# Hearing Guidelines

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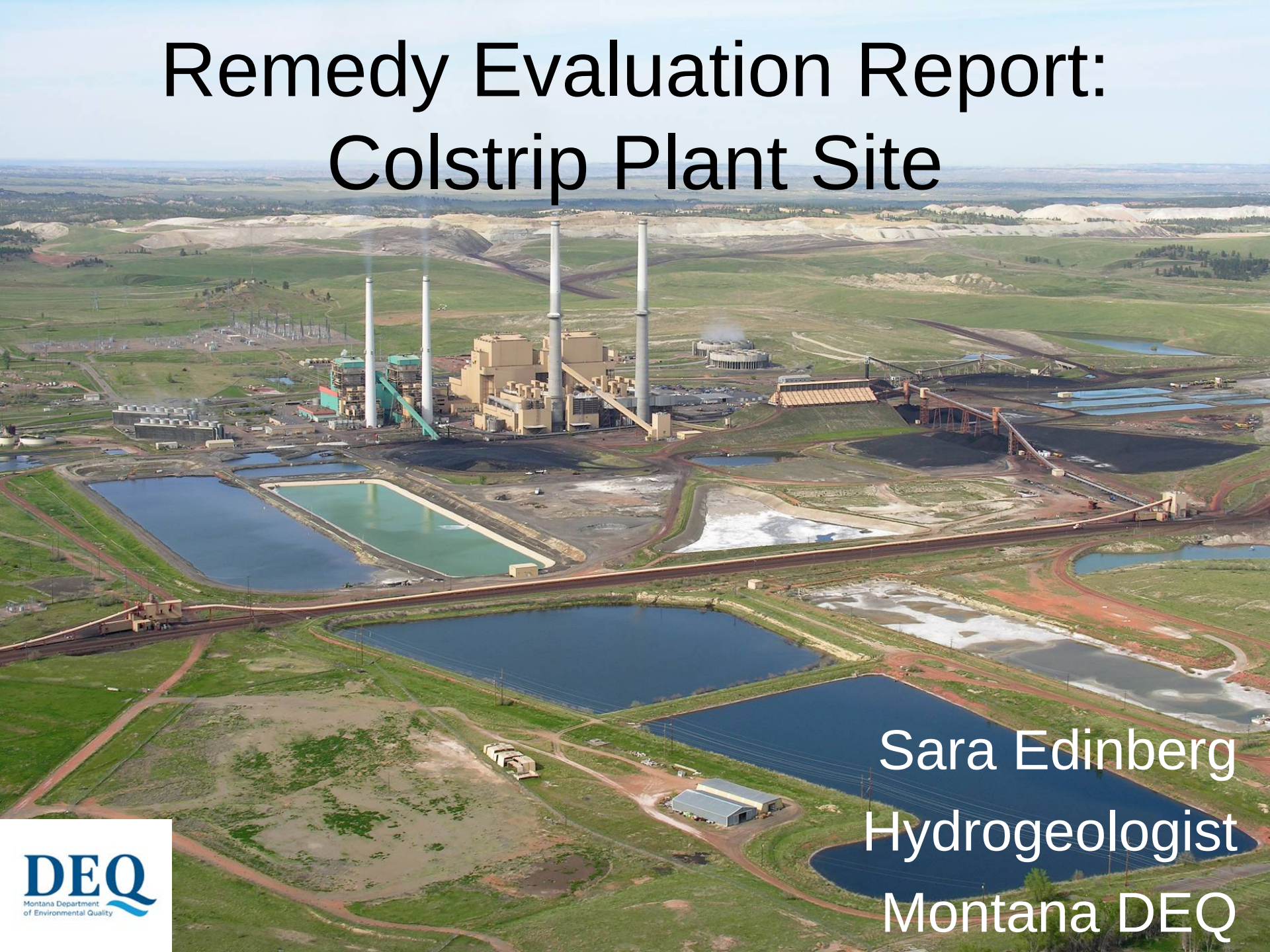
# Remedy Evaluation Report: Colstrip Plant Site



