2023 Annual Administrative Order on Consent (AOC) Public Meeting

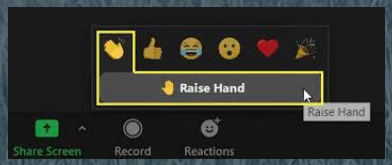
COLSTRIP STEAM ELECTRIC STATION
Remedial Activities
February 15, 2024

Sarah Seitz (sarah.seitz@mt.gov or 406.444.6797)
Colstrip Environmental Project Officer
Waste Management & Remediation Division

Logistics

Welcome and thank you for participating in DEQ's Colstrip AOC Annual Meeting. Please read the following tips about participating in this hybrid meeting:

- All Zoom participants have been automatically muted. Please remain so until called on to speak. We will have a question and answer period at the end of the annual AOC presentation. You will need to be given permission to unmute. Once you have spoken, please re-mute yourself.
- On Zoom, use the "raise hand" feature in the app to indicate that you would like to speak. For those in the room, please also raise your hand.

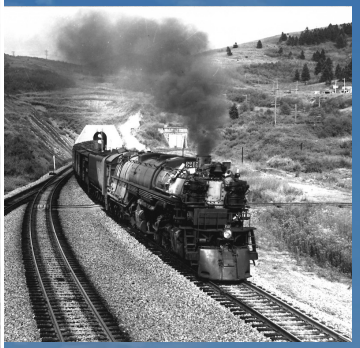


- If you are called on to speak, please identify yourself by stating your first and last name.
- You may also use the chat box and/or Q&A (Zoom webinar) to type your questions.
- If you are joining by phone:
  - Press *6 to mute/unmute yourself.
  - Press *9 to raise your hand.
- Visit the following link for helpful tips about using Zoom software:
  - https://support.zoom.us/hc/en-us/articles/201362193-Joining-a-meeting

Agenda

- Colstrip Steam Electric Station (SES) Plant
  - Background & Location
- Network of Remediation Laws/Agreements
  - MT Major Facility Siting Act/Water Quality Act
    - Administrative Order on Consent (AOC)
  - MT Coal-Fired Plant Remediation Act
  - Federal EPA Coal Combustion Residuals (CCR) Rules
- Annual Update on AOC Remediation Progress
  - Plant Site: Remedy Implementation
  - Units 1&2: Settlement to Remedy Design
  - Units 3&4: Remedy Design Progress & Dry Disposal
- What's Next & Public Participation in Future

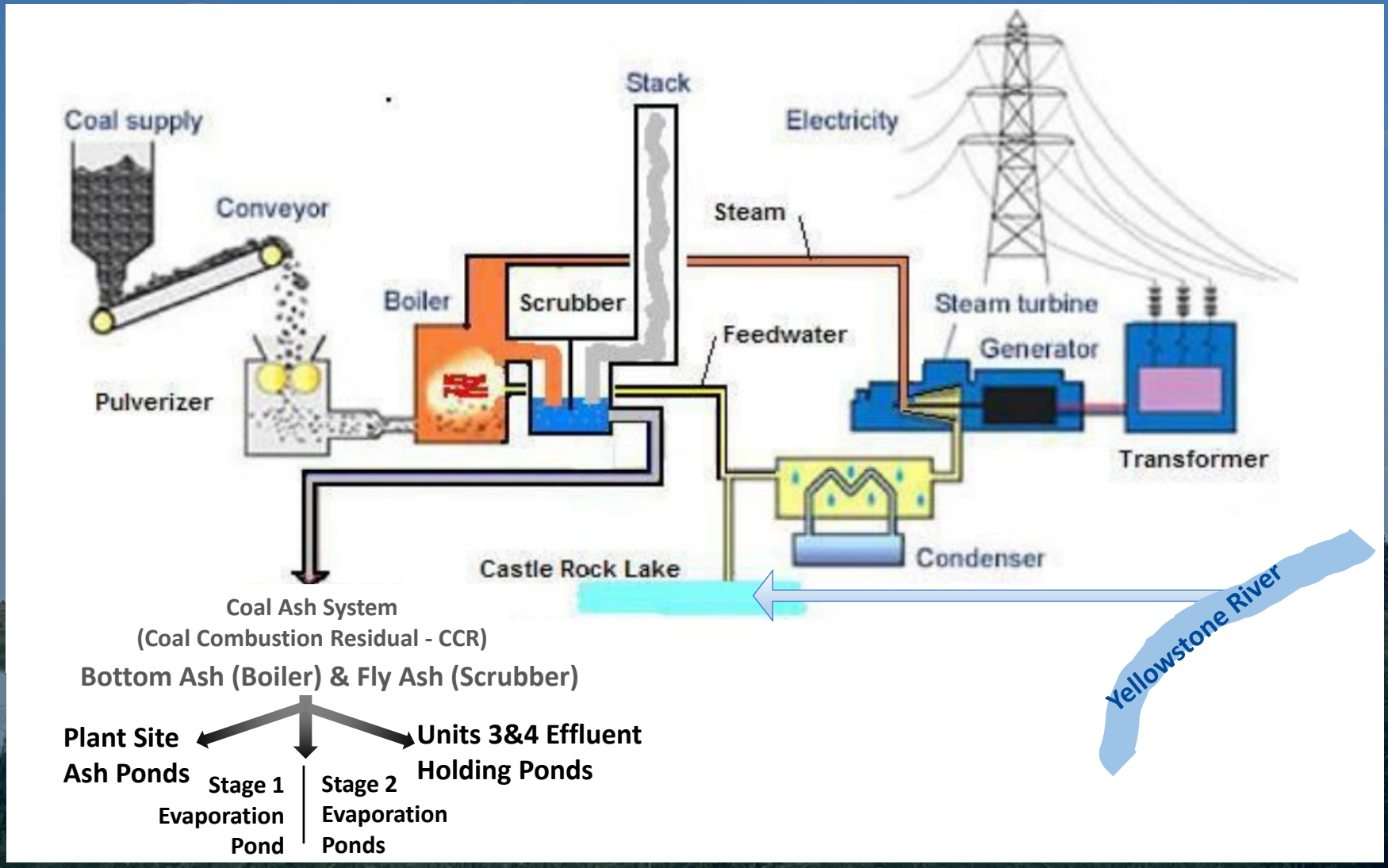
- Questions/Comments



Northern Pacific Railway Mine and Company Town: 1924 - 1958

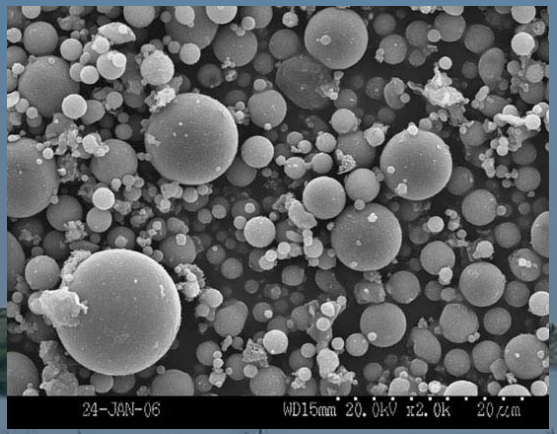
Colstrip Generating Station for NW US and MT: 1970's - Now

