



**Yerington Mine Site  
Groundwater Operable Unit (OU-1)  
2013/2014 Additional Monitor Well Installations  
August 6, 2015**

# OU-1 Groundwater Discussion Topics

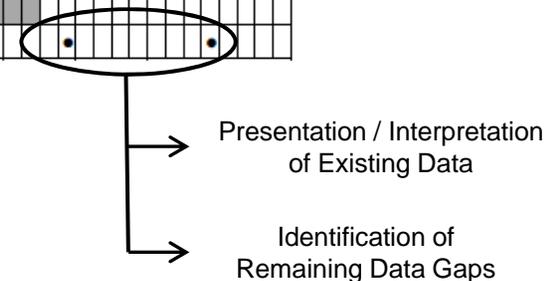
- Progression of OU-1 Remedial Investigation (RI)
- Completed vs. remaining RI work
- Summary of 2013/2014 field work
- Timeline for completing remaining RI data gaps
- Next steps

# Progression of RI Work

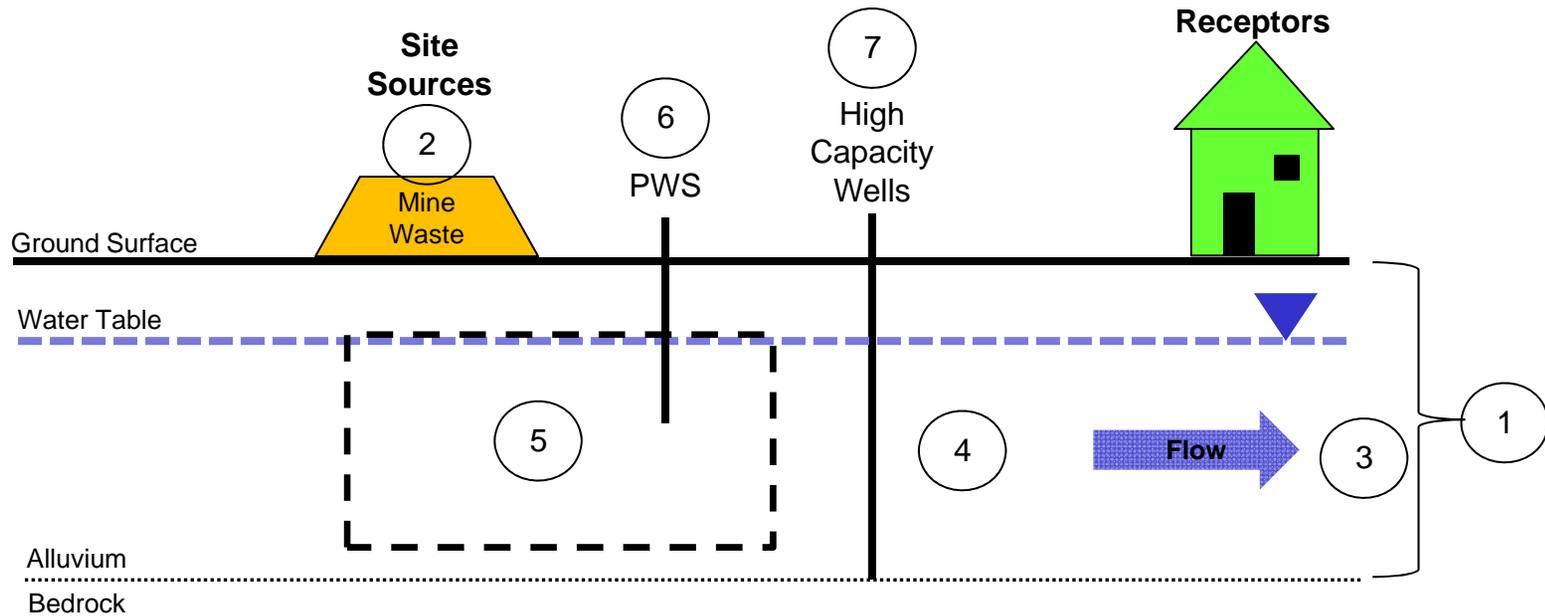
- 2007 Administrative Order, Scope of Work (SOW) defined 15 “study elements” for OU-1 RI
- Periodic groundwater technical meetings to discuss progress of RI work
- Phased approach to data collection

Groundwater RI Activity	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Hydrologic Framework Assessment I	█	█	█								
Hydrologic Framework Assessment II			█	█	█						
Shallow Zone Characterization					█	█					
Off-Site Groundwater Characterization						█	█	█			
On-Site Groundwater Characterization							█	█			
Groundwater Flow (Hydraulic Properties)								█			
Draft/Final Groundwater RI Work Plans									•		•