Sara Edinberg
Hydrogeologist
Montana DEQ

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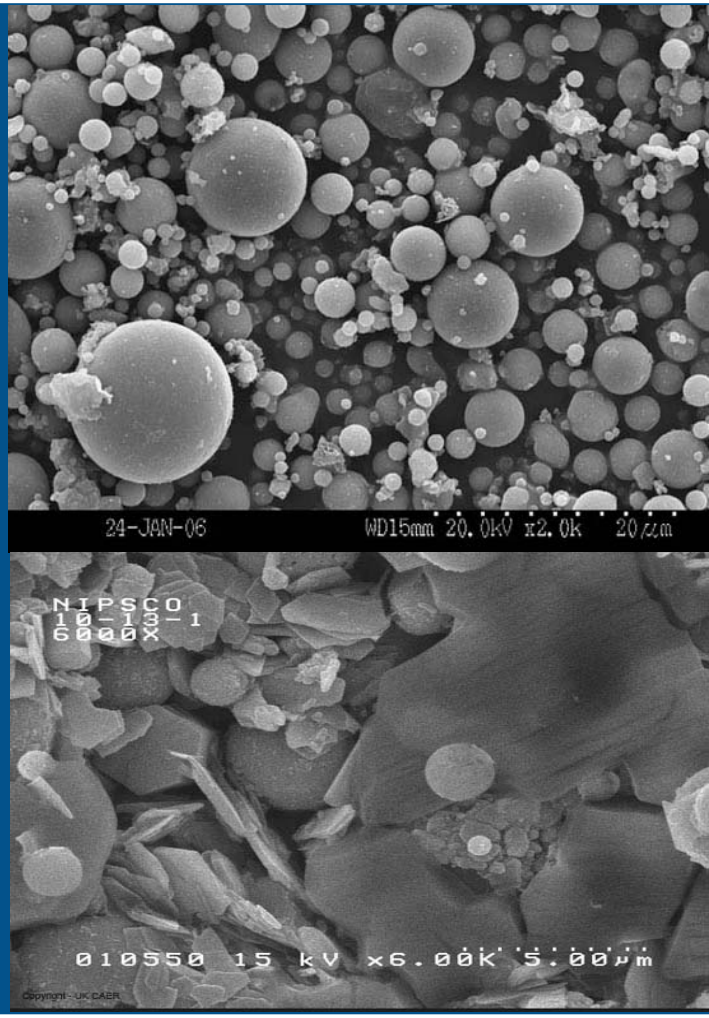
# What is fly ash?

- “Coal Combustion Residual” (CCR) —byproducts of burned coal
- May contains traces of metals naturally present in the coal
- Regulated by Federal CCR Act

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# Administrative Order on Consent (AOC)

- Addresses groundwater contamination from coal ash disposal ponds
- Divides site into 3 areas:
  - Plant Site
  - Units 1&2 Evaporation Ponds
  - Units 3&4 Effluent Holding Ponds

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# AOC Process by Area

Site Characterization Report (describes the current condition of each area)

↓

Cleanup Criteria & Risk Assessment Work Plan

↓

Cleanup Criteria & Risk Assessment Report (identifies constituents of interest, risk for exposure to contaminants, and cleanup criteria for contaminants

↓

Remedy Evaluation Report (evaluates remediation alternatives)

↓

DEQ selects remedy

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# AOC Process by Area (continued)

DEQ selects remedy

↓

Remedial Design/Remedial Action Work Plan
(implementing selected remedy)

↓

Final Remedial Action Report (describes completed remedy)

↓

Facility Closure Plan (long-term maintenance and monitoring)

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# Remedy Evaluation Report

- Presents an evaluation of remedial alternatives to clean up the Plant Site
- DEQ will determine an appropriate remedy based upon cleanup criteria

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# Plant Site Overview

- Northern part of Powder River Basin
- Complex geology; interbedded sedimentary layers
- Clinker, spoils and fractures complicate groundwater movement