Colstrip Plant Operations Diagram

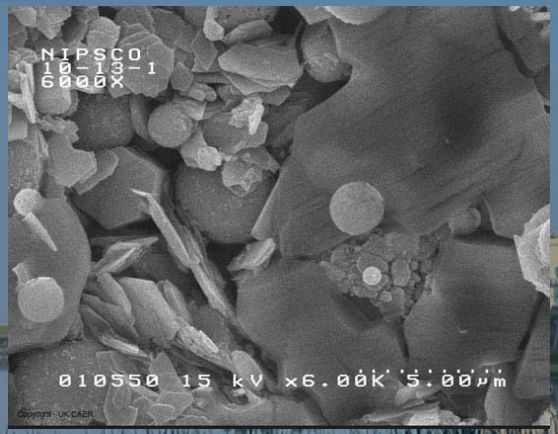


What is Coal Ash?

- Coal Ash = Coal Combustion Residual (CCR)
  - Byproduct of burned coal
  - May contain traces of contaminants, typically metals naturally present in the coal
  - Regulated by Federal CCR Rule



Fly ash (magnified 2000x)



Bottom ash (magnified 6000x)

Colstrip SES Groundwater Constituents of Concern or Interest (COCs or COIs):
Boron, Sulfate, Cobalt, Lithium, Selenium, Molybdenum (Plant Site), Manganese

Plant Site Ponds – Units 1-4

Stage 1 Evaporation Pond (SOEP)

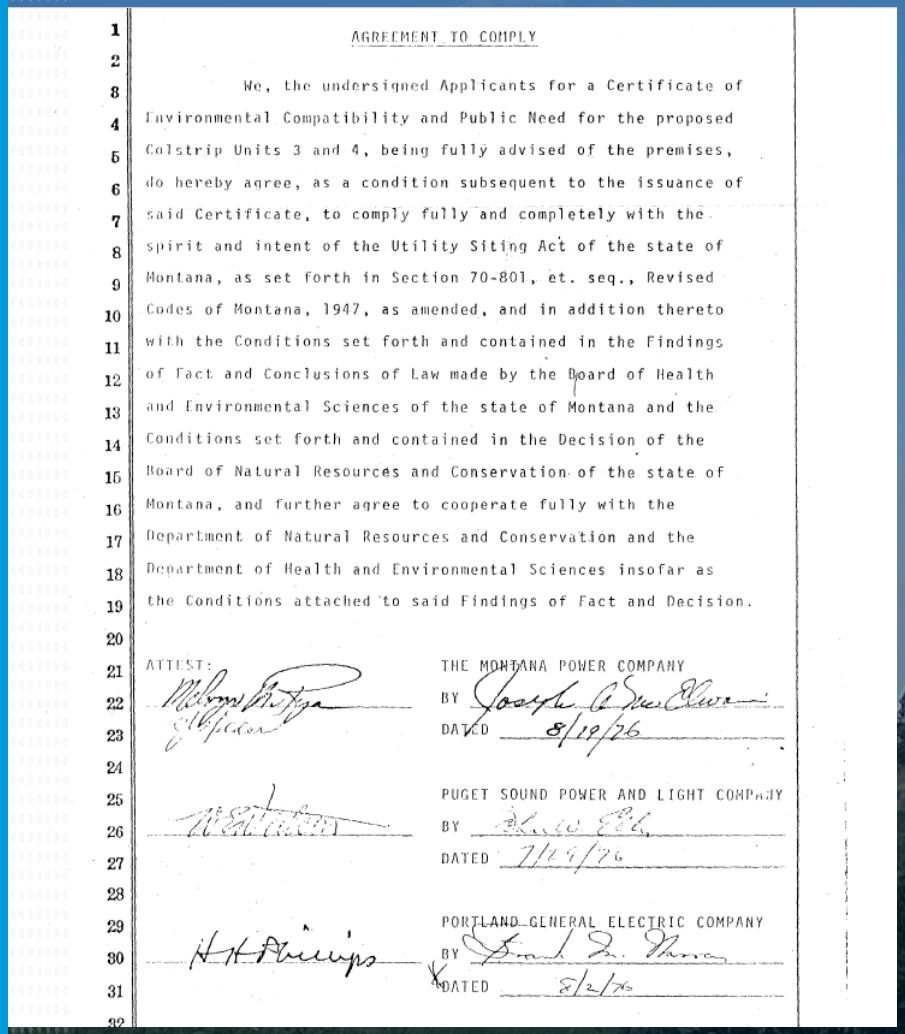
Stage 2 Evaporation Ponds (STEP)

Units 3&4 Effluent Holding Pond (EHP)

Major Facility Siting Act

- Provides for DEQ review of a facility engaged in the generation, conversion, or distribution of energy.
  - The need to meet energy demands
  - The constitutional objective of maintaining a clean and healthful environment
  - MCA §75-20-102

- Colstrip SES' MFSA Certificate outlines operation and waste management, including the management of seepage from coal ash ponds and control of the seepage



AGREEMENT TO COMPLY

We, the undersigned Applicants for a Certificate of Environmental Compatibility and Public Need for the proposed Colstrip Units 3 and 4, being fully advised of the premises, do hereby agree, as a condition subsequent to the issuance of said Certificate, to comply fully and completely with the spirit and intent of the Utility Siting Act of the state of Montana, as set forth in Section 70-801, et. seq., Revised Codes of Montana, 1947, as amended, and in addition thereto with the Conditions set forth and contained in the Findings of Fact and Conclusions of Law made by the Board of Health and Environmental Sciences of the state of Montana and the Conditions set forth and contained in the Decision of the Board of Natural Resources and Conservation of the state of Montana, and further agree to cooperate fully with the Department of Natural Resources and Conservation and the Department of Health and Environmental Sciences insofar as the Conditions attached to said Findings of Fact and Decision.