- Submittal of Groundwater RI Work Plans
- Implementation of remaining RI work

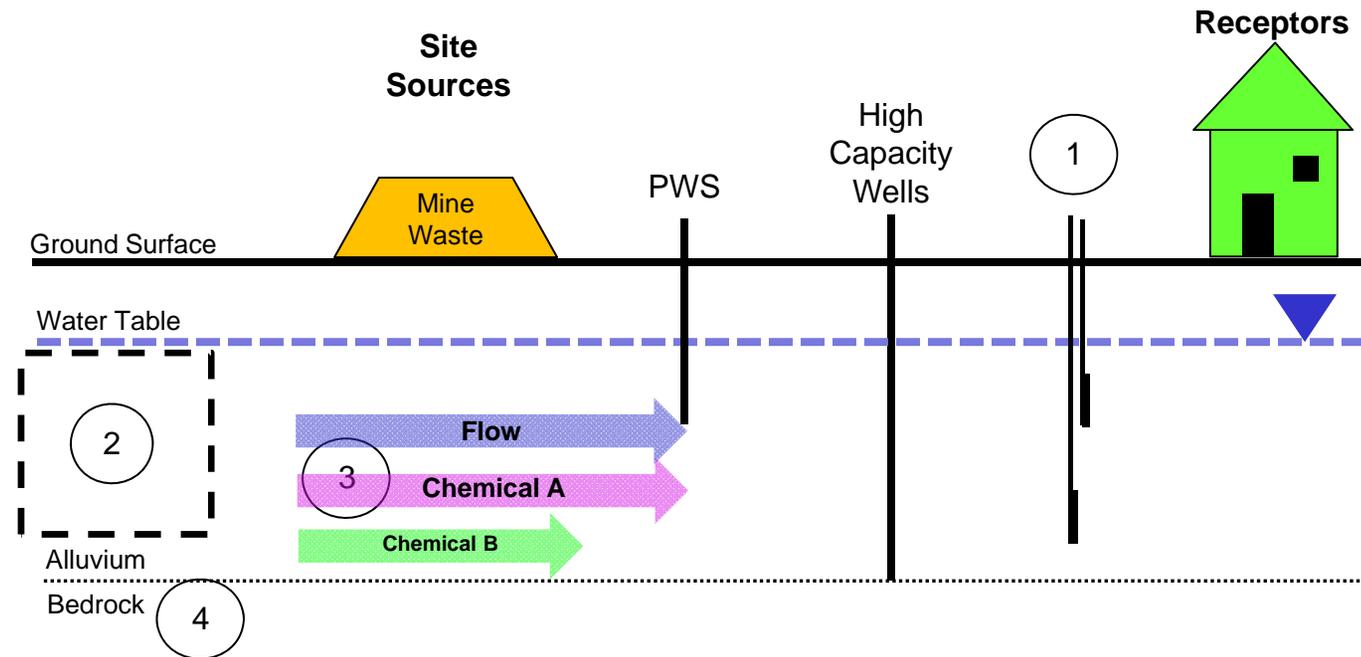


# Completed RI Work



1. Physical setting (e.g., types of sediments, depth to bedrock, etc.)
2. Sources of chemicals to groundwater
3. Groundwater movement (e.g., direction, water level fluctuations, etc.)
4. Aquifer properties (ability to move water)
5. Chemical distributions
6. Pumpback Well System (PWS) effectiveness
7. Agricultural and other man-made influences