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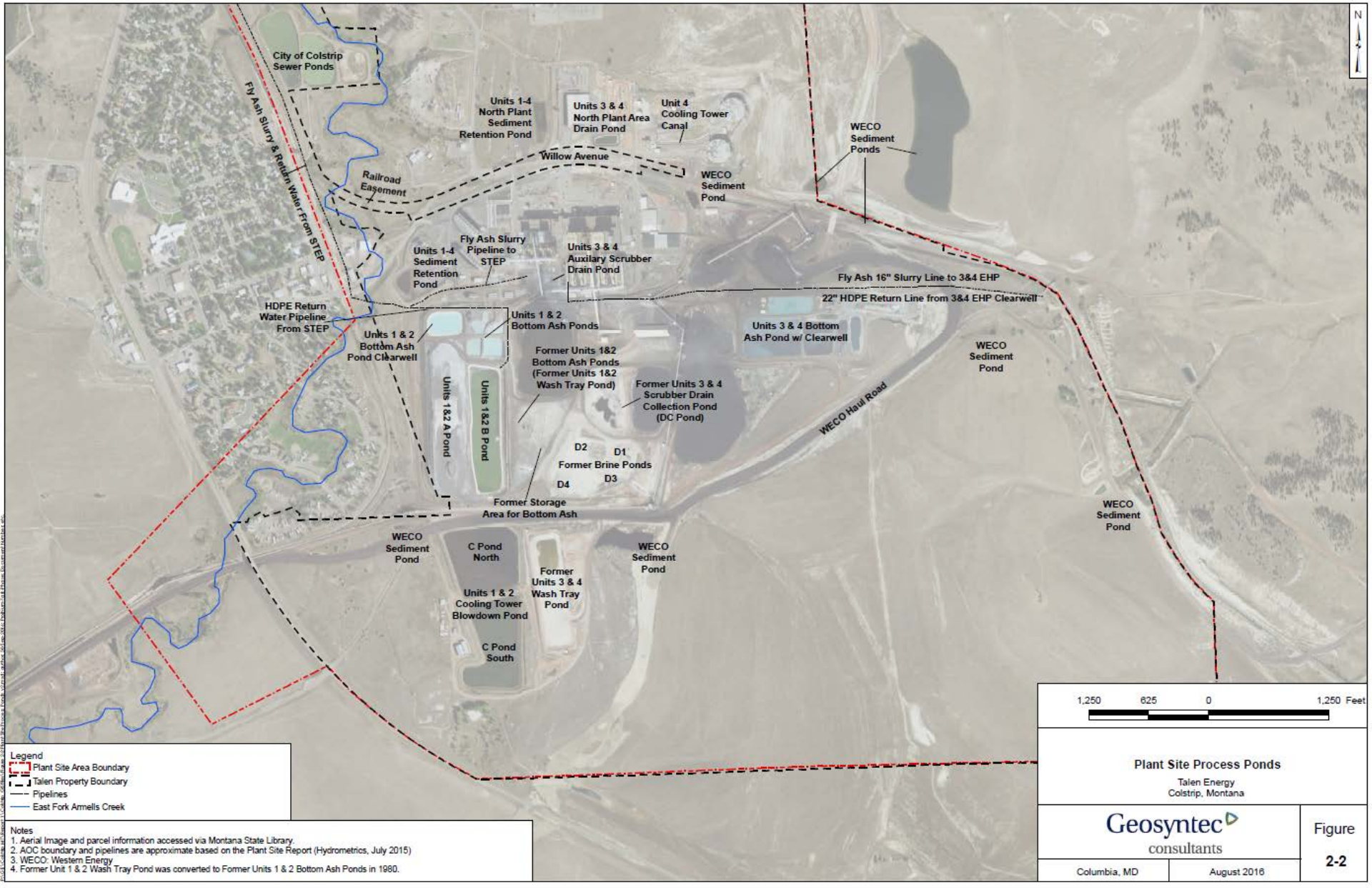
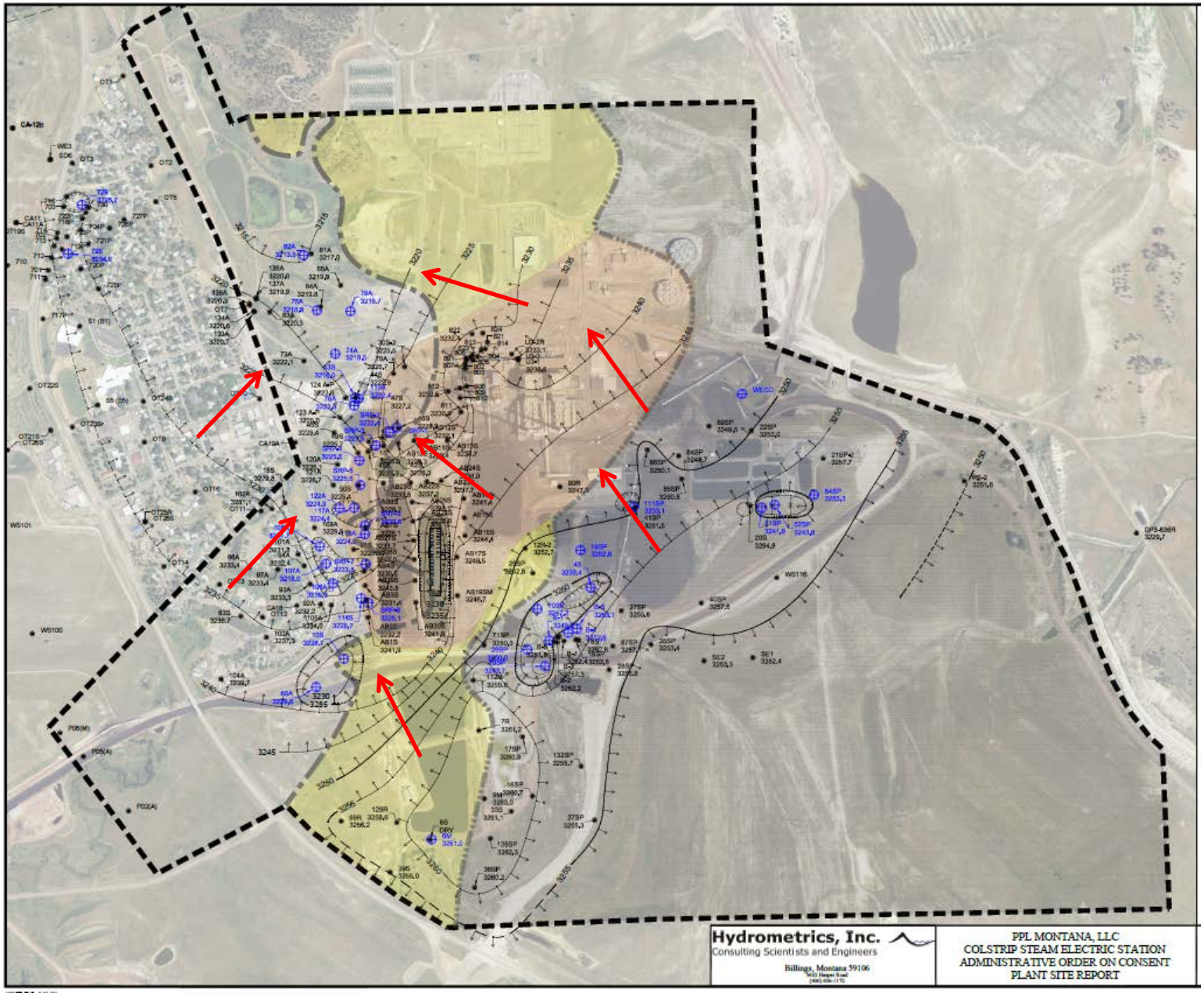
# Pond Layout