ATTEST:

THE MONTANA POWER COMPANY
BY
DATED 8/19/76

PUGET SOUND POWER AND LIGHT COMPANY
BY
DATED 7/19/76

PORTLAND GENERAL ELECTRIC COMPANY
BY
DATED 8/2/76

MT Water Quality Act

- Provides for DEQ to regulate state waters in order to (MCA §75-5-101):
  - Conserve water by protecting, maintaining, and improving the quality and potability of water for public water supplies, wildlife, fish and aquatic life, agriculture, industry, recreation, and other beneficial uses;
  - Provide a comprehensive program for the prevention, abatement, and control of water pollution; and
  - Balance the inalienable rights to pursue life's basic necessities and possess and use property in lawful ways with the policy of preventing, abating, and controlling water pollution in implementing the program referred to in subsection

- Colstrip SES groundwater contamination resulted from seepage from the coal ash ponds and operations beyond the pond/cell engineering controls

Process from MFSA/WQA to AOC

Major Facility Siting Act (MFSA) Colstrip Operational Certificate

Seepage from coal ash ponds/cells greater than certificate allowed and not able to be mitigated by engineered controls (groundwater capture and return to ponds/cell)

A O C

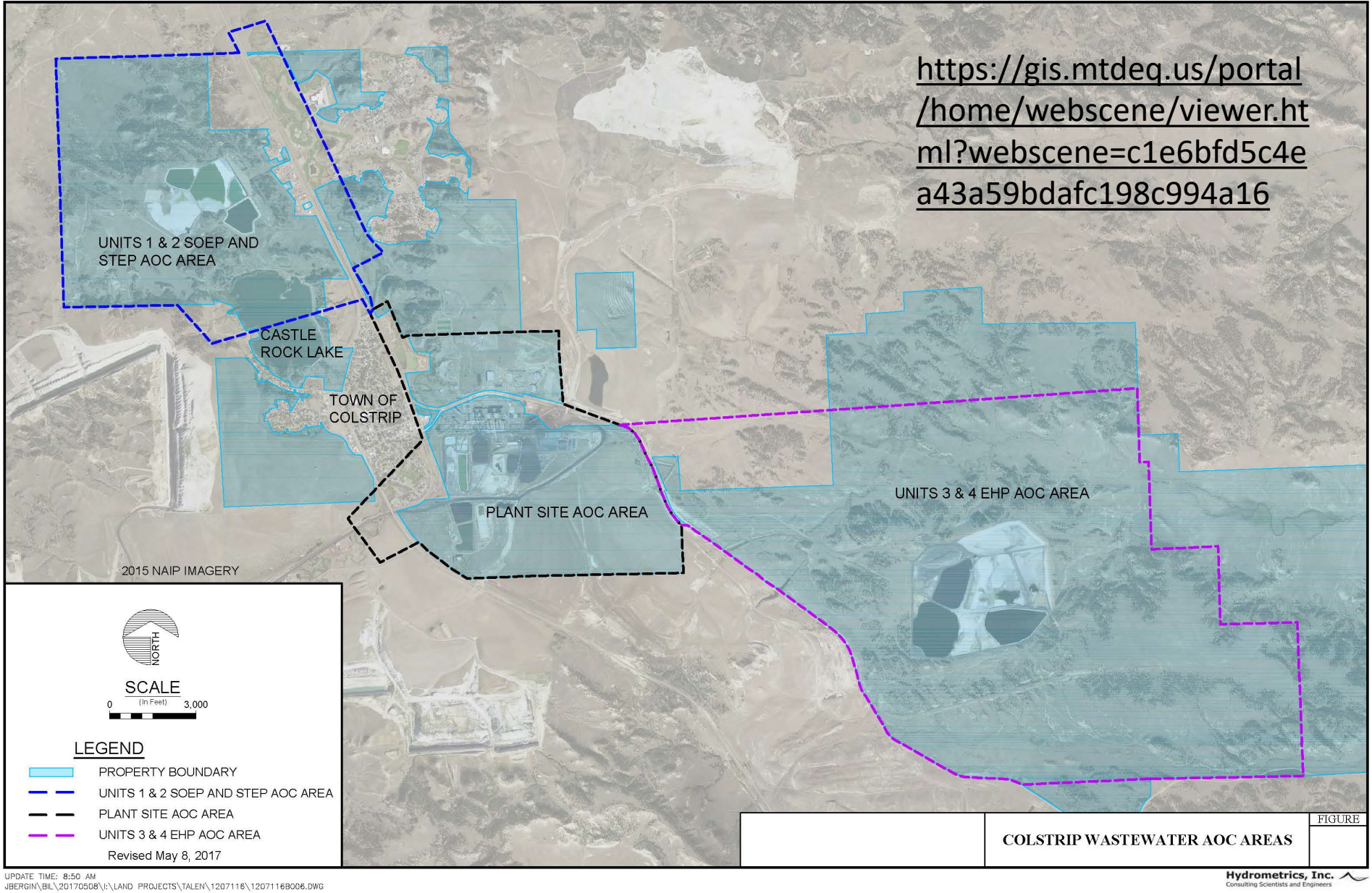
Montana Water Quality Act

Seepage from coal ash ponds affected underlying state waters (groundwater) and was not being mitigated within the MFSA pond/cell boundaries

Administrative Order on Consent (AOC)
DEQ and Talen Montana (formerly PPL Montana) entered into AOC in 2012 (2017 & 2021 Amendments)

Addresses groundwater contamination from coal ash disposal ponds and operations
Outlines Process and Deadlines to investigate and remedy contamination

- Divides site into 3 AOC areas:
  - Plant Site
  - Units 1&2 Evaporation Ponds
  - Units 3&4 Effluent Holding Ponds


https://gis.mtdeq.us/portal/home/webscene/viewer.html?webscene=c1e6bfd5c4ea43a59bdafc198c994a16
UNITS 1 & 2 SOEP AND STEP AOC AREA
CASTLE ROCK LAKE
TOWN OF COLSTRIP
PLANT SITE AOC AREA
UNITS 3 & 4 EHP AOC AREA
2015 NAIP IMAGERY
NORTH
SCALE
0 (In Feet) 3,000
LEGEND
PROPERTY BOUNDARY
UNITS 1 & 2 SOEP AND STEP AOC AREA
PLANT SITE AOC AREA
UNITS 3 & 4 EHP AOC AREA
Revised May 8, 2017
COLSTRIP WASTEWATER AOC AREAS
FIGURE
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Hydrometrics, Inc.
Consulting Scientists and Engineers

