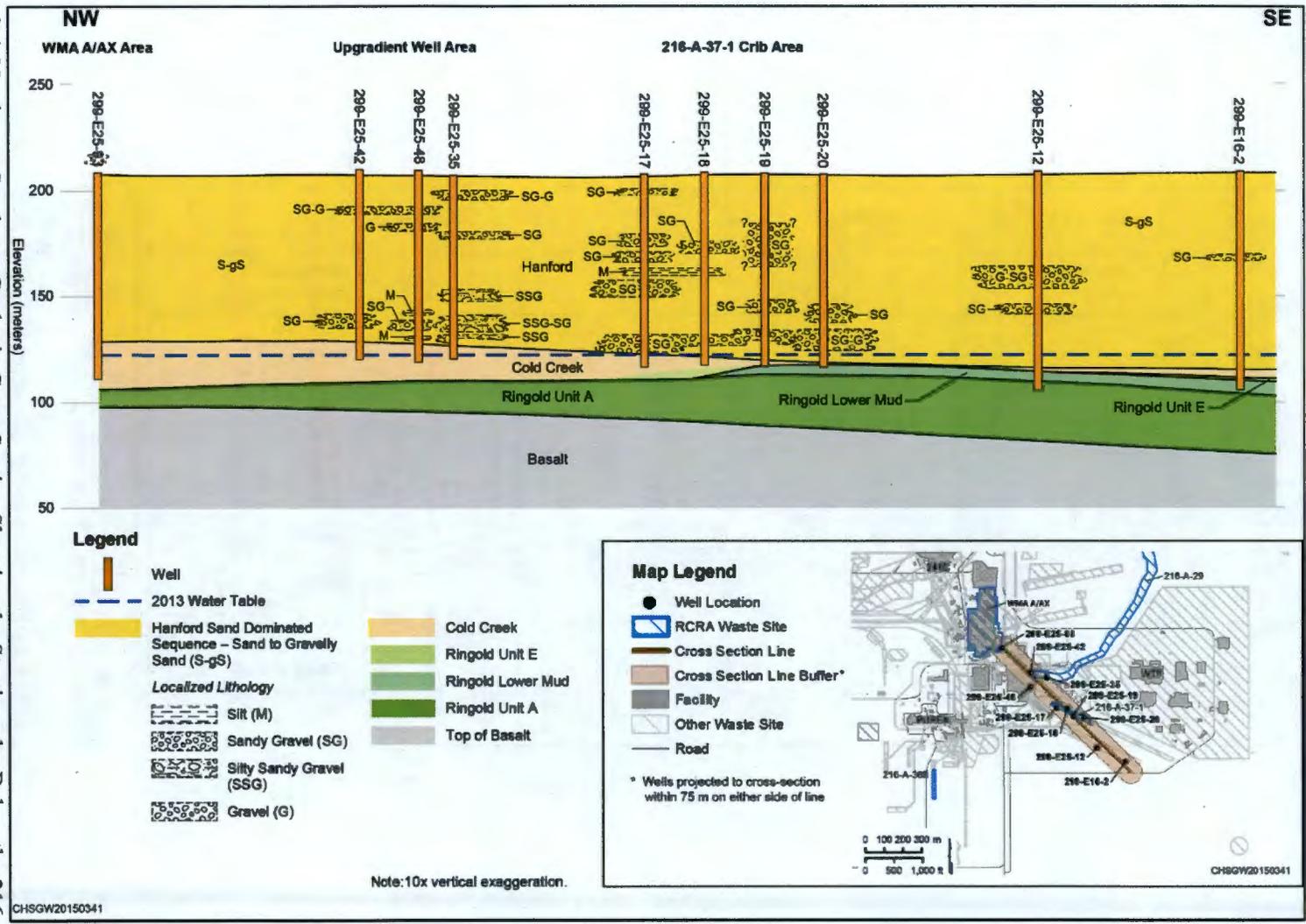
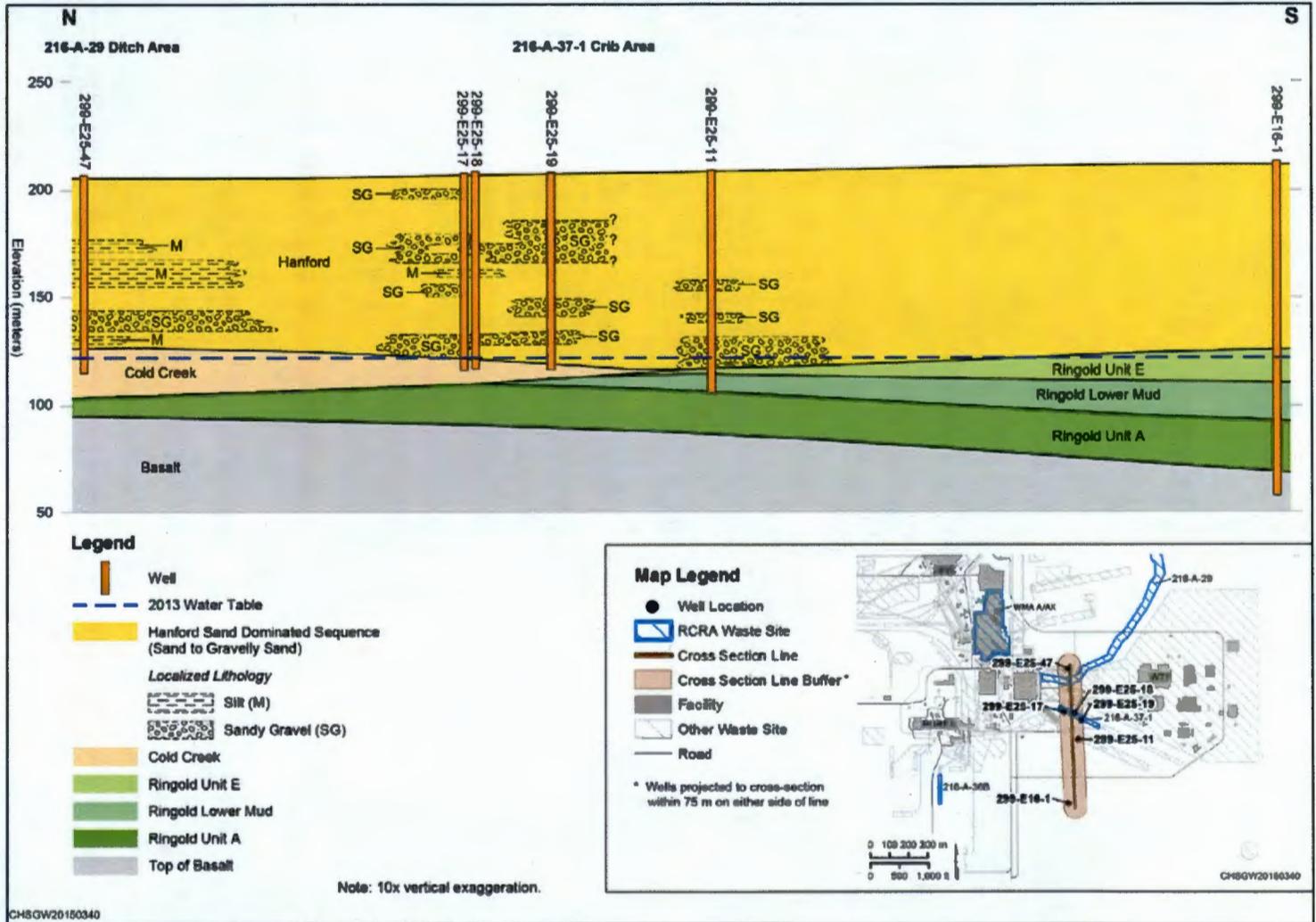