City of Colstrip Sewer Ponds
Fly Ash Slurry & Return Water From STEP
Railroad Easement
Units 1-4 North Plant Sediment Retention Pond
Units 3 & 4 North Plant Area Drain Pond
Unit 4 Cooling Tower Canal
Willow Avenue
WECO Sediment Ponds
WECO Sediment Pond
Units 1-4 Sediment Retention Pond
Fly Ash Slurry Pipeline to STEP
Units 3 & 4 Auxilary Scrubber Drain Pond
Fly Ash 16" Slurry Line to 3&4 EHP
22" HDPE Return Line from 3&4 EHP Clearwell
HDPE Return Water Pipeline From STEP
Units 1 & 2 Bottom Ash Pond Clearwell
Units 1 & 2 Bottom Ash Ponds
Units 3 & 4 Bottom Ash Pond w/ Clearwell
WECO Sediment Pond
Former Units 1&2 Bottom Ash Ponds (Former Units 1&2 Wash Tray Pond)
Former Units 3 & 4 Scrubber Drain Collection Pond (DC Pond)
Units 1&2 A Pond
Units 1&2 B Pond
WECO Haul Road
D2
D1
Former Brine Ponds
D3
D4
Former Storage Area for Bottom Ash
WECO Sediment Pond
C Pond North
WECO Sediment Pond
Former Units 3 & 4 Wash Tray Pond
Units 1 & 2 Cooling Tower Blowdown Pond
C Pond South
WECO Sediment Pond
N
1,250 625 0 1,250 Feet
Legend
Plant Site Area Boundary
Talen Property Boundary
Pipelines
East Fork Armells Creek
Notes
1. Aerial Image and parcel information accessed via Montana State Library.
2. AOC boundary and pipelines are approximate based on the Plant Site Report (Hydrometrics, July 2015)
3. WECO: Western Energy
4. Former Unit 1 & 2 Wash Tray Pond was converted to Former Units 1 & 2 Bottom Ash Ponds in 1980.
Plant Site Process Ponds
Talen Energy
Colstrip, Montana
Geosyntec consultants
Columbia, MD
August 2016
Figure 2-2

# Groundwater Flow



# Constituents of Interest (COIs)

- Result from site operations
- Exceed background screening levels (BSLs)
- Some COIs are used to evaluate process water impacts