AOC Process (1 of 2)

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

↓

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

AOC Process (2 of 2)

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)

AOC Progress

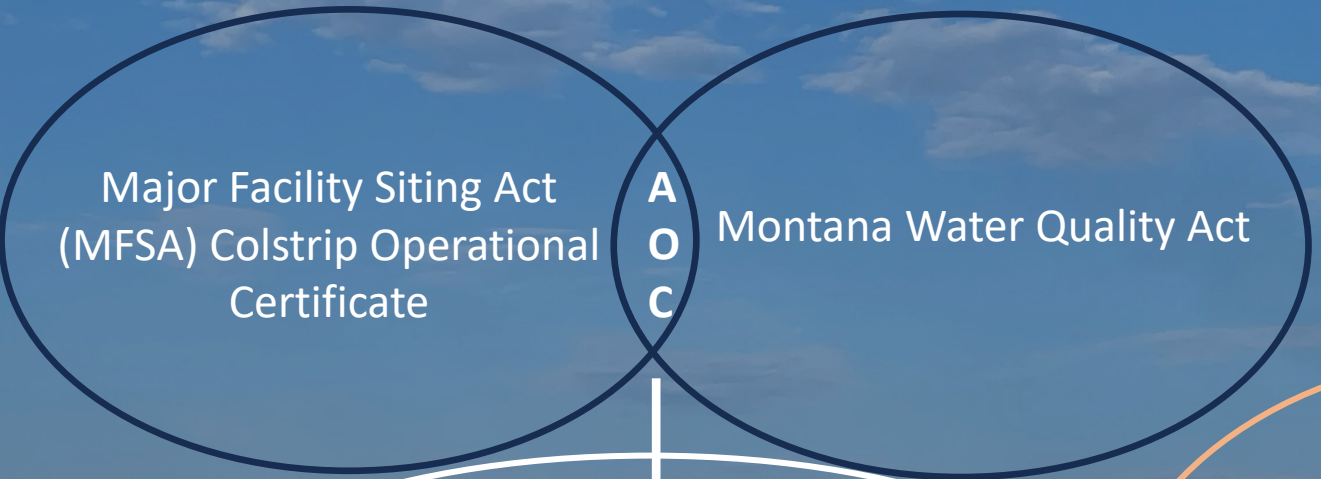
Report Name	Plant Site	Units 1&2	Units 3&4
Site Characterization Report	✓	✓	✓
Background Screening Level Report	✓	✓	✓
Cleanup Criteria & Risk Assessment Report	✓	✓	✓
Remedy Evaluation Report	✓	✓	✓
Remedial Design/Remedial Action Workplan	✓	✓	✓
Annual Remedy Progress Report (Annual Hydrologic & Remedial Progress Report)	✓	✓	✓
Final Remedial Action Report	--	--	--
Closure Plans	✓	✓	✓

AOC Progress

Colstrip Owners	Financial Assurance (FA) Provided as of Jan. 2024[1]
Talen	$117.6 million
Puget Sound Energy	$128.8 million
Northwestern Energy	$16.8 million
Portland General Electric	$22.5 million
Avista	$16.8 million
PacifiCorp	$11.2 million
Total	**$313.8 million**

1: DEQ revisits and reviews FA annually, every 5-years DEQ did a comprehensive review 2022

Process from MFSA/WQA to AOC



Administrative Order on Consent (AOC)
DEQ and Talen Montana (formerly PPL Montana) entered into AOC in 2012
(2017 & 2021 Amendments)

Coal-Fired Generating Unit Remediation Act

- MCA §75-8-101 through 110 (2017 Legislative Session)
  - Requires Colstrip owners to submit a remediation plan within 90 days of shutdown

Coal-Fired Generating Unit Remediation Act

- MCA §75-8-101 through 110 (2017 Legislative Session)
  - Requires Colstrip owners to submit a remediation plan within 90 days of shutdown
  - The purpose of this plan was to provide remediation information for items not covered under the AOC – primarily in operations areas

- MCA §75-8-110 Water Feasibility Study (2021 Legislative Session)

Units 1&2 Remediation Act – Plan (2020)

- Universal Wastes, Polychlorinated biphenyl (PCB) Materials, Asbestos, Petroleum waste (lubricating oils, hydraulic oils, etc.), other wastes (i.e. mercury containing devices, fire extinguishers, etc.), petroleum releases
- Due to safety and other considerations related to operation of Units 3&4, demolition and removal will be deferred until after Units 3&4 are retired
  - Periodic inspections of "moth balled" Units 1&2 buildings
- Future use of land = industrial (primarily), some stock

Water Feasibility Study

2021 Legislative Action to modify MCA – Coal-Fired Generating Unit Remediation Act

- Required water feasibility study to be completed by operator by Nov. 1, 2022 to evaluate water resources and costs associated with those resources for local government (City of Colstrip)
  - **Completed 2022 and communication continued 2023**
  - Biannual Local Government, Power Plant Owners Representatives, and State Government