# Remaining RI Work (Data Gaps)



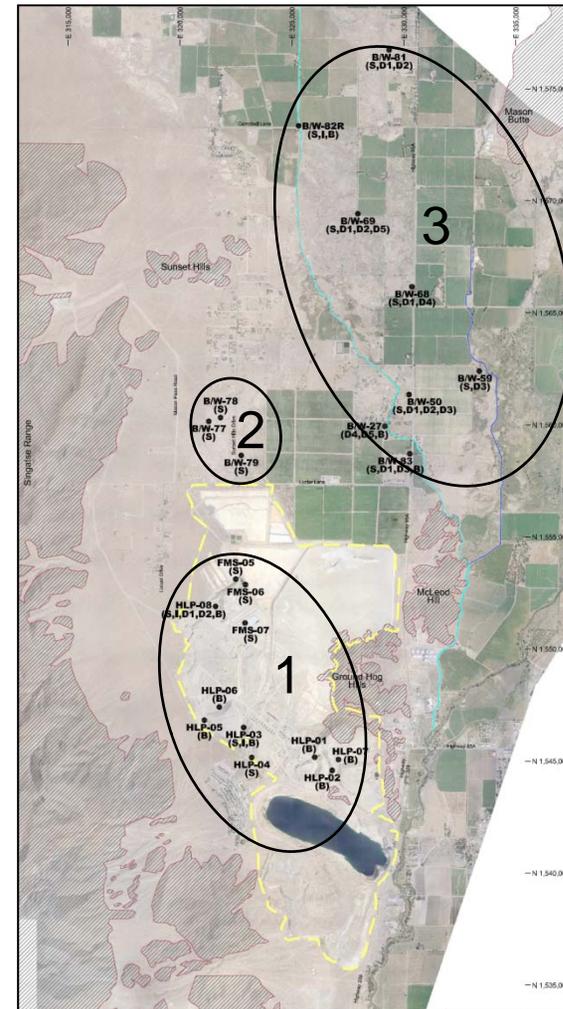
1. Additional monitor well installations
2. Background groundwater quality
3. Geochemical transport
4. Bedrock groundwater conditions

# Additional Well Installation Discussion Topics

- Objective and data uses
- Data collection activities
- Field findings

# Objective

- Address spatial data gaps
  1. Arimetco Facilities
  2. Off-site around B/W-32
  3. Northeast Study Area

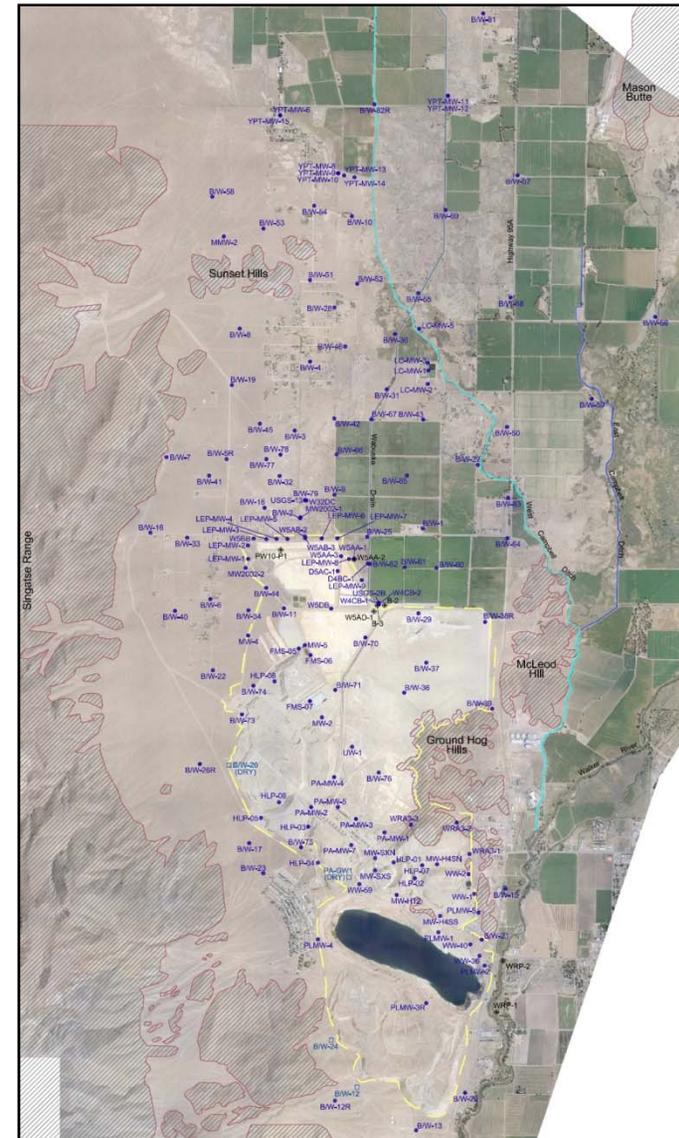


# Sequential Approach to Data Collection

		<u>2012</u>	<u>2013/2014</u>	<u>2015</u>
■ Drilling and geologic logging	ft	47,000	9,000	56,000
■ Zonal (depth specific) groundwater sampling	#	500	100	600
• Chemical distributions				
• Monitor well placement				
■ Monitor well installation and testing	#	309	46	354
• Long-term monitoring of water levels and chemical distributions				
• Aquifer hydraulic properties				