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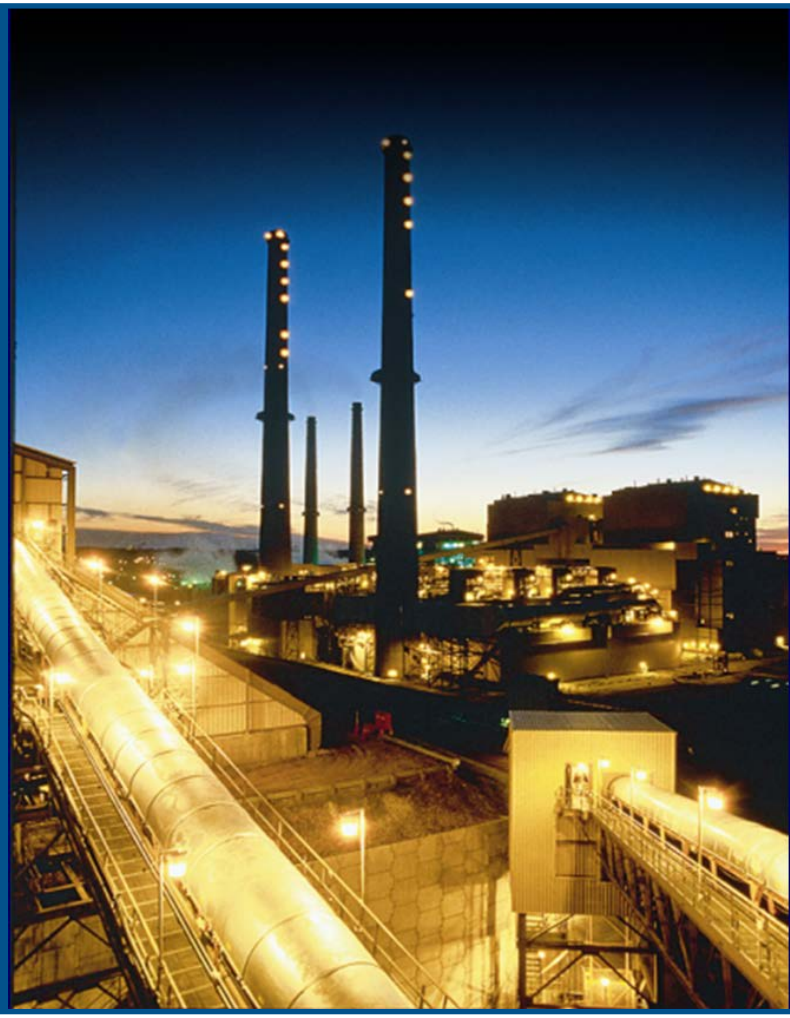
# COIs

- Boron*
- Sulfate*
- Specific conductivity*
- Total dissolved solids
- Magnesium
- Sodium
- Potassium
- Selenium
- Manganese
- Chloride*
- Calcium to Magnesium Ratio*



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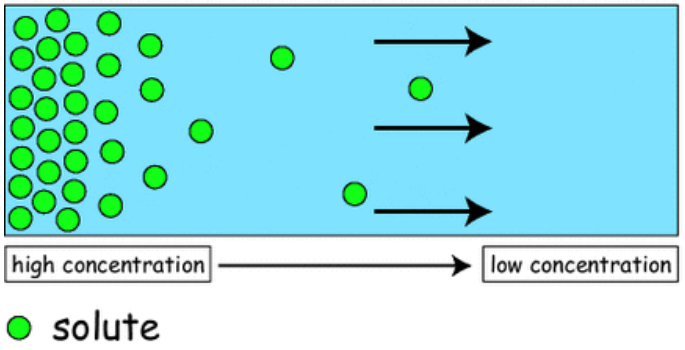
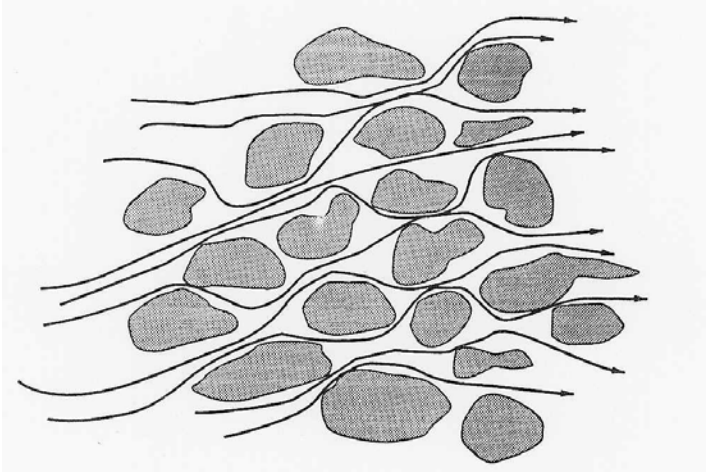
# Chemical Processes

- Matrix back-diffusion
- Natural attenuation
  - Immobilization
  - Dispersion
  - Dilution
- Mass discharge