Water Feasibility Study

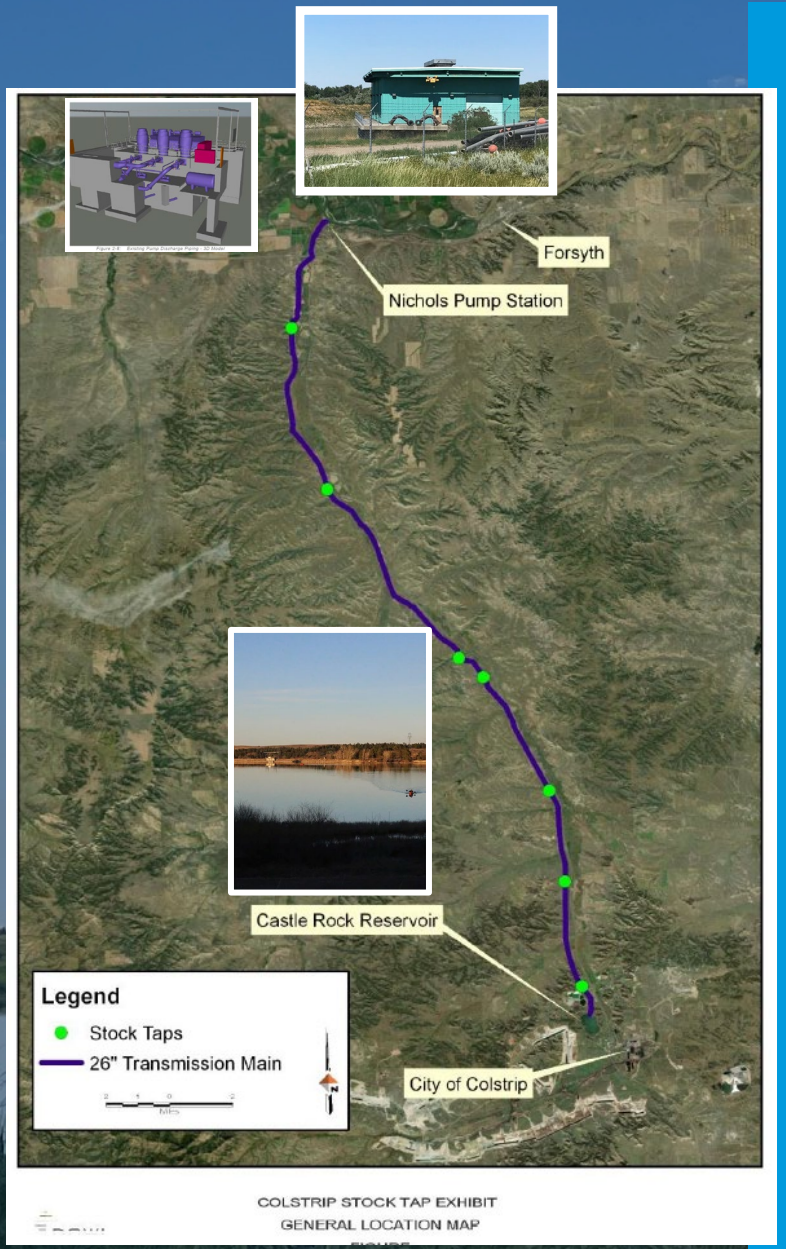


Table 2-21: Projected 2049 Water Demands

Projected 2049 Water Demand									
Month	City of Colstrip (MGD)	Power Plant Remediation (MGD)	Castle Rock Lake E&L (MGD)	Miscellaneous Agricultural Users (MGD)	Combined Average Daily (MGD)	Total Monthly Use (MG)	New Pump Rate Required* (cfs)	Approx. Existing Pump Runtime Hours Required per month (Single Pump)	Spray Wash (MGD)
Jan	0.412	0.965	0.162	0.060	1.60	49.57	3.09	97.2	0.0493
Feb	0.427	0.965	0.164	0.060	1.62	45.24	3.13	88.7	0.0498
Mar	0.438	0.965	0.166	0.060	1.63	50.49	3.15	99.0	0.0502
Apr	0.437	0.965	0.588	0.060	2.05	61.48	3.96	120.5	0.0632
May	0.508	0.965	0.770	0.060	2.30	71.39	4.45	140.0	0.0710
Jun	1.047	0.965	0.826	0.060	2.90	86.95	5.61	170.5	0.0893
Jul	1.398	0.965	0.857	0.060	3.28	101.67	6.34	199.4	0.1011
Aug	1.388	0.965	0.785	0.060	3.20	99.15	6.19	194.4	0.0986
Sep	0.940	0.965	0.606	0.060	2.57	77.13	4.97	151.2	0.0792
Oct	0.528	0.965	0.164	0.060	1.72	53.23	3.32	104.4	0.0529
									0.0512
									0.0525
									0.1

ALTERNATIVES CONSIDERED
(BOLDED RETAINED FOR COST EVALUATION):

Alt PMP 1: Operate Pump Station "As Is", Budget for Equipment Replacement

Alt PMP 2: Operate Pump Station "As Is", Replace Mechanical Equipment Up Front

Alt PMP 3: Convert Pump Station, Install Two Smaller Pumps and Keep One Large Pump

Alt PMP 4: Convert Pump Station; Install Three Smaller Pumps

Alternative 5: Install New Surface Water Intake, Pump Station

Alternative 6: Retrofit Pump Station and Install New Booster Station and Pipeline Directly to Colstrip Water Treatment Plant

Alternative 7: Pursue Groundwater Source Using Wells and New Water Treatment Plant

Alternative 8: Pursue Alternative Surface Water Sources

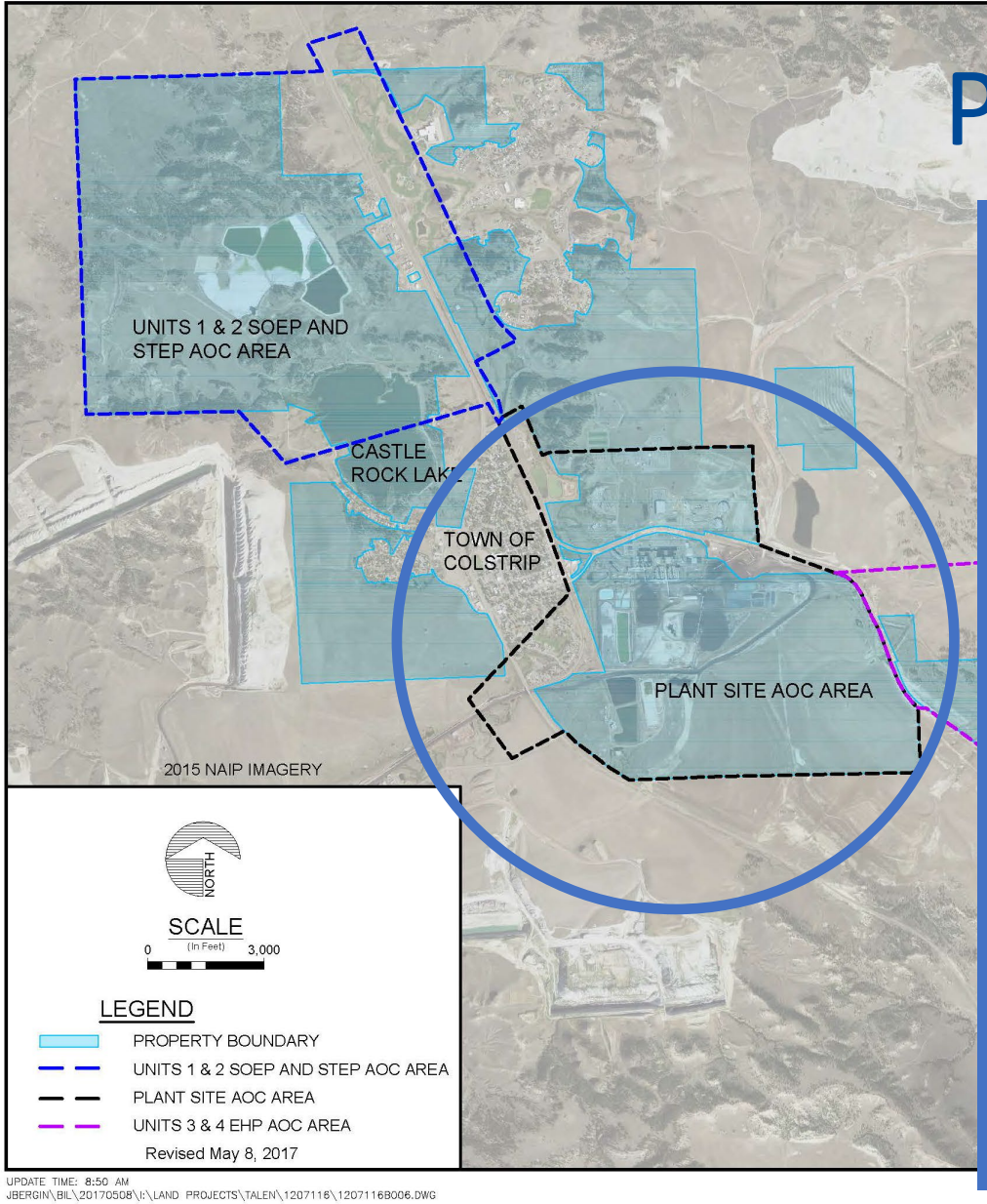
Alternative 9: Replace Existing Pipeline & Appurtenances