Figure 2-4. Northwest-Southeast Geologic Cross Section Showing the Stratigraphy Below the 216-A-37-1 Crib.

Figure 2-5. North-South Geologic Cross Section Showing the Stratigraphy Below the 216-A-A-37-1 Crib.







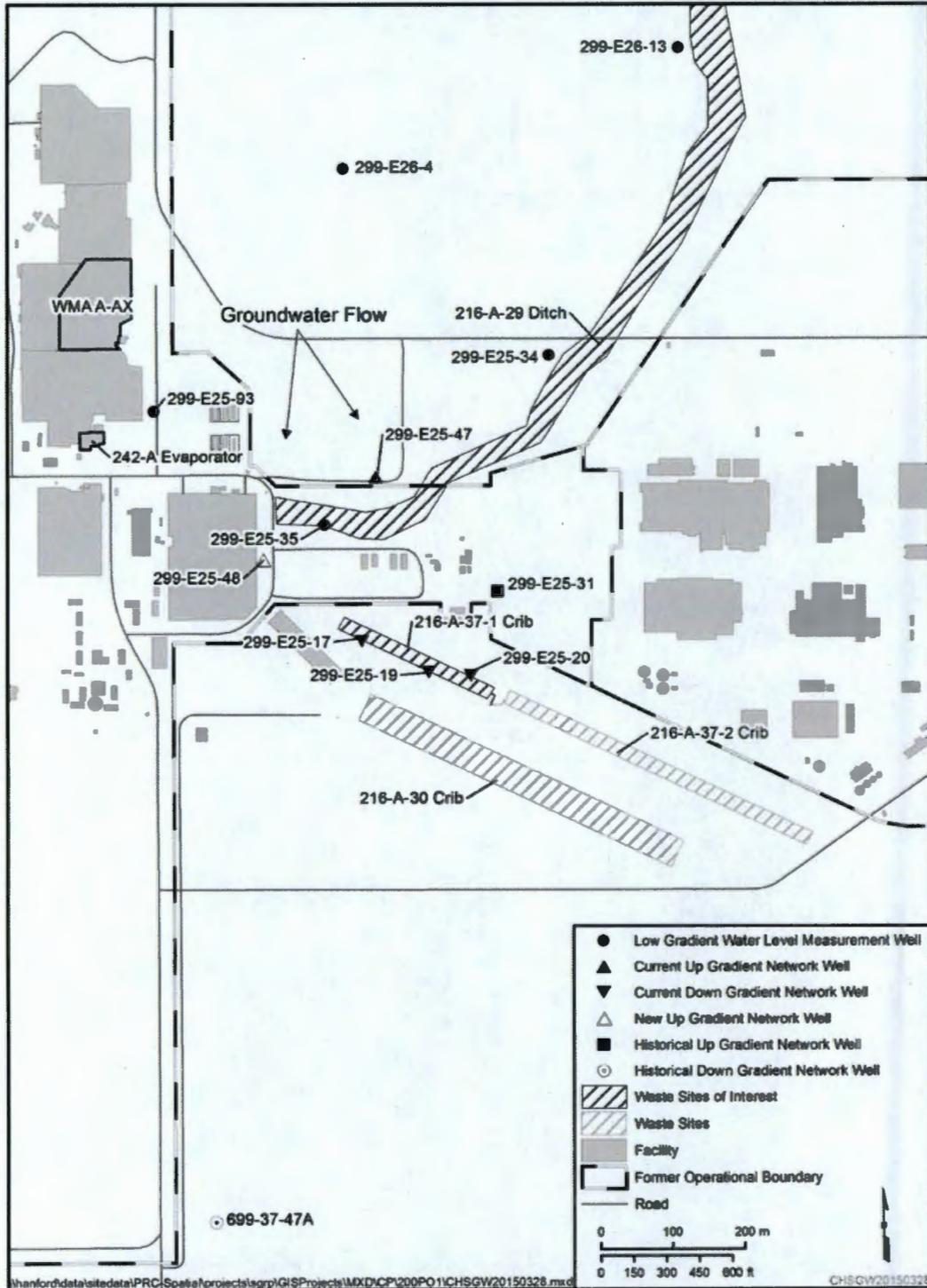


Figure 2-8. Estimated Local Flow Direction and Monitoring Networks near the 216-A-37-1 Crib

**Table 2-2. Summary of Groundwater Monitoring Plans for the 216-A-37-1 PUREX Crib.**

Document number	Rev.	Monitoring Program	Document title	Publication date	Summary
PNNL-11523	0	Groundwater Quality Assessment	Combination RCRA Groundwater Monitoring Plan for the 216-A-10, 216-A-36B, and 216-A-37-1 PUREX Crib	June 1997	Plan developed because the 216-A-37-1 crib required groundwater monitoring under RCRA.  Three RCRA waste sites were combined into one groundwater assessment program.
PNNL-11523	1	Groundwater Quality Assessment	Interim-Status RCRA Groundwater Monitoring Plan for the 216-A-10, 216-A-36B, and 216-A-37-1 PUREX Crib	July 2005	Continued well network coverage of three waste sites under one monitoring plan.
DOE/RL-2010-92	0	Indicator Evaluation Program	Interim Status Groundwater Monitoring Plan for the 216-A-37-1 PUREX Plant Crib	October 2010	216-A-37-1 site-specific RCRA groundwater monitoring plan.  Indicator evaluation program was initiated for 216-A-37-1 Crib.
DOE/RL-2010-92	1	Indicator Evaluation Program	Interim Status Groundwater Monitoring Plan for the 216-A-37-1 PUREX Plant Crib	June 2011	Updated the previous plan to include the constituent list and sampling frequency for monitoring during the first year.
DOE/RL-2010-92	2	Indicator Evaluation Program	Interim Status Groundwater Monitoring Plan for the 216-A-37-1 PUREX Plant Crib	In progress	Update to the previous plan

