



Colstrip Administrative Order on Consent Status Update August 11, 2016

Agenda

- Overview
- Three New Reports
 - New Background Screening Level Report
 - Units 1&2 SOEP/STEP Site Characterization Report
 - Units 3&4 EHPs Site Characterization Report - Settlement
- What's Next?
- Question and Answer
- Talen Coal Combustion Residual Rule Compliance Update
- Question and Answer
- Hearing for Submittal of Formal Public Comment on Report



Settlement Agreements

- Federal Settlement
 - Air impacts
 - Results in closure of Units 1 & 2
 - DEQ not a party
 - Units 1 & 2 ponds will still be addressed under the AOC
- Administrative Order on Consent Settlement
 - Prior to Court ruling, Talen and Earth Justice settled
 - DEQ approved
 - Requires Units 3 & 4 switch to dry stacking of coal ash
 - Likely would have been evaluated
 - Enforceable through Court, not the AOC

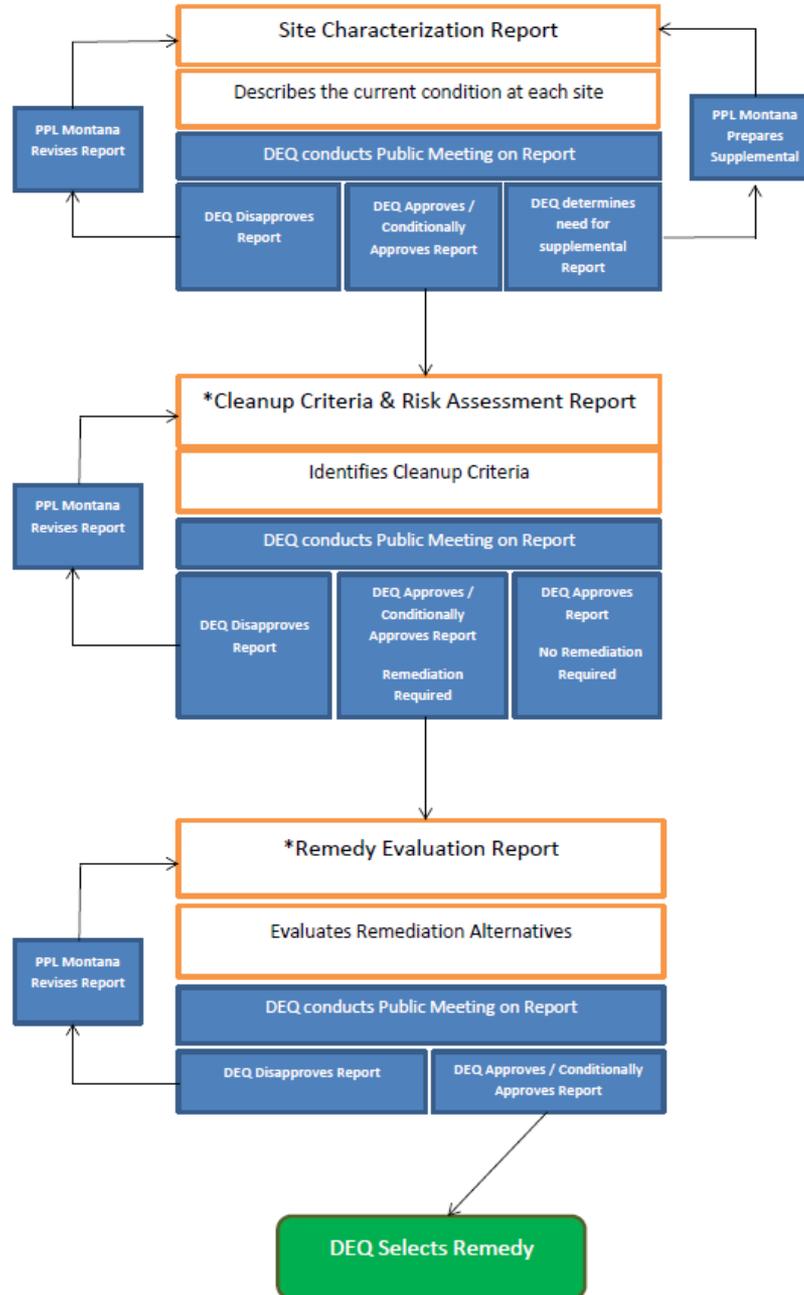
Hearing Guidelines

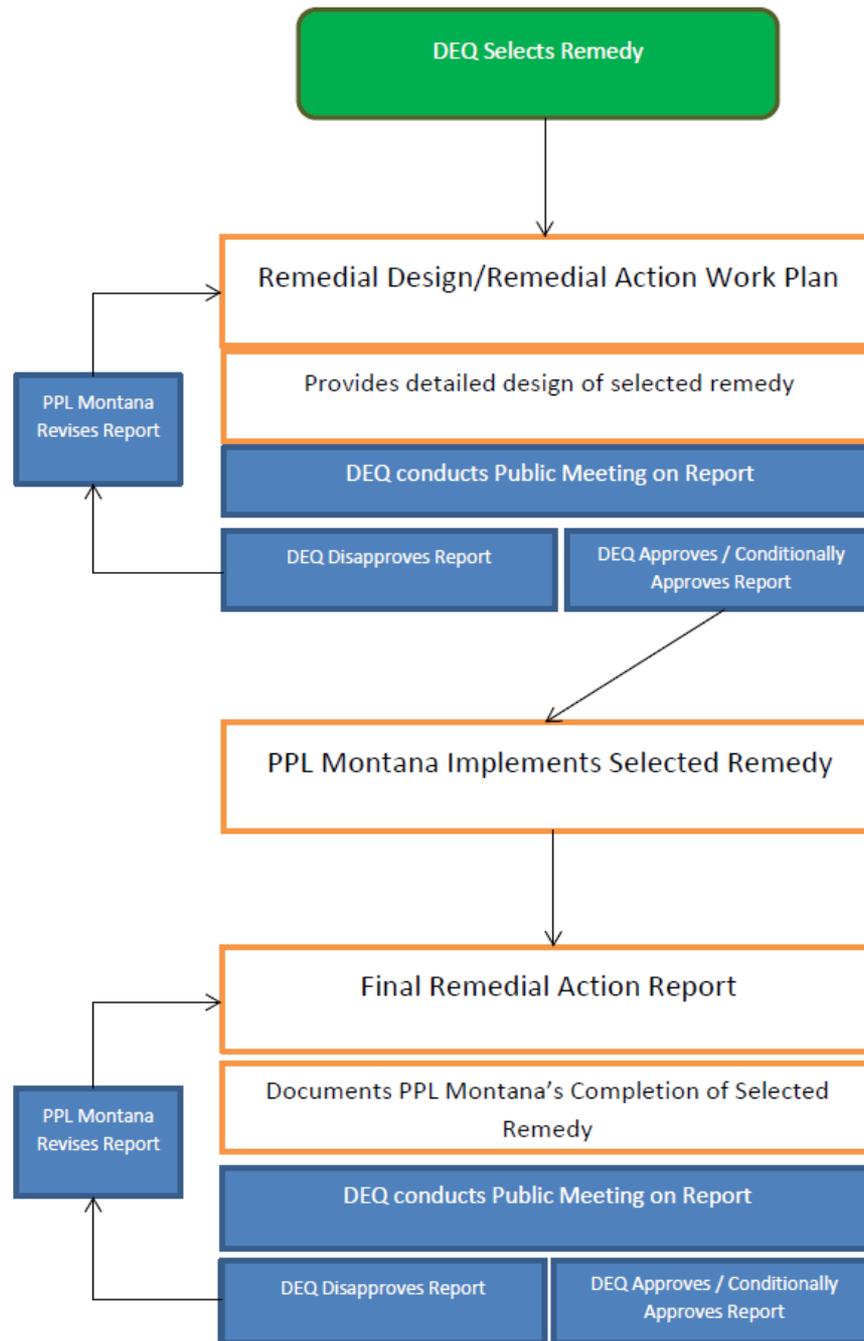
- Please sign-in to submit oral comments tonight
- Please use the comment forms for written comments
- Written comments can also be sent to Sara Edinberg by August 22 at 11:59 pm
- Comments will not be addressed at this meeting
- Comments will be considered during revision of site reports.
- A response addressing all comments will be issued.

Administrative Order on Consent Process

- AOC – Administrative Order on Consent
- Agreement between DEQ and Talen to address groundwater contamination
- Effective Date: August 3, 2012

FLOWCHART OF AOC PROCESS





Site Overview

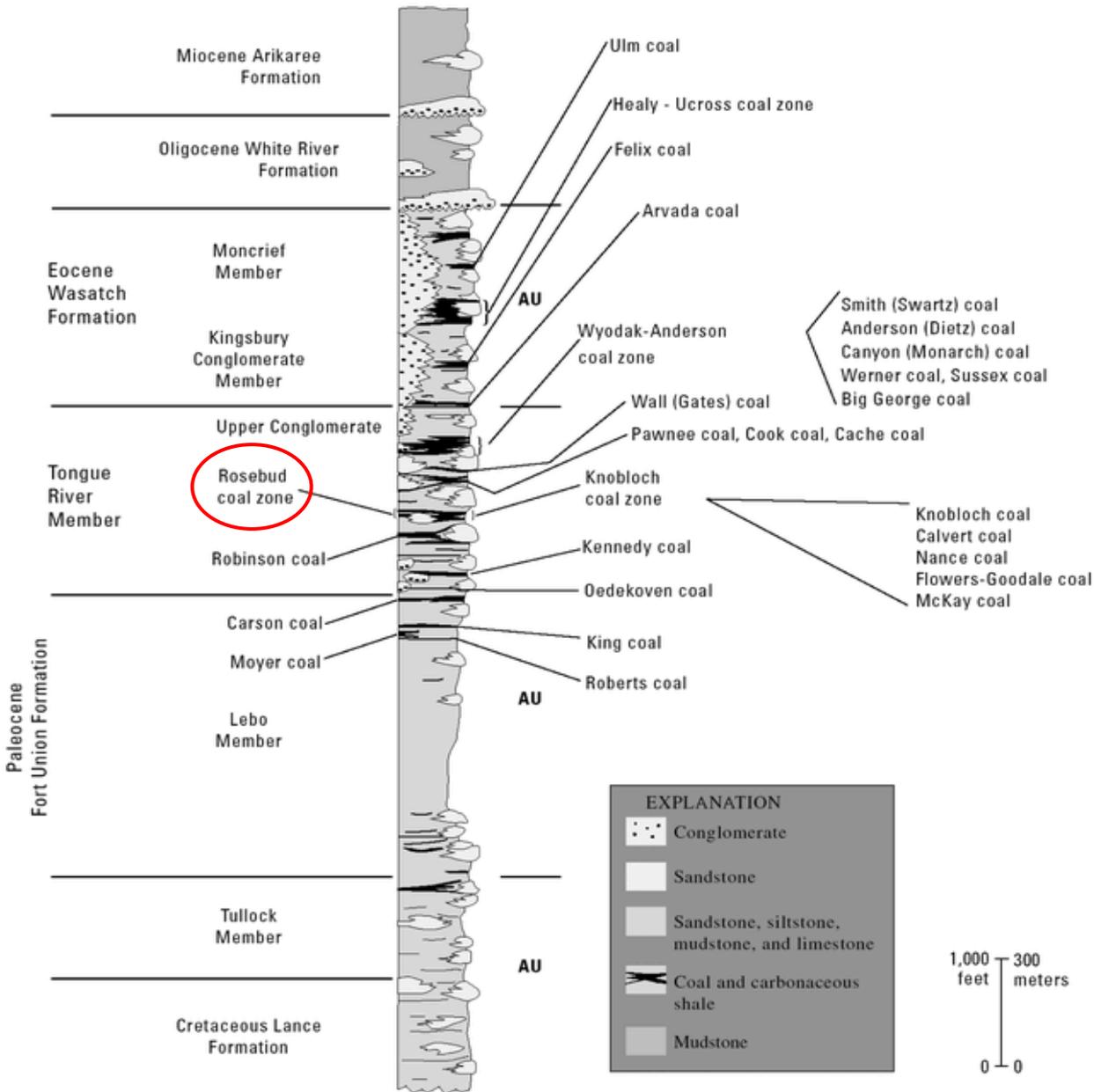
- Plant Site Complex—
4 Units
- Units 1&2 Stage I & II
Evaporation Ponds
(SOEP & STEP)
- Units 3&4 Effluent
Holding Ponds (EHPs)