Water Feasibility Study Future Actions

Discussions to find a multi-layered solution for Colstrip Community

- Open Owner Communication
  - Understanding of Infrastructure
  - Update/Understanding of Water Rights
  - Costs
- Understanding or New Agreements/Contracts
- Local Gov. and State Reps awareness and participation
- State Agency awareness and input
- Out-of-the-Box suggestions

Plant Site Remedy



- Approved remedy addresses groundwater contamination from coal ash process/disposal ponds
  - Closure of ponds and ash dewatering (in place)
  - Freshwater flushing and groundwater capture system
  - Additional Measures:
    - Monitored Natural Attenuation (MNA)
    - Permeable Reactive Barriers (PRB)

Plant Site Ponds

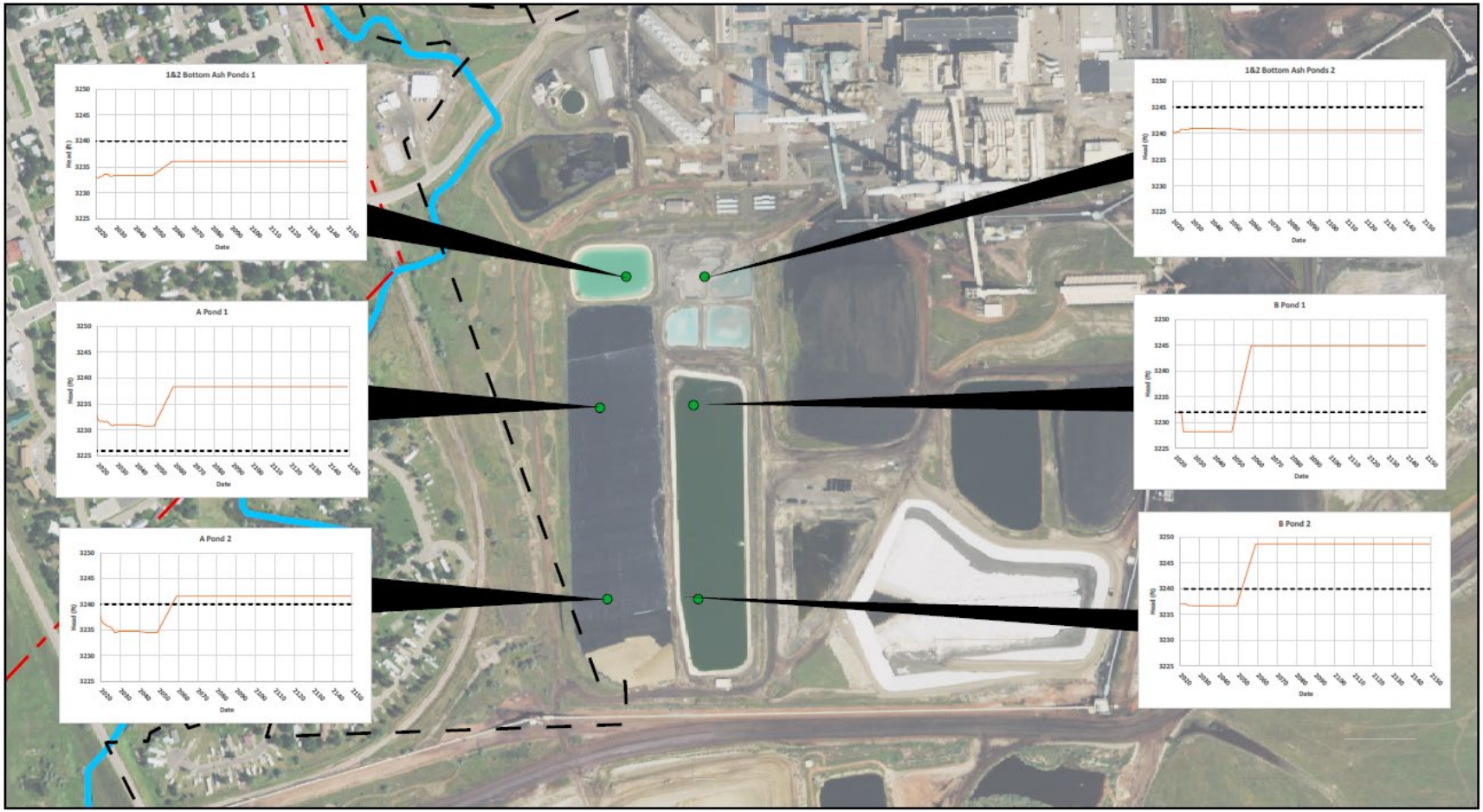
- Pond closures and planned closures –
  - **Units 3&4 Bottom Ash Ponds** – Closed in place in East of Units 3&4 (north coal storage barn)
    - **No proposed modification to remedy**
  - **DEQ Preliminary Decision on Remedy Modification**
    - **Units 1&2 A Pond** – Closed in place/cover added 2020-2021
      - Dewatering active
    - **Units 1&2 B Pond**
      - Units 1&2 B Pond stopped receiving water (CCR /operations materials) from Units 1&2 SOEP/STEP in Q2 2022
    - **Units 1&2 Bottom Ash and Clearwell**
      - Stopped receiving CCR material in January 2020