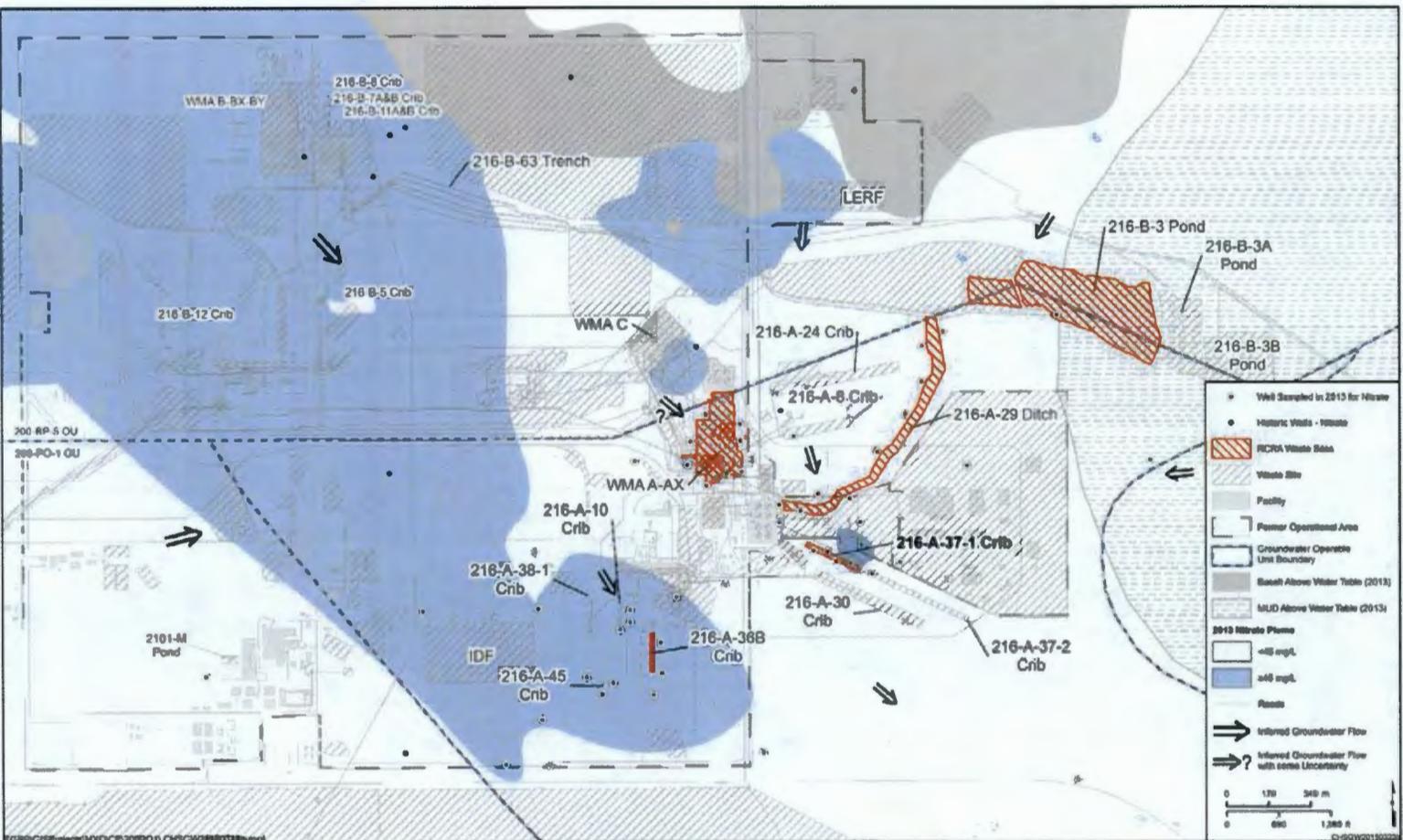


Figure 2-9. Distribution of nitrate in 2013 at a concentration above the 45 mg/L drinking water standard in vicinity of the 200-A-37-1 Crib.

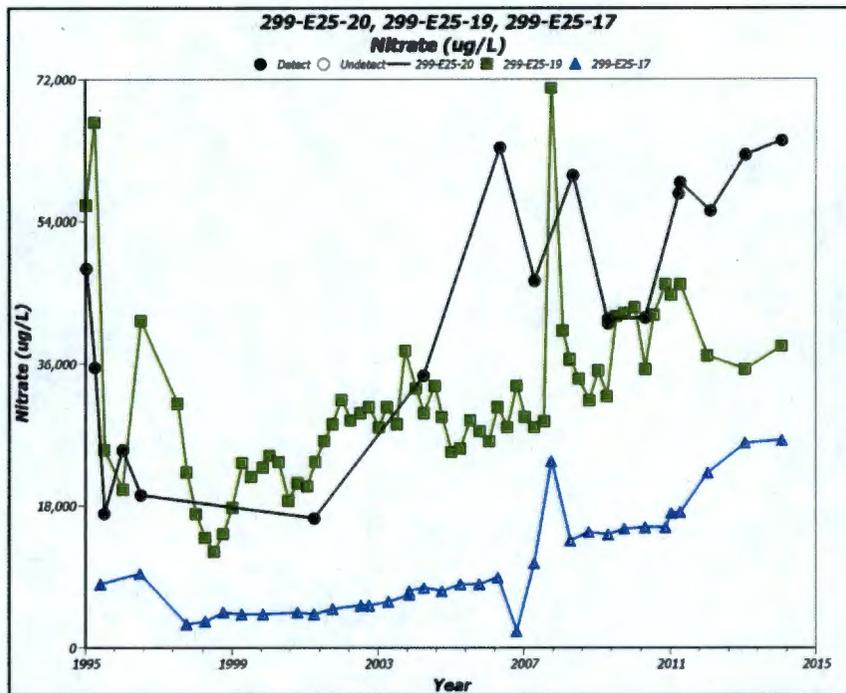