Geology Overview

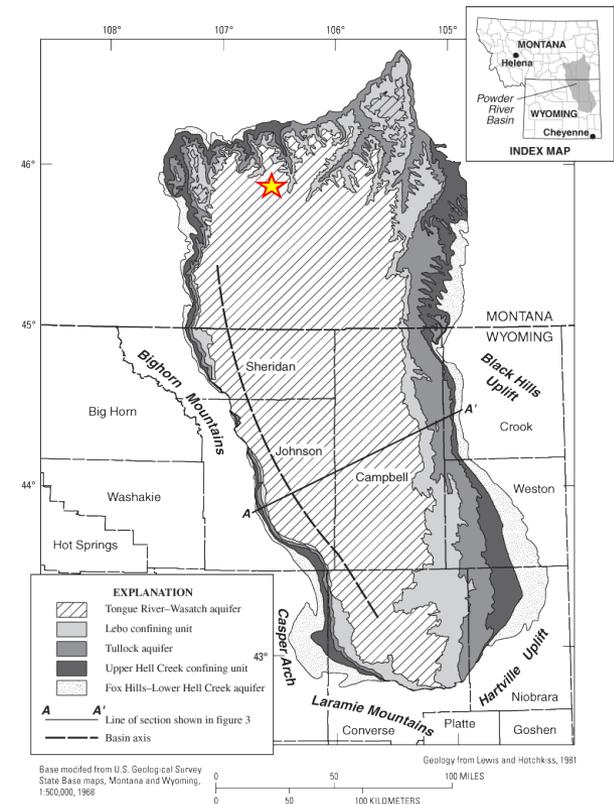
- Part of the Powder River Basin
- Fort Union Formation; ancient river deposits
- Complex hydrogeology
 - Flow paths
 - Separate units
 - Clinker
 - Coal removal (spoil)





Strata around Colstrip:

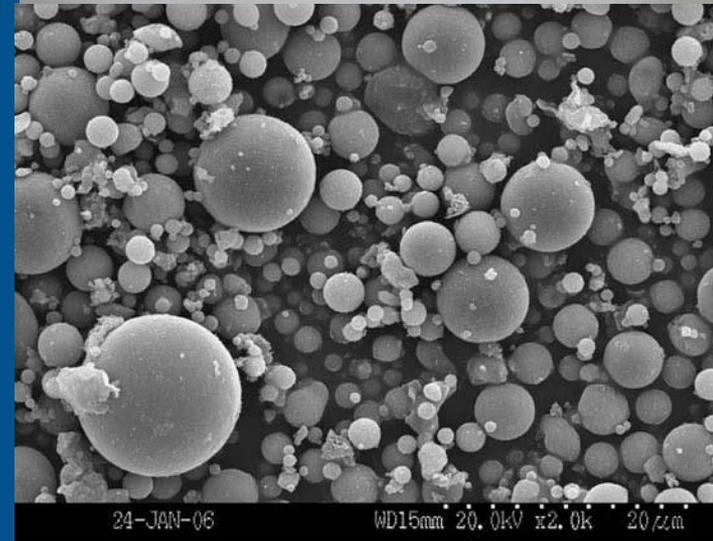
- Alluvium/colluvium
- Spoil
- Clinker
- Rosebud coal
- Interburden
- McKay coal
- Sub-McKay
- Robinson coal



Base modified from U.S. Geological Survey State Base maps, Montana and Wyoming, 1:500,000, 1966. Geology from Lewis and Hotchkiss, 1991.

What is coal ash?

- Solids left over after coal is burned
- Fly Ash (caught by scrubbers)



What is coal ash?

- Bottom Ash (bottom of boiler)
- Both are stored in ponds as a slurry
- About 10% of coal volume burned



What are the concerns?

- Coal ash contains certain chemicals or constituents
- These constituents dissolve in the pond water
- Pond water seeps into the groundwater
- Groundwater concentrations of these “constituents of interest” higher below the ponds
 - Chloride, boron, sulfate, and specific conductivity

What is being done?