Plant Site Ponds – Preliminary Remedy Modification

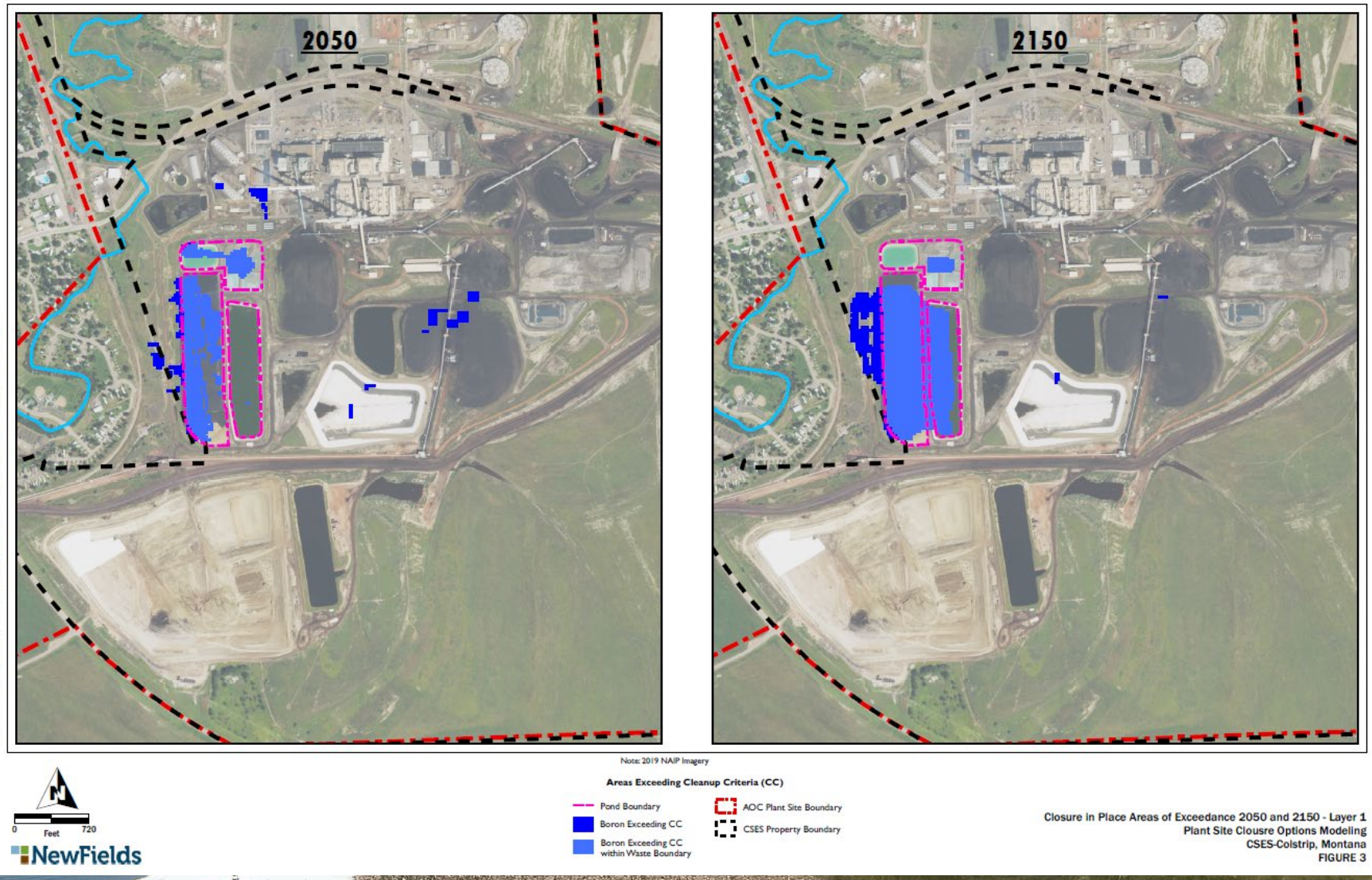
Plant Site Ponds – Remedy Modification Process

- DEQ/Talen steps on modification of remedy/closure design for A Pond, **B Pond** and **Bottom Ash/Clearwell Pond**
  - *Talen Closure Evaluation*:
    - DEQ agreed to delayed Closure Activities – Jan 2023
  - Model Updates – Completed March 2023
  - *Talen Alternatives Assessment* – May 1, 2023
    - 1.35 M cubic yards
    - Three viable alternatives mod remedy
      - Alternative A – Closure in Place
      - Alternative B – Closure by Removal to New Plant Site Landfills
      - Alternative C – Closure in Place with Vertical Barrier Walls
  - DEQ requested selection and evaluation of viable modified remedy – June 2023
  - Talen submitted *Request to Modify Remedy to Alternative 4B* – Closure by removal to new plant site landfills