Figure 2-10 .Time Series Plot Showing Changes in Nitrate Concentrations in Downgradient Monitoring Wells

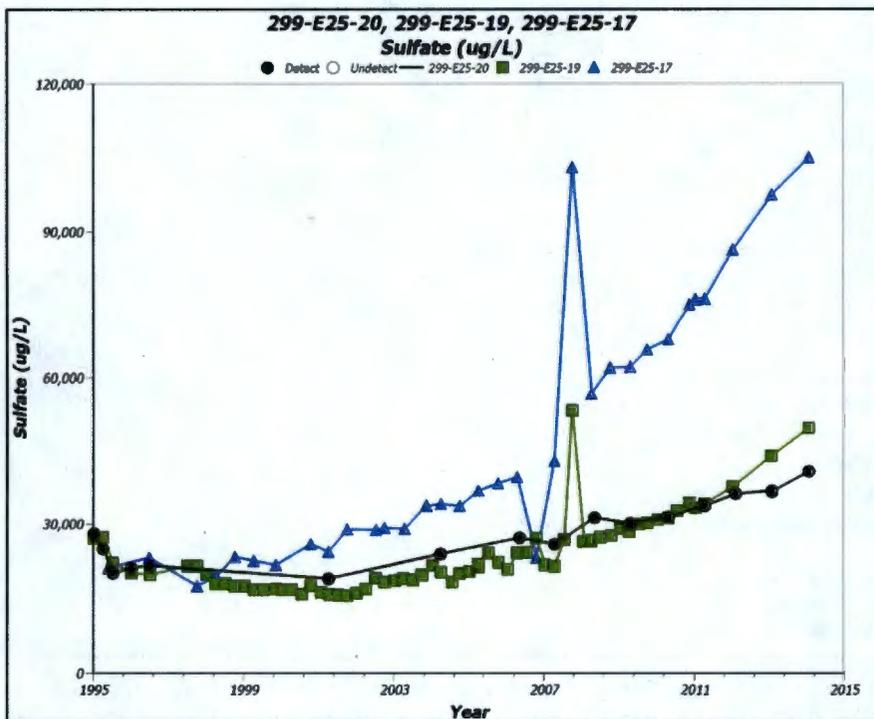


Figure 2-11. Time series Plot Showing Changes in Sulfate Concentrations in Downgradient Monitoring Wells