- All active storage ponds now lined (clay/bentonite or geomembrane)
- Some ponds have been closed
- Extensive capture systems
 - Capture wells pump groundwater back to the ponds
 - Dam capture system



Three New Reports:

- Updated Background Screening Levels (BSLs)
- Site Characterization Report: Units 1&2 Stage One Evaporation Ponds (SOEP)/ Stage Two Evaporation Ponds (STEP)
- Site Characterization Report: Units 3&4 Effluent Holding Ponds (EHP)

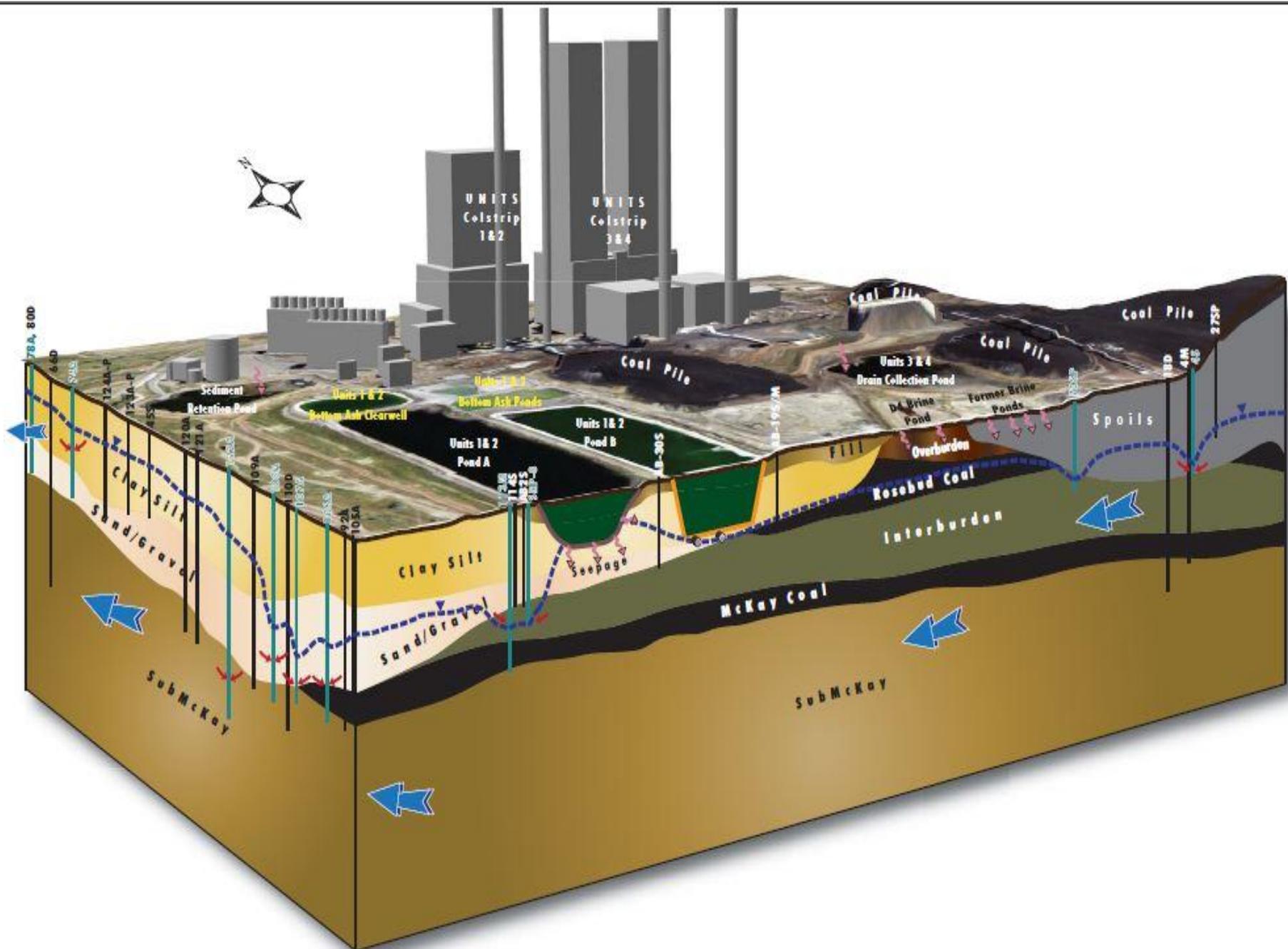
Updated Background Screening Levels (BSLs) Report

Submitted by Neptune & Company on behalf of Talen Energy

Updated BSLs Report

Determine background levels of constituents in groundwater and surface water

- May determine amount of cleanup possible
- Statistical analysis
- BSLs for five aquifers:
 - Alluvium
 - Spoils
 - Clinker
 - Coal-Related
 - SubMcKay



Updated BSL Constituents

- Aluminum
- Ammonia
- Antimony
- Arsenic
- Barium
- Beryllium
- Boron
- Bromide
- Cadmium
- Calcium
- Chloride
- Chromium
- Cobalt
- Copper
- Fluoride
- Iron
- Lead
- Lithium
- Magnesium
- Manganese
- Mercury
- Molybdenum
- Nickel
- Nitrate
- Nitrite
- Nitrite + Nitrate
- Orthophosphate
- pH (Field)
- pH (Laboratory)
- Phosphate
- Phosphorus
- Potassium
- Specific Conductance (Field)
- Specific Conductance (Lab)
- Selenium
- Silica
- Silver
- Sodium
- Strontium
- Sulfate
- Total Dissolved Solids
- Thallium
- Tin
- Titanium
- Vanadium
- Zinc
- Zirconium