# 2015 Site-Wide Groundwater Monitoring Program

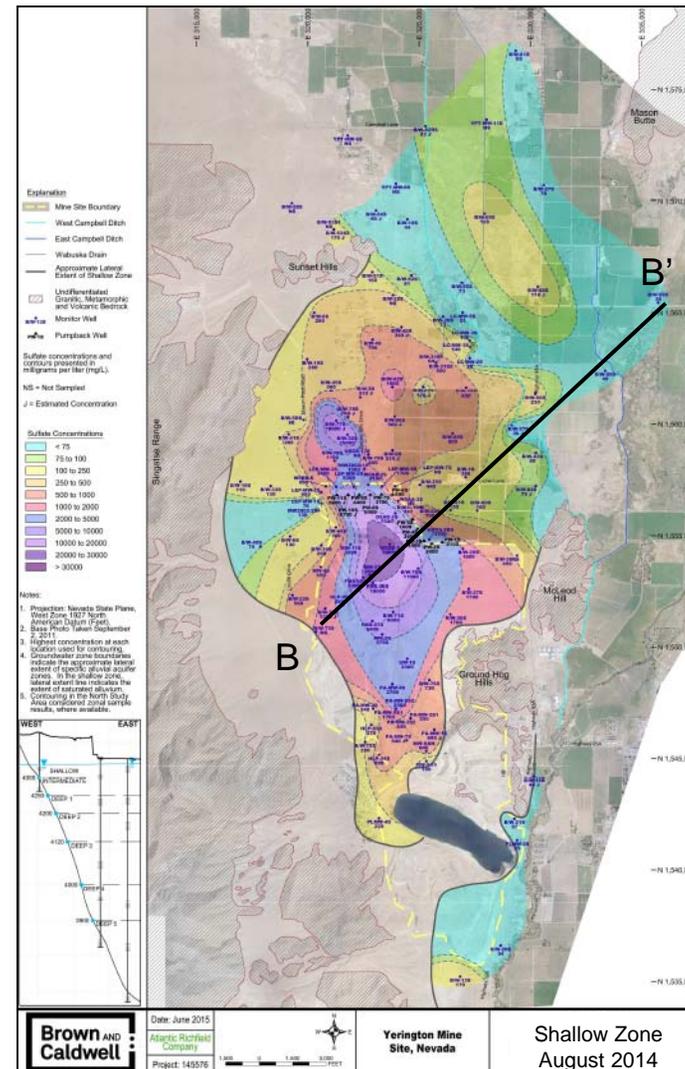
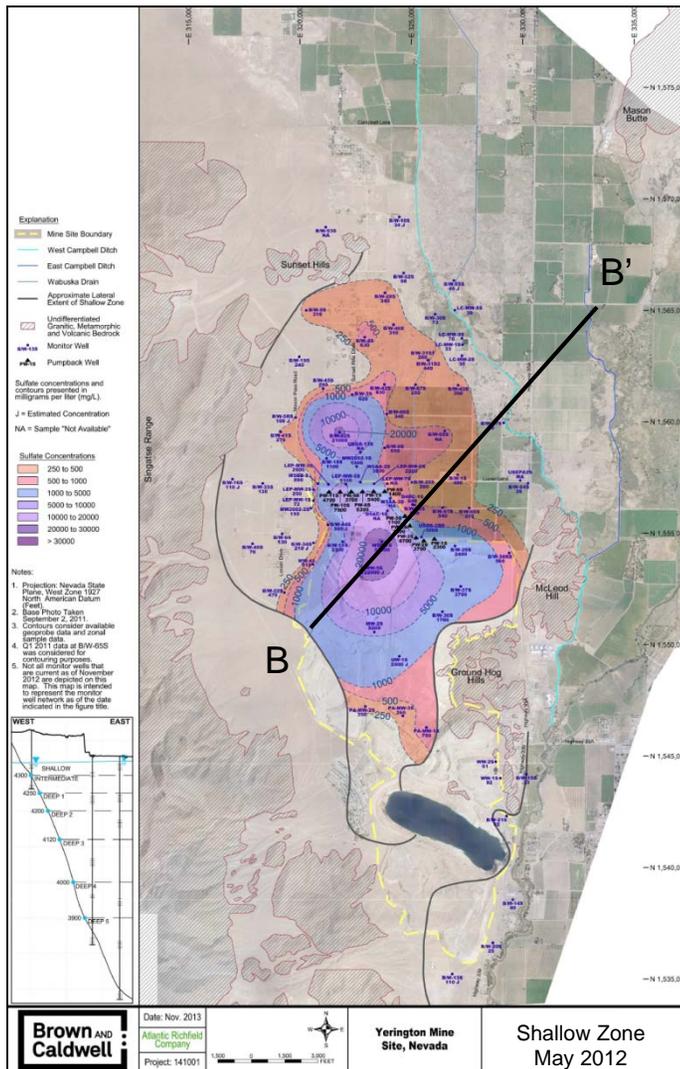
- Data support all OUs
- Water level monitoring
  - Quarterly: 354 wells
  - Every 4 hours: 67 wells
- Water quality monitoring
  - Frequency
    - Quarterly: 354 (Q1, Q3)
    - Semi-annual: 236 (Q2, Q4)
  - Field parameters
    - pH, specific conductivity, temperature, dissolved oxygen, oxidation-reduction potential
  - Lab parameters (50)
    - 12 physical parameters and major ions
    - 32 metals
    - 6 radiochemicals