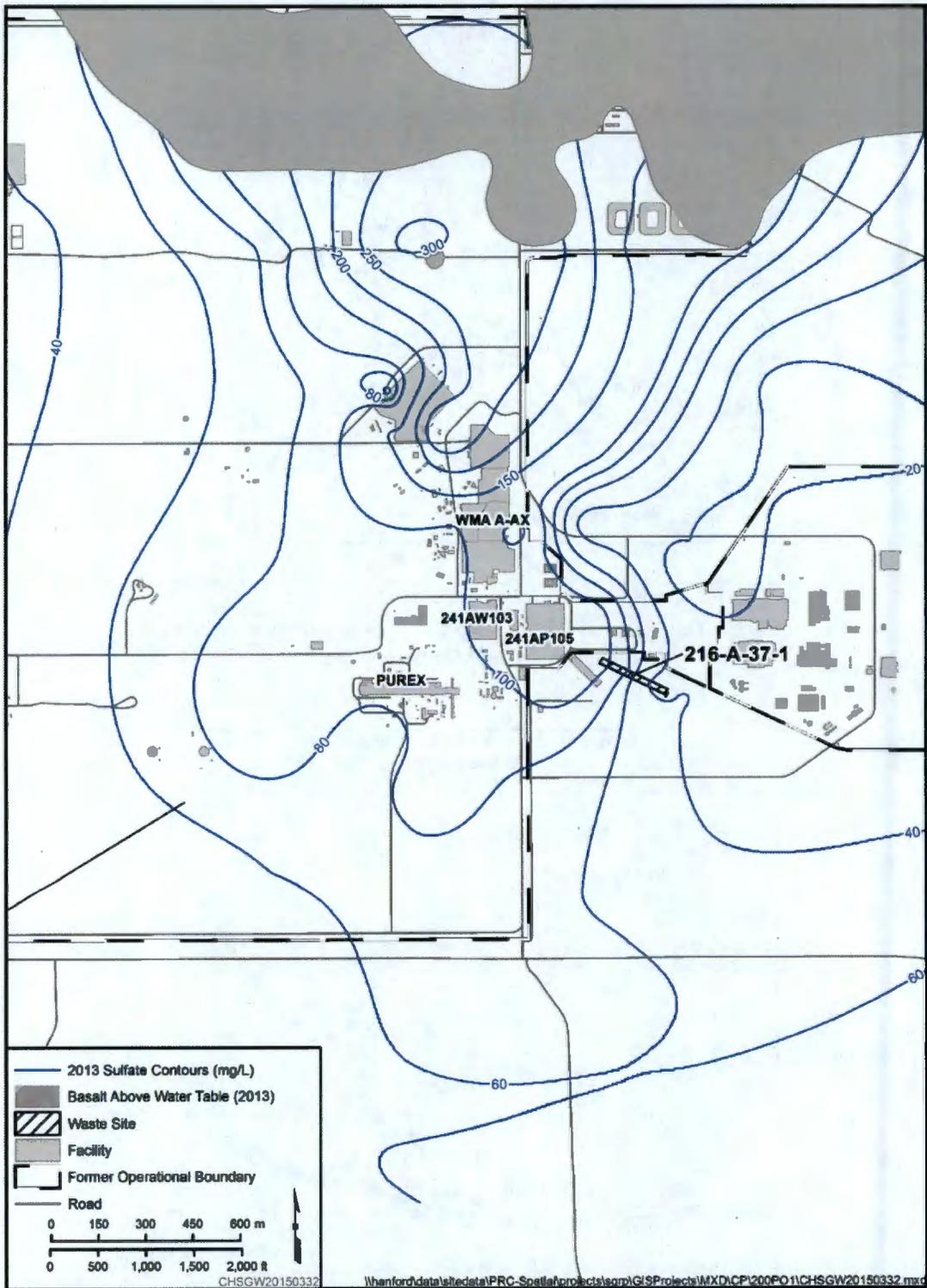


Figure 2-12. Contour Map of 2013 Sulfate Concentrations in the Vicinity of 216-A-37-1 Crib.

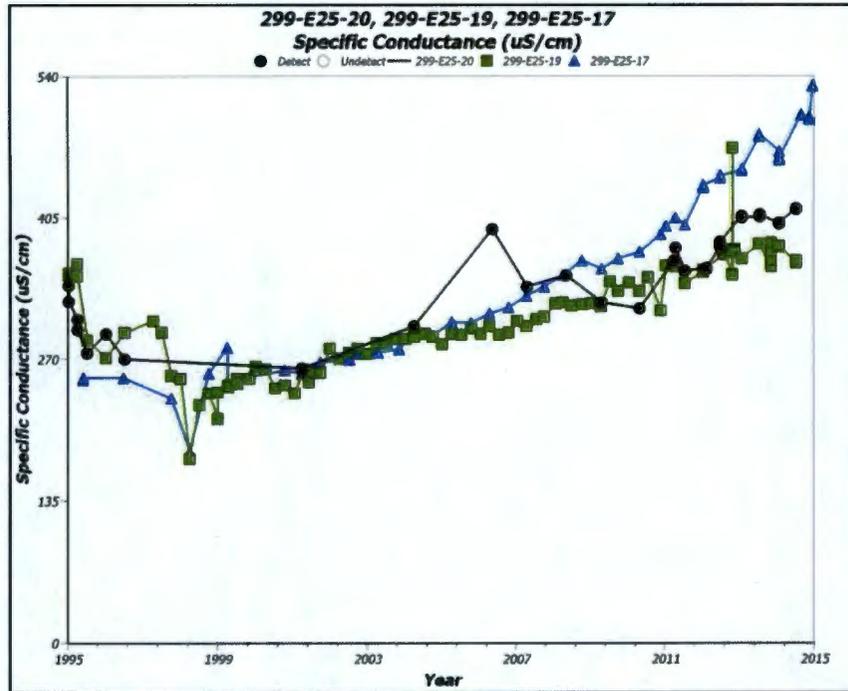


Figure 2-13. Time Series Plot Showing Increasing Conductivity Values in Downgradient Wells Associated with Upgradient Nitrate and Sulfate Contributions.