Site Characterization Reports Purpose

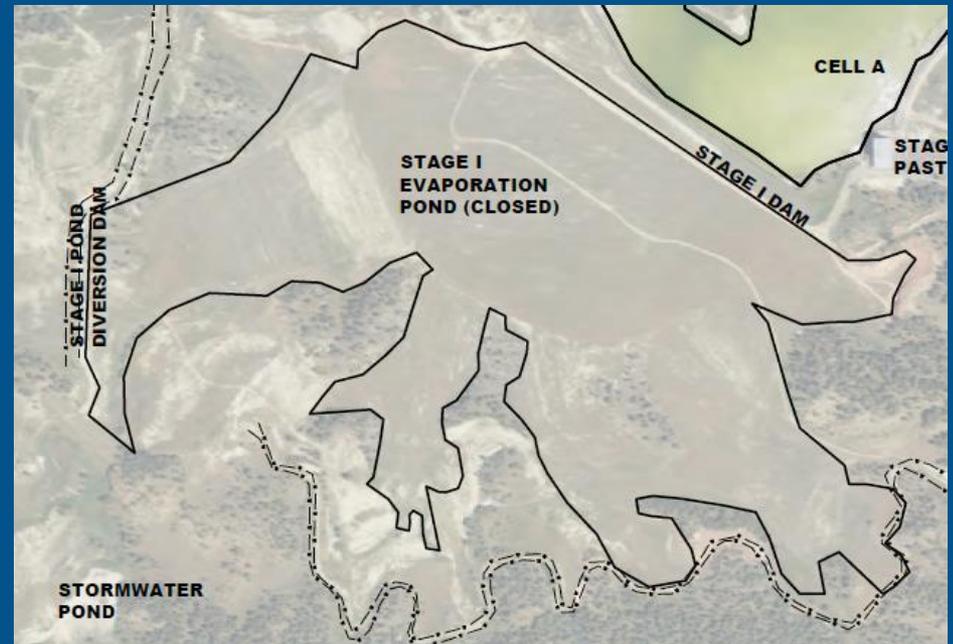
- Provide information about each site
- Provide pond construction information
- Provide data on the nature and extent of impacts
- Include complicated groundwater flow models
- Document and assess interim remedial actions
- Identify data gaps and recommendations for future work

Units 1&2 SOEP/STEP Site Characterization Report

Submitted by Hydrometrics and New Fields on behalf of
Talen Energy

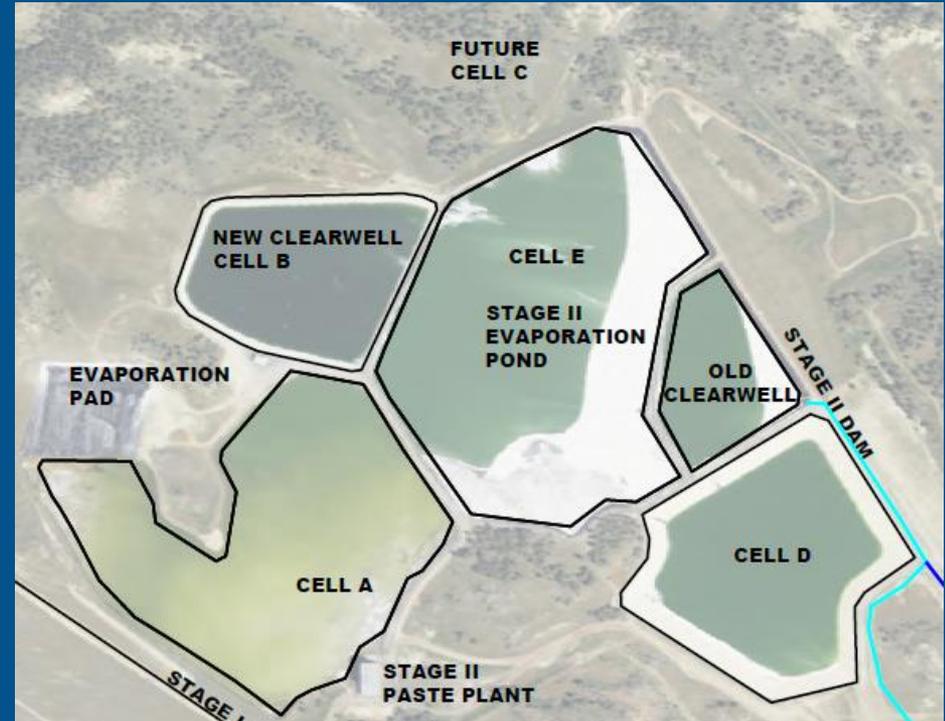
Units 1&2 SOEP Overview

- SOEP: Partial clay liner; inactive
 - Reclaimed with cap installed in 2002
 - Area = 114 acres
 - Seepage estimated from model: 9.9 gallons per minute



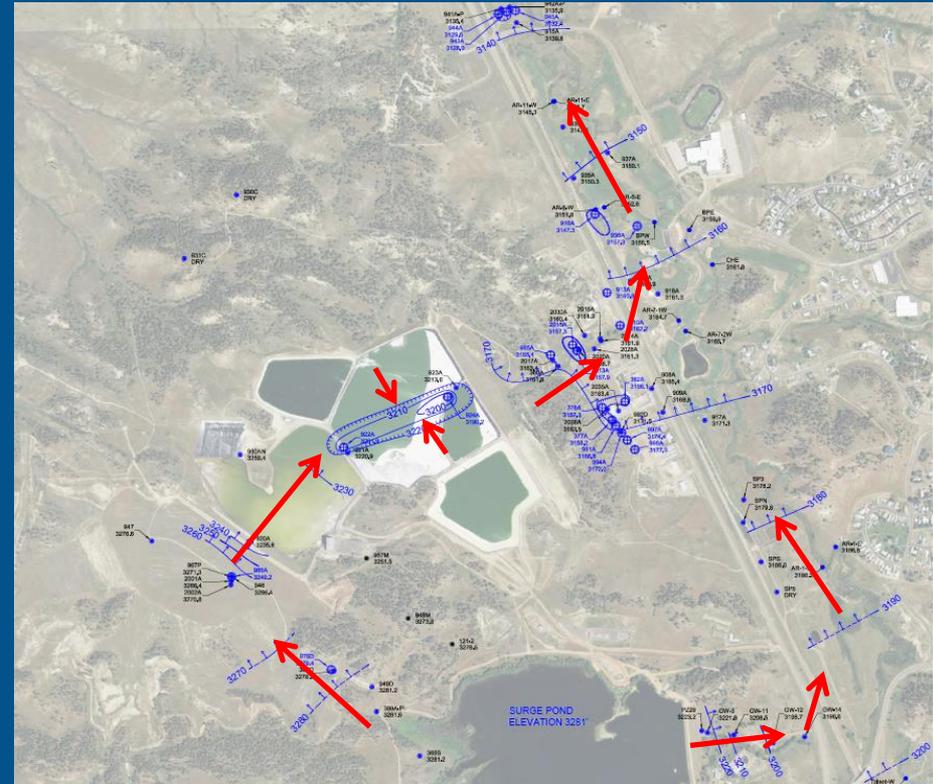
Units 1&2 STEP Overview

- STEP: Five cells, downgradient of SOEP
 - All cells lined with geo-synthetic liners
 - Newer cells double-lined
 - Area = 216 acres
 - Seepage estimate: 21.5 gallons per minute