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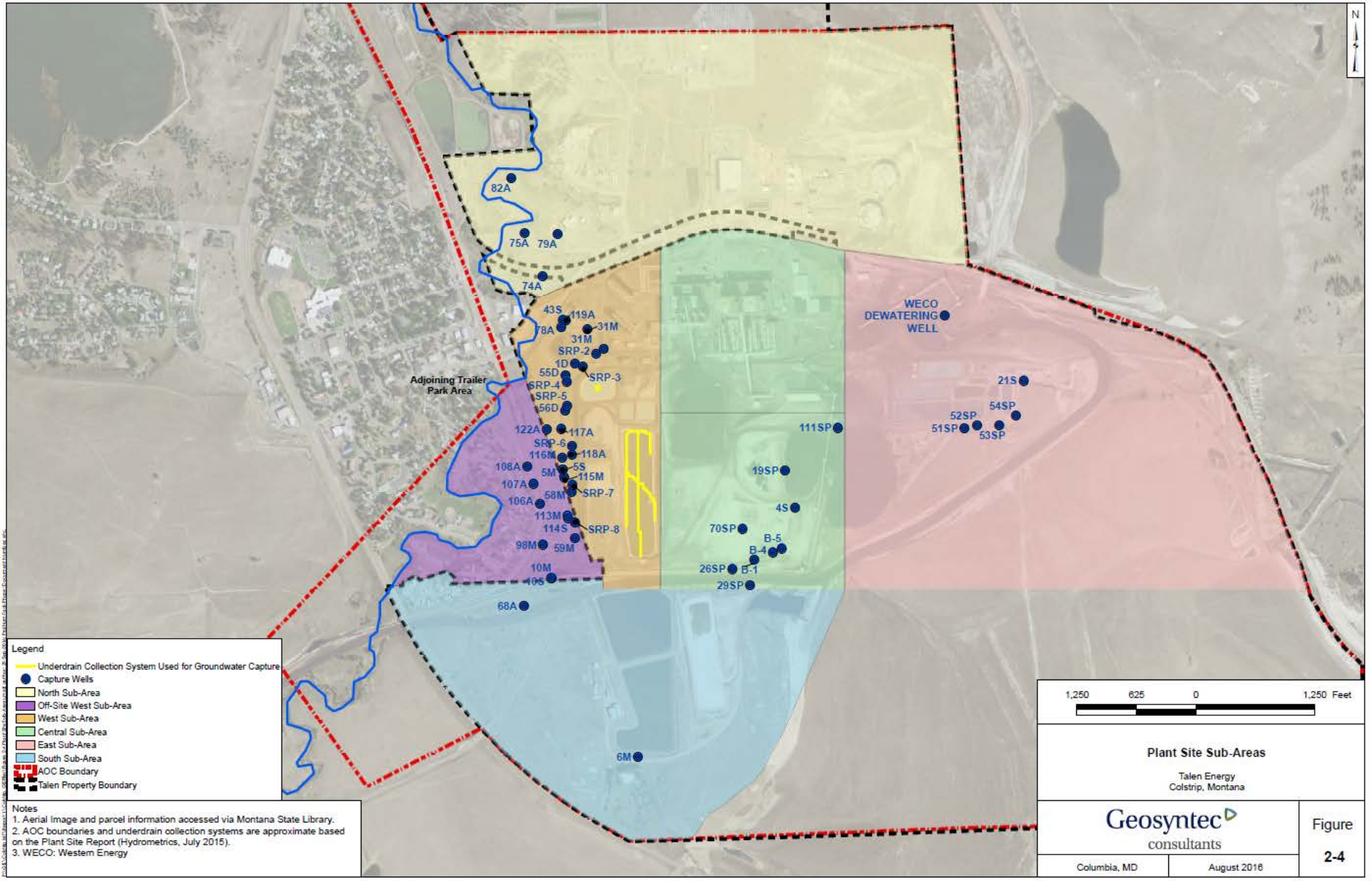
# Proposed Remedial Action Components

- Source Control
  - Prevent pond seepage
- Migration Management
  - Control spread of contaminated groundwater
- Institutional Controls
  - Reduce potential exposure




Notes
1. Aerial Image and parcel information accessed via Montana State Library.
2. AOC boundaries and underdrain collection systems are approximate based on the Plant Site Report (Hydrometrics, July 2015).
3. WECO: Western Energy

**Plant Site Sub-Areas**

Talen Energy
Colstrip, Montana

Geosyntec consultants

Columbia, MD | August 2016

Figure 2-4

# Interim Remedial Measures

- Ground- and surface water monitoring
- Groundwater capture & re-use
- Operational changes
- Soil removal
- Process wastewater “best management practices”

# Proposed Remedial Action Alternatives

# Proposed Technology Screening Criteria

- Effectiveness
- Implementability
- Qualitative cost

# Alternative 1

No further additional action

- Used as a baseline for other alternatives
- Doesn’t capture everything; COIs will remain in source and downgradient areas

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# Alternative 2

- Source control upgrades
- Monitored Natural Attenuation
- Point-of-Use Treatment
- Institutional Controls

- Would significantly reduce seepage from ponds, and reduce concentrations across most of the Plant Site