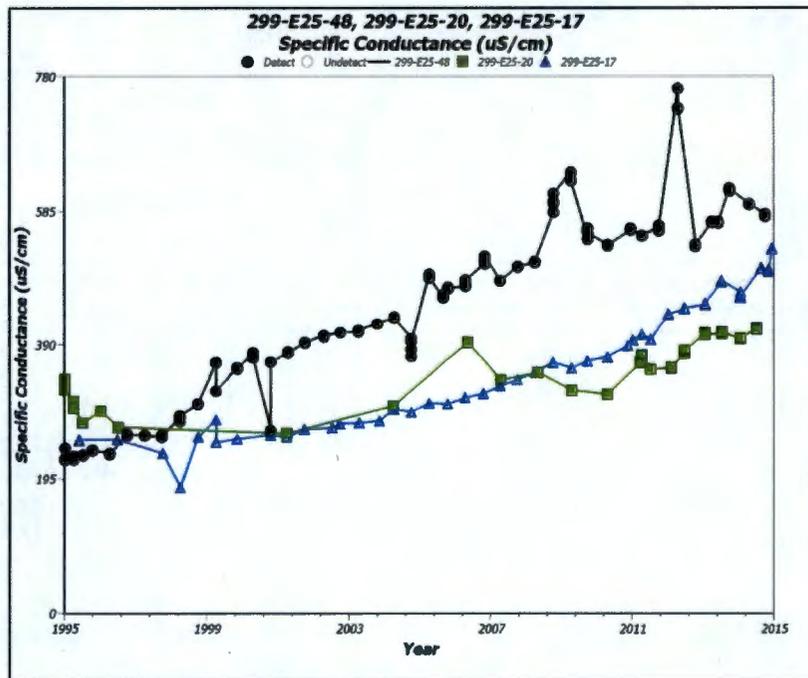
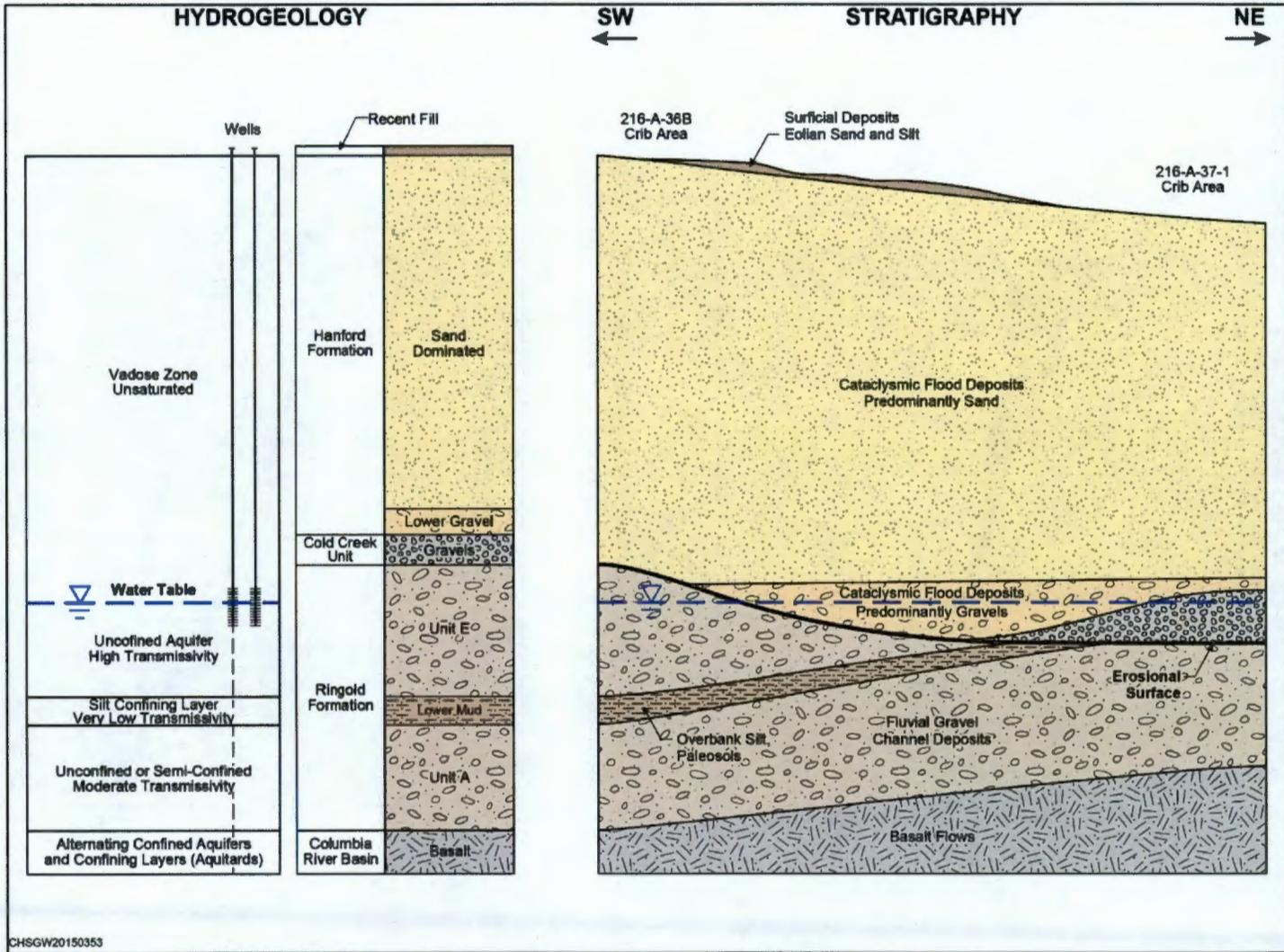