Units 1&2 SOEP/STEP Hydrogeology

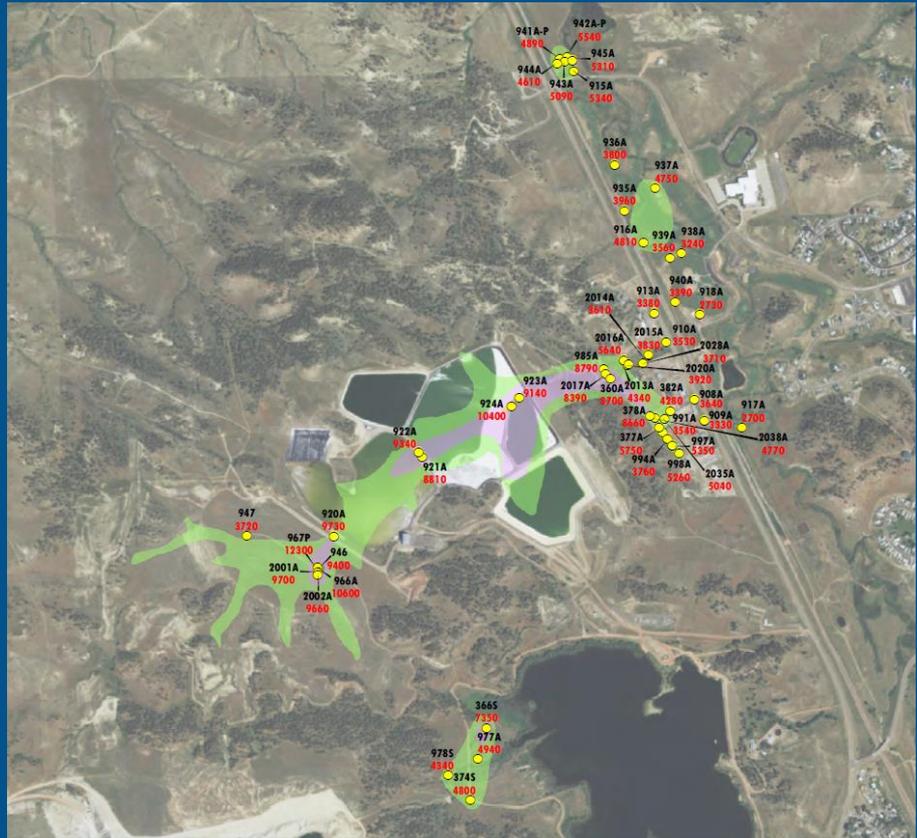
- Groundwater generally flows east/northeast
 - More variation in shallow units
 - Locally influenced by capture wells
- Flow varies based on geology



Shallow potentiometric surface

BSL Exceedance

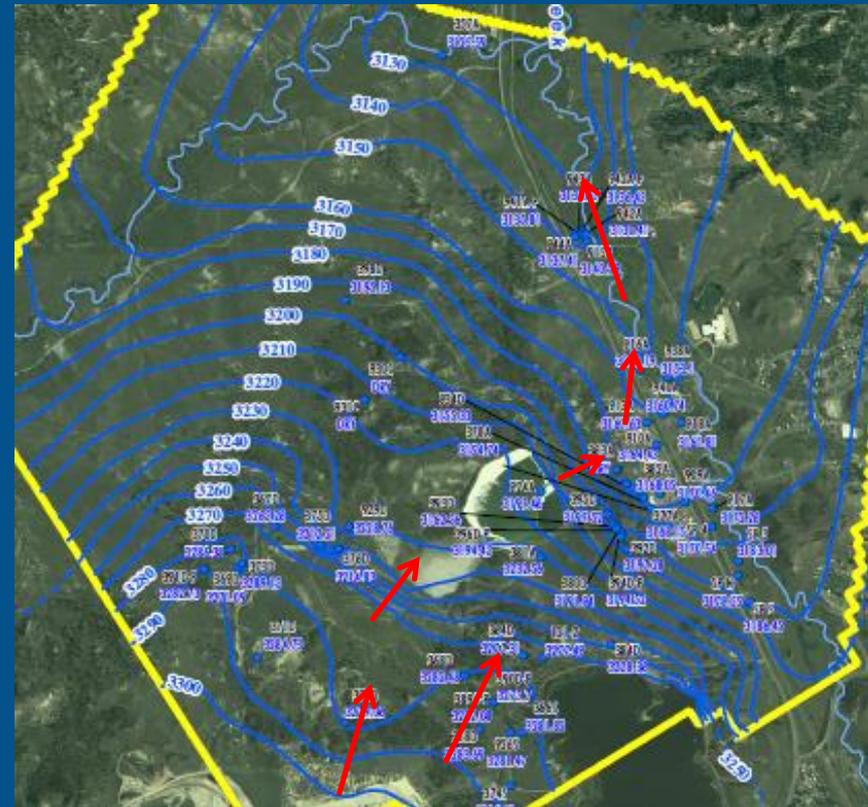
- Conservative estimate
- Not all areas that exceed BSLs are impacted by process water



BSL exceedance for specific conductance, shallow groundwater

Units 1&2 SOEP/STEP Groundwater Model

- Model that accurately represents flow
 - Confirms flow direction and pumping effects
 - Estimates effectiveness of capture system