# Field Findings

- Better spatial definition of chemical distributions
- Information regarding chemical distributions and hydrology northeast of West Campbell Ditch
- Information regarding seasonal effects of agricultural pumping on groundwater flow conditions and trends in chemical concentrations

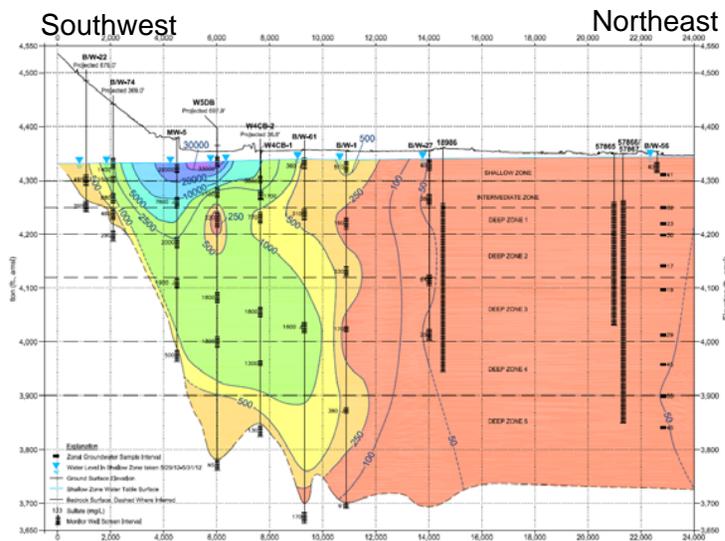
# Better Spatial Definition of Chemical Distributions



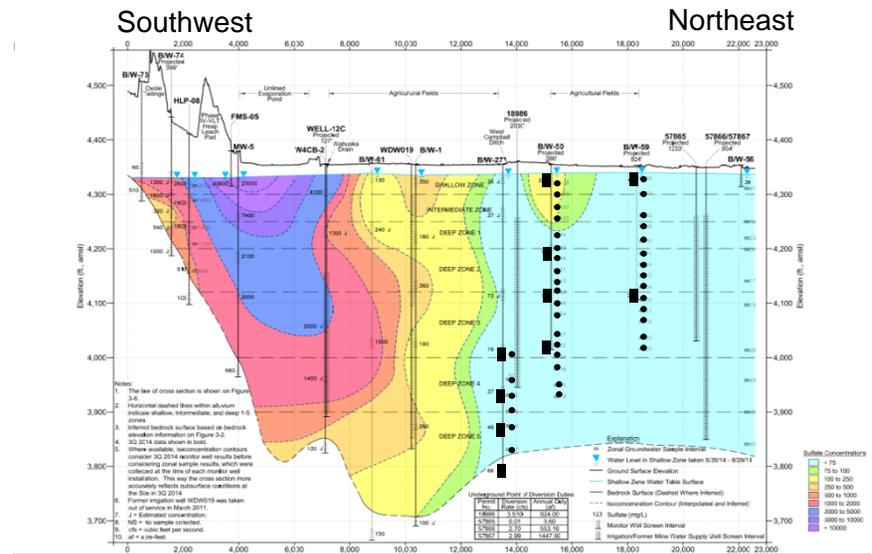
Sulfate

# Better Spatial Definition of Chemical Distributions

2012



2014



Sulfate

# Timeline for RI Data Gap Completion

- Additional monitor well installations (June 2015)
- Background groundwater quality (July 2015)
- Geochemical transport (September 2015)
- Bedrock groundwater conditions (December 2015)

# Next Steps

- Finalize reports addressing the 4 remaining data gaps
- Perform human health and ecological risk assessments
- Submit Draft Site-Wide Groundwater Operable Unit (OU-1) Remedial Investigation Report