Figure 2-14. Time Series Plot Showing Increasing Conductivity Values in Upgradient Well 299-E25-48 and Downgradient Wells 299-E25-20 and 299-E25-17.

Figure 2-15. Hydrogeologic Conceptual Model for the 216-A-37-1 Crib and Southeastern Portion of the 200 East Area



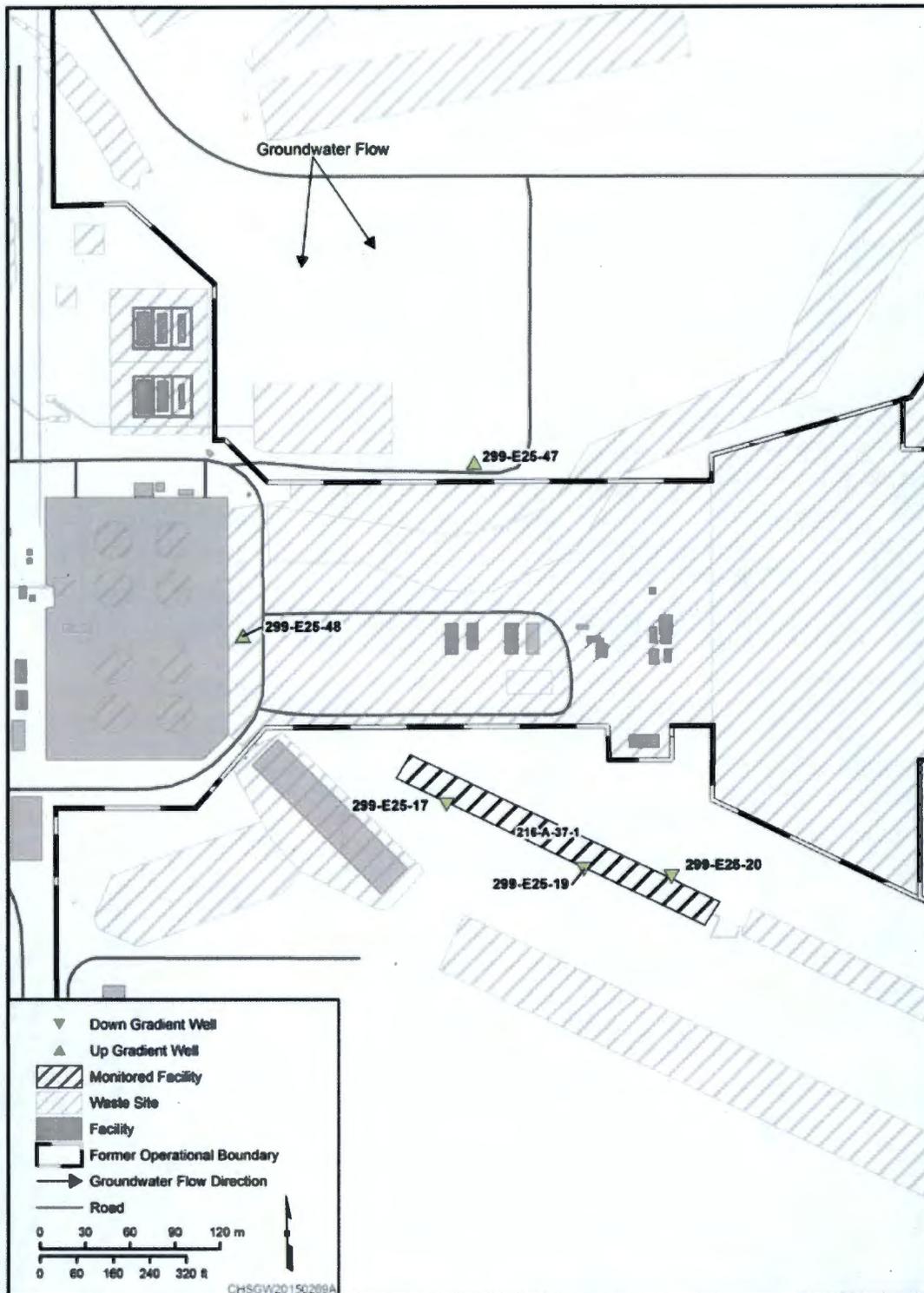


Figure 3-1. 216-A-37-1 RCRA Monitoring Well Network

Table 3-1. Monitoring Well Network for the 216-A-37-1 Crib

Well Name	Purpose	WAC Compliant	RCRA Required Parameters <sup>a</sup>											Other				
			Water Level	Contamination Indicator Parameters				Groundwater Quality Parameters							Water Chemistry Supporting Constituents			
				pH	Specific Conductance	Total organic carbon	Total organic halogen	Chloride	Iron (filtered and unfiltered)	Manganese (filtered and unfiltered)	Phenols	Sodium (filtered and unfiltered)	Sulfate	Alkalinity <sup>b</sup>	Metals <sup>c</sup>	Anions <sup>d</sup>	Field parameters <sup>e</sup>	
299-E25-47	Upgradient	Y	S	S4	S4	S4	S4	A	A	A	A	A	A	A	A	A	S	
299-E25-48	Upgradient	Y	S	S4	S4	S4	S4	A	A	A	A	A	A	A	A	A	S	
299-E25-17	Downgradient	N <sup>f</sup>	S	S4	S4	S4	S4	A	A	A	A	A	A	A	A	A	S	
299-E25-19	Downgradient	N <sup>f</sup>	S	S4	S4	S4	S4	A	A	A	A	A	A	A	A	A	S	
299-E25-20	Downgradient	N <sup>f</sup>	S	S4	S4	S4	S4	A	A	A	A	A	A	A	A	A	S	

## Notes:

a. Parameters required by 40 CFR 265.92, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," "Sampling and Analysis."

b. Alkalinity includes analysis of bicarbonate alkalinity, carbonate alkalinity, and hydroxide alkalinity

c. Includes analysis of calcium, magnesium, and potassium.

d. Includes analysis of fluoride, nitrate, and nitrite

e. Includes temperature, turbidity

f. Well identified for replacement consistent with site-wide cleanup priorities described in Milestone M-024-58 of the Tri-Party Agreement Action Plan (Ecology et al., 1989b).

A = to be sampled annually

S = to be sampled semiannually

S4 = to be sampled semiannually, with quadruplicate samples collected during each event

CFR = Code of Federal Regulations

WAC = Washington Administrative Code

Y = well is constructed as a resource protection well (WAC 173-160, "Minimum Standard for Construction and Maintenance of Wells")

N = well is not constructed as a resource protection well (WAC 173-160, "Minimum Standard for Construction and Maintenance of Wells")

**Table 3-2. Attributes for Wells in the 216-A-37-1 Groundwater Monitoring Network**

<b>Well Name</b>	<b>Completion Date</b>	<b>Easting <sup>a</sup> (m)</b>	<b>Northing <sup>a</sup> (m)</b>	<b>Screen Top (m [ft] bgs) <i>elevation (m)</i></b>	<b>Screen bottom (m [ft] bgs) <i>elevation (m)</i></b>	<b>Water Depth (m [ft] bgs) <i>elevation (m)</i></b>	<b>Remaining Water Column (m[ft])</b>	<b>Water Table Measurement Date</b>