Shallow potentiometric surface

Units 1&2 SOEP/STEP Interim Remedial Actions

- SOEP evapotranspiration cap
- Cell liners
- Process water management
- 60 capture wells
- Best management practices



Paste plant

Interim Remedial Action Effectiveness

- Capture system collects a lot of the water
- Still some areas where water is not captured
 - Mostly north of the SOEP/STEP

Proposed Recommendations in Report

- Continue current practices
- Install additional wells where needed
- Continue to update model



Installing lining on the STEP



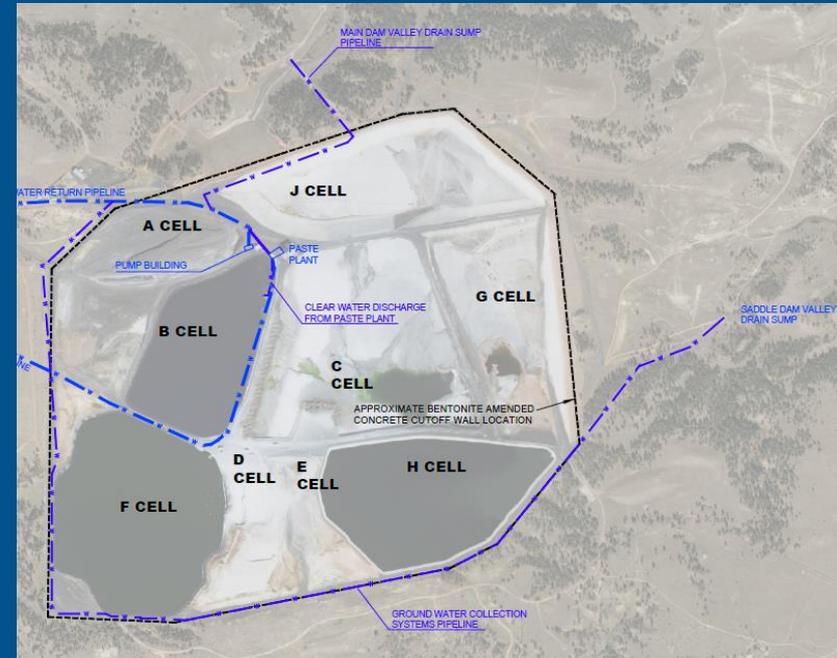
Reclaimed SOEP

Units 3&4 EHPs Site Characterization Report

Submitted by Hydrometrics and New Fields on behalf of
Talen Energy

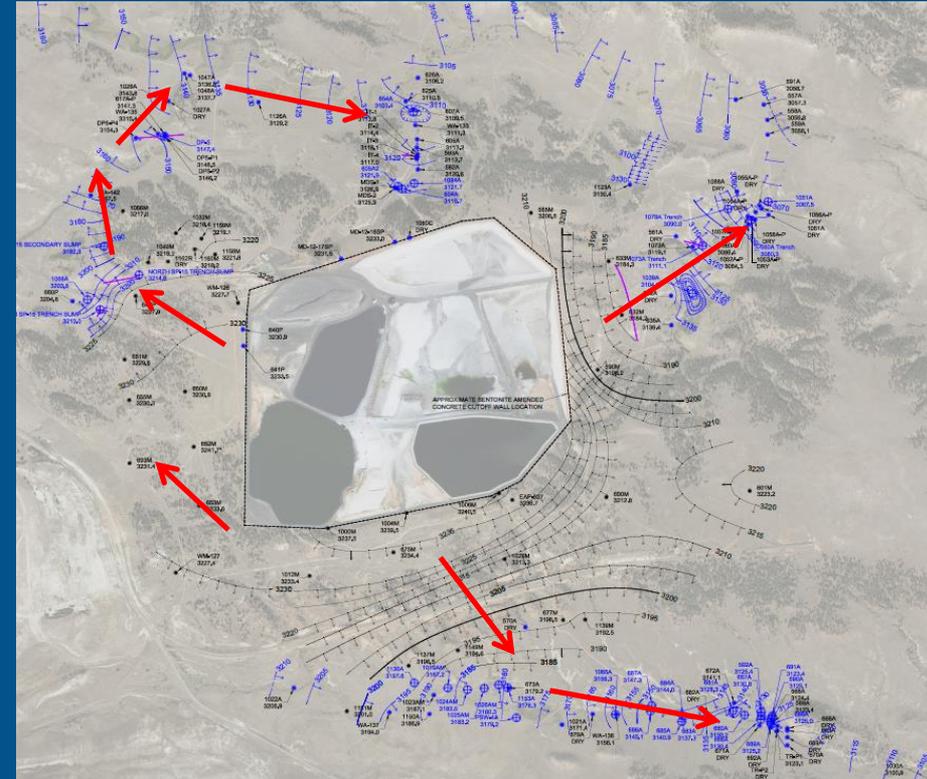
Units 3&4 EHPs Overview

- 9 cells; 3 actively receiving water
 - All cells that receive water are lined with geomembrane
 - Other ponds are lined with bentonite amended soil
 - Total area = 416 acres
- Surrounded by bentonite amended concrete wall
- Total seepage: 243 gallons per minute