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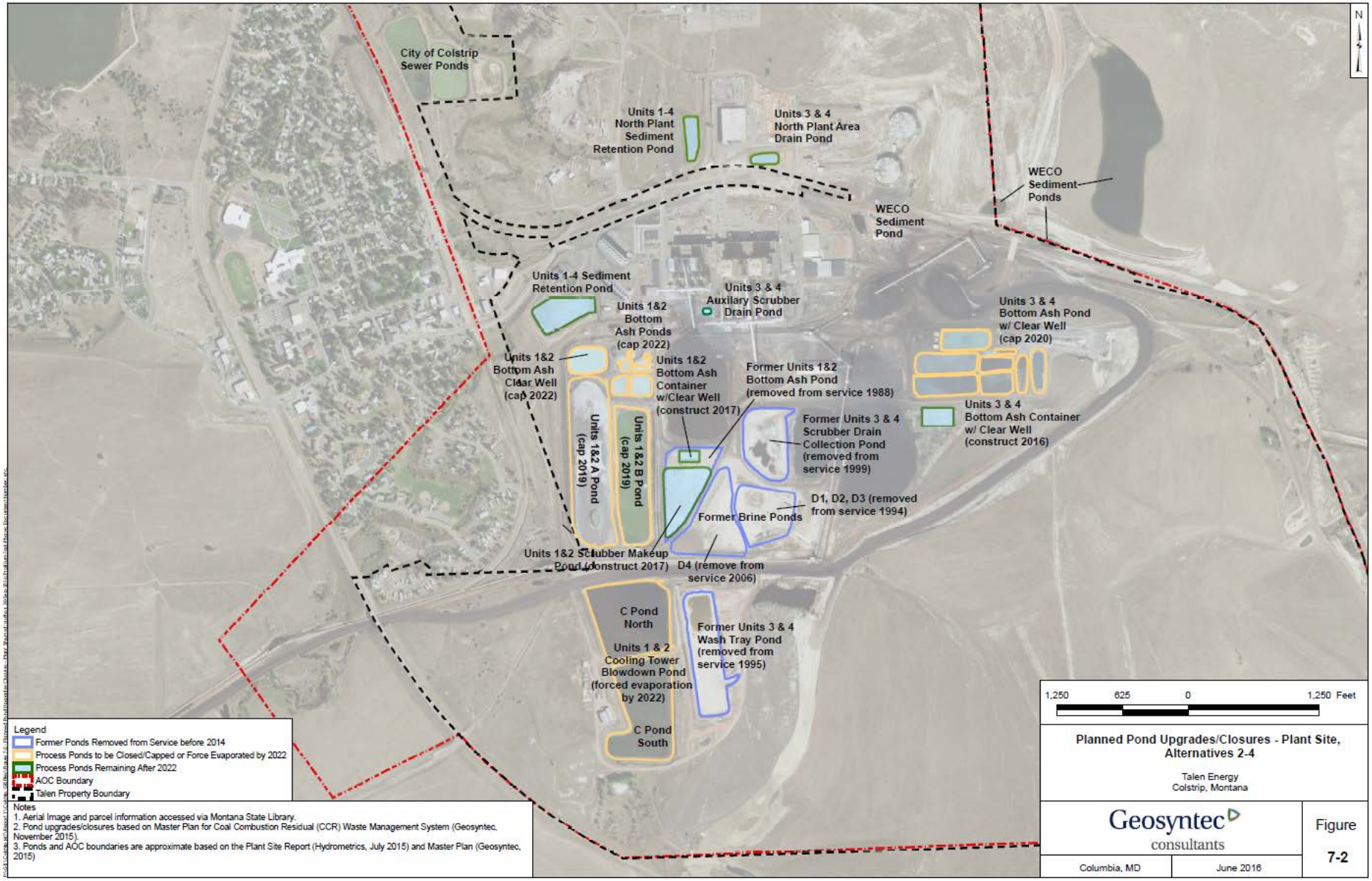


**Planned Pond Upgrades/Closures - Plant Site, Alternatives 2-4**

Talen Energy
Colstrip, Montana

Geosyntec consultants

Columbia, MD | June 2016

Figure 7-2

# Alternative 3

- Source control upgrades
- Enhance existing capture system
- Institutional controls

- Reduces seepage and concentrations in groundwater, but time-wise no better than Alternative 2

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# Alternative 4

- Source control upgrades
- Extraction well upgrades
- Institutional controls

- Will enhance mass removal, increase capture system effectiveness, and accelerate cleanup timeframes.

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# Talen's Proposed Remedy: Alternative 4

- The most cleanup, source control, and groundwater remediation proposed
- Most protective of human health and environment proposal
- Alternatives 1-3 do help, but some units perform better with Alt. 4