299-E25-47 <sup>b</sup>	1992	575778.953	135931.544	80.2 (263) <i>125.196</i>	86.3 (283.2) <i>119.039</i>	83.6 (274.3) <i>121.822</i>	2.78 (8.12)	1/9/2015
299-E25-48 <sup>b</sup>	1992	575623.851	135815.69	83.6 (274.3) <i>124.577</i>	89.8 (294.6) <i>118.389</i>	86.4 (283.5) <i>121.778</i>	3.38 (11.1)	10/3/2014
299-E25-17	1976	575760.245	135702.51	83.2 (273) <i>123.457</i>	90.0 (295) <i>116.657</i>	84.9 (278.5) <i>121.757</i>	5.1 (16.7)	12/12/2014
299-E25-19	1976	575852.333	135659.027	82.3 (270) <i>124.609</i>	90.0 (295) <i>116.909</i>	85.2 (279.6) <i>121.709</i>	4.8 (15.7)	12/22/2014
299-E25-20	1976	575910.942	135654	82.0 (269) <i>124.688</i>	89.6 (294) <i>117.088</i>	85.0 (279.0) <i>121.688</i>	4.6 (14.96)	7/11/2014

a. Coordinates are in North American Datum of 1983 (NAC 83)

b. Upgradient well

Table 3-3. Main Differences Between this Monitoring Plan and Previous Monitoring Plan

Type of Change	Previous Plan <sup>a</sup>	Current Plan	Justification Summary
Constituents	Indicator parameters, groundwater quality parameters, water chemistry constituents, site specific constituents <sup>b</sup>	Indicator parameters, groundwater quality parameters, water chemistry constituents, site specific constituents	Removal of VOC sampling from site specific constituent list as it was completed under previous plan.
Sampling frequency	Indicator parameters – Semi-annual; Groundwater Quality Parameters – Annual; Water level measurements – every sampling event; Additional constituents – Annual; Field parameters – Semi-annual	Same	No change
Well network	One upgradient well, three downgradient wells	Two upgradient wells, three downgradient wells	Additional upgradient monitoring well 299-E25-48 added as two upgradient wells are needed to monitor current spatial variability in upgradient constituent concentrations impacting the site.
Groundwater flow direction	South to Southeast	Same	No change
Type of groundwater monitoring program	Indicator Evaluation Program	Same	No change
Background arithmetic mean recalculated	Calculated annually using one upgradient well	Calculated annually using two upgradient wells	Two wells (299-E25-47 and 299-E25-48) are needed to capture spatial variability in upgradient conditions.
Groundwater Quality Assessment Plan Outline	None <sup>c</sup>	Updated outline provided in Section 5.	Updated outline made available within document.

a. DOE/RL-2010-92, Rev. 1, *Interim Status Groundwater Monitoring Plan for the 216-A-37-1 PUREX Plant Crib*

b. Specifically VOCs, listed as a supporting constituent in the previous plan for first year analysis only.

c. Outline developed and accessible in project file.