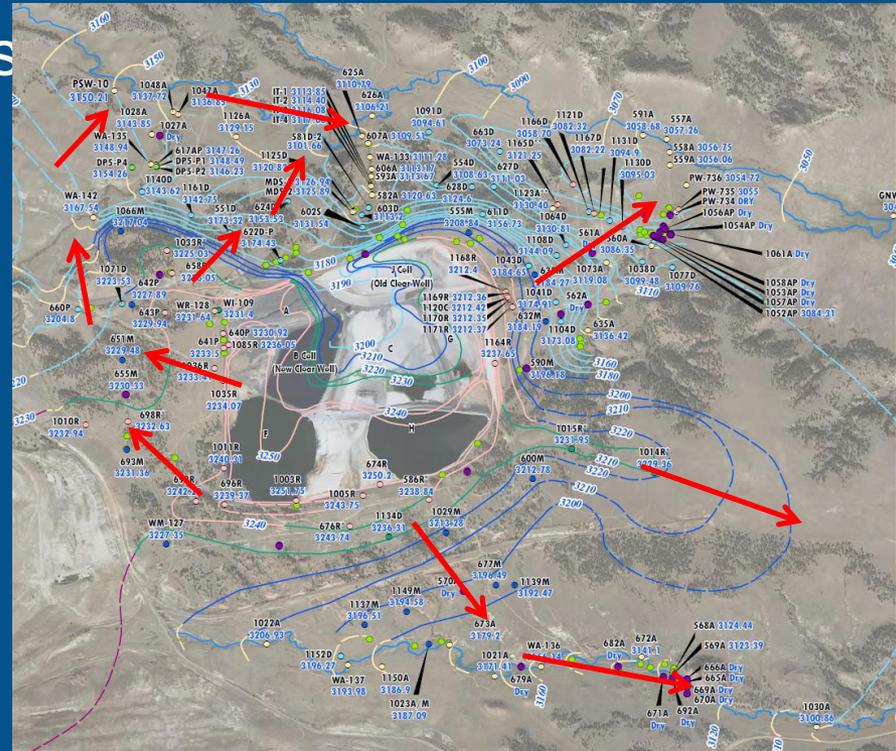
Units 3&4 EHPs Hydrogeology

- Groundwater generally flows outward from ponds in all directions; eventually travels east/northeast
 - Locally influenced by capture units
- Flow varies based on geology



Units 3&4 EHPs Groundwater Model

- Model that accurately represents flow
- Confirms and refines field observations
- Indicates that not all process water is being captured (conservative estimate)



Shallow potentiometric surface

Units 3&4 EHPs Interim Remedial Actions

- Water management
- Groundwater capture & addition of wells
- Pond liners (3 cells)
- Best management practices
- Future pond construction
- Settlement of AOC lawsuit requires switch to dry stacking



Paste plant

Interim Remedial Action Effectiveness

- Capture system collects a lot of the water
- Still some areas where water is not captured
 - Mostly northeast of the EHPs
- Lining is effective; double-lined pond loses the least amount of water

Proposed Recommendations in the Report

- Continue current practices
- Install additional wells where needed
- Continue to update model
Determine time to de-water fly ash and paste
- Address scaling issues



Installing lining in Cell H

What's Next

- Submit DEQ, DEQ consultant, and public comments on these reports; Talen will revise to address comments
- Next submissions:
 - Remedy Evaluation Reports: Units 1&2 and 3&4 ponds
 - Cleanup Criteria & Risk Assessment Reports: Plant Site, Units 1&2, and Units 3&4 ponds

Questions?

For more information or additional questions, please contact:

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Helena, MT 59620-0901
DEQColstrip@mt.gov

Updated CCR Report



Presented by Gordon Criswell
Talen Energy

Hearing Guidelines

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Updated BSL Results

Analyte	Alluvium	Spoils	Clinker	Coal-Related	SubMcKav
Aluminum	0.3	0.2	1.2	0.2	0.2
Ammonia	0.415	3.04		1.6	4.03
Antimony	0.15	0.45		0.39	0.15
Arsenic	0.01	0.005		0.005	0.005
Barium	0.022	0.27		0.111	0.09
Beryllium	0.003	0.01		0.005	0.003
Boron	1.6	0.818	4	1.1	1.3
Bromide	5	1	10	10	5
Cadmium	0.005	0.005	0.01	0.002	0.003
Calcium	378	495	367	351	313
Chloride	45	62	34	20	24
Chromium	0.1	0.0215		0.0146	0.1
Cobalt	0.02	0.0232		0.0034	0.00066
Copper	0.02	0.031	0.02	0.03	0.05
Fluoride	0.65	0.4	0.81	0.51	2.1
Iron	0.22	2.608	1.45	1.23	2.41
Lead	0.01	0.05	0.02	0.01	0.01
Lithium	0.092	0.09		0.072	
Magnesium	409	547	524	303	289
Manganese	0.6	2.79	0.67	0.54	0.27
Mercury	0.001	0.005	0.001	0.001	0.001
Molybdenum	0.04	0.048		0.02	0.004
Nickel	0.1	0.08	0.03	0.0142	0.03
Nitrate	4.7	2.92		0.4	0.87
Nitrite	0.92	0.5		2.5	0.05
Nitrite + Nitrate	1.78	5.8	0.53	0.73	0.58
Orthophosphate	0.43	1.3	0.19	0.18	0.11
pH (Field)	7.5	7.16	8.3	7.73	8.1
pH (Laboratory)	7.8	7.88	8.2	7.8	8.2
Phosphate	0.95				3.55
Phosphorus	0.72				
Potassium	16.7	18.5	30	15	15
SC (Field)	4314	4900	4700	4130	4470
SC (Laboratory)	4270	4633	5310	3550	4470
Selenium	0.009	0.0023	0.01	0.005	0.005
Silica	27.2	22		23	18.1
Silver	0.03	0.012		0.011	0.03
Sodium	372	339	586	383	858
Strontium	8.7	15.2		13.8	5.02
Sulfate	2600	3045	3160	2061	2200
TDS	4000	4930	5170	3160	3710
Thallium	0.5	0.05		0.005	0.5
Tin	0.03	0.88		1.7	0.03
Titanium	0.1	0.039		0.035	0.013
Vanadium	1	0.0107	1	1	1
Zinc	0.13	0.44	0.07	0.76	0.64
Zirconium	0.0309	0.1		0.022	
	BSL = max non-detect			BSL < 90th percentile	