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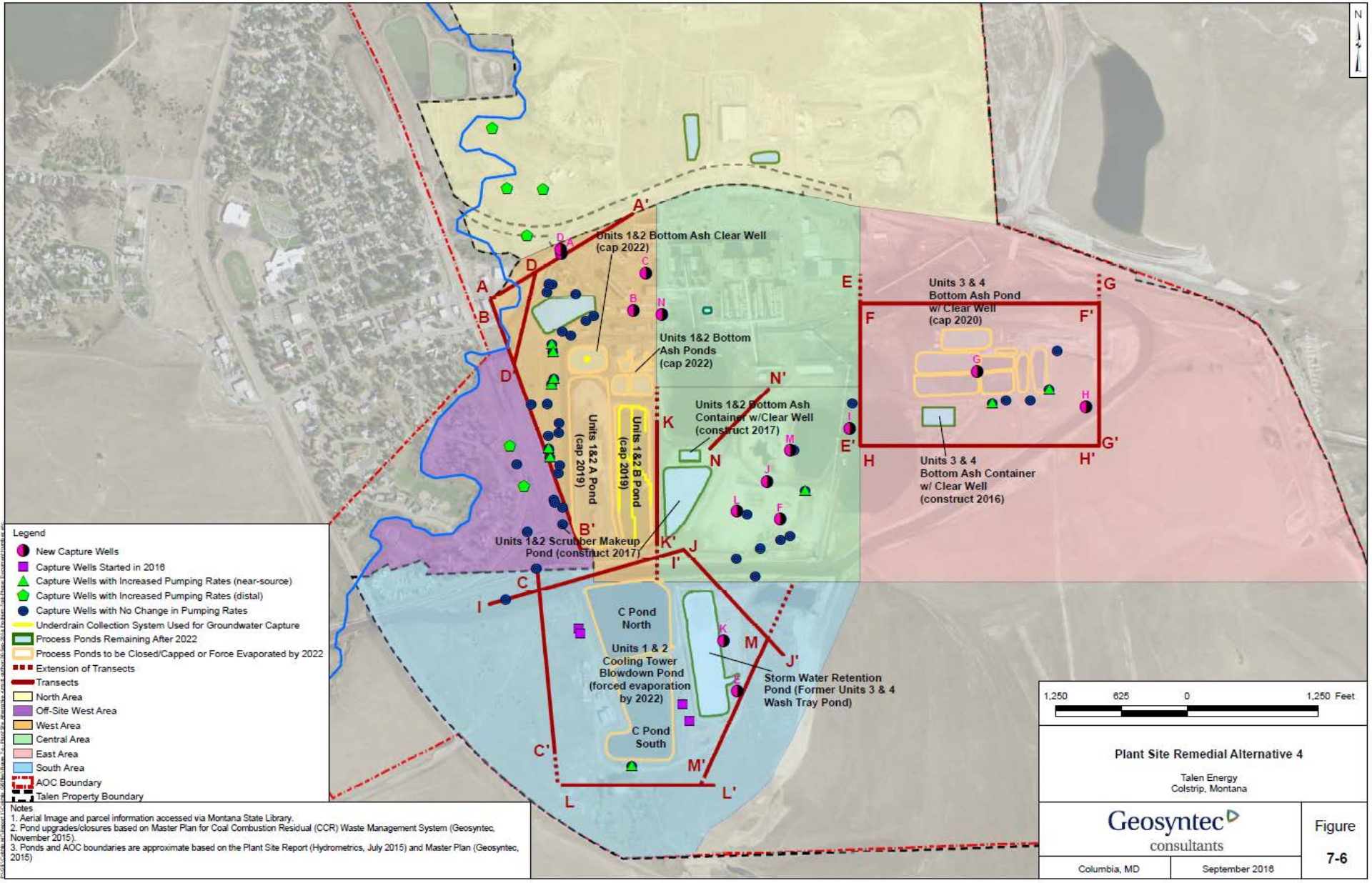


# Plant Site Remedial Alternative 4

Talen Energy
Colstrip, Montana

Geosyntec consultants

Columbia, MD | September 2016

Figure 7-6

# Alternative 4 Timeline

- Pumping rates would be increased in 2017
- New wells would be installed in 2018
- Pond closures/upgrades began in 2016, would be completed by 2022
- COIs would be reduced to concentrations at or below BSLs by 2065
- Mass discharge from ponds would be reduced by 98% by 2027

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# Report Timeline

- This is a draft proposal that DEQ is evaluating
- DEQ may require other or additional remedial actions
- DEQ may require changes based upon public comment

BOTTOM LINE: This is not a done deal.

# Cleanup Criteria and Risk Assessment Status

- Work Plan is under review
- Establishes cleanup criteria and identifies “COIs”
- DEQ-7 standards, USEPA  Maximum Contaminant Levels (MCLs), risk-based screening levels, or BSLs

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# What's Next

- Plant Site Cleanup Criteria & Risk Assessment
- Units 1&2 Remedy Evaluation Report
- Units 1&2 Cleanup Criteria & Risk Assessment
- Units 3&4 Remedy Evaluation Report
- Units 3&4 Cleanup Criteria & Risk Assessment

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# For more information…

- DEQ Colstrip Website:

  http://deq.mt.gov/DEQAdmin/mfs/ColstripSteamElectricStation
- Talen Montana CCR Website:

  https://www.talenenergy.com/generation/fossil-fuels/ccr-colstrip
- DEQ Contact:

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