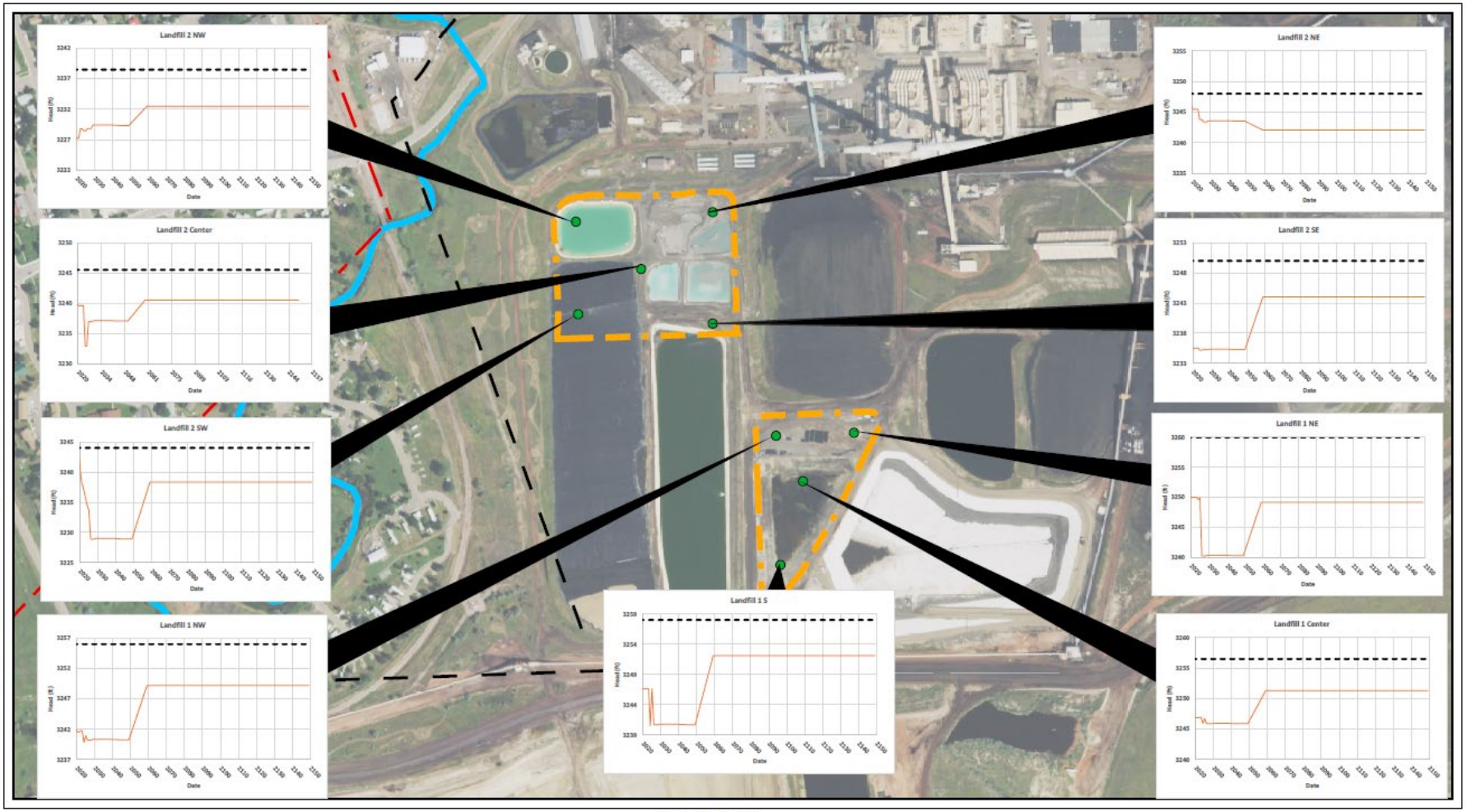
Plant Site Ponds – Approved Remedy Closure in Place



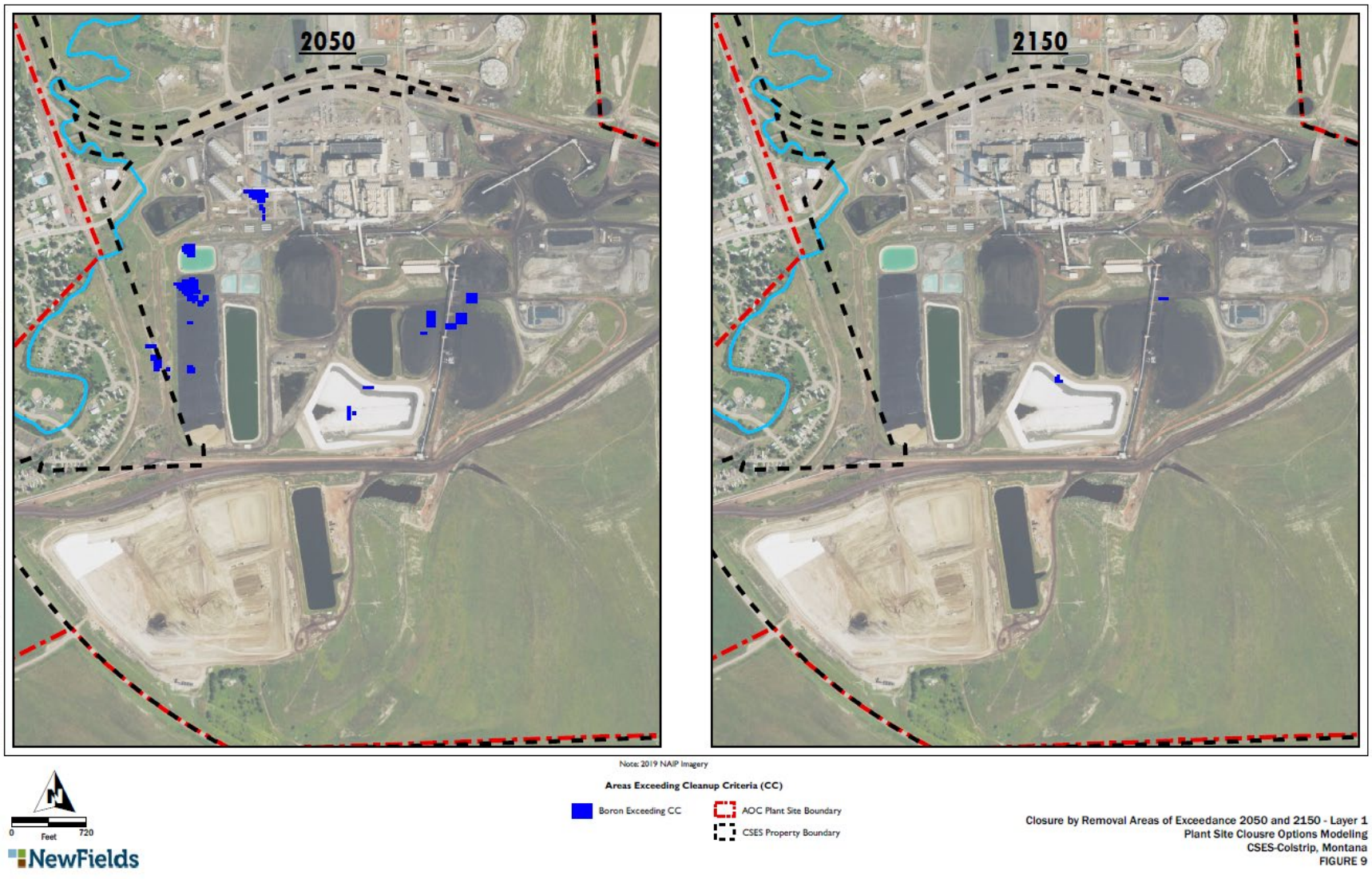
Plant Site Ponds – Approved Remedy Closure in Place



Plant Site Ponds – Remedy Modification Alternative 4B



Plant Site Ponds – Remedy Modification Alternative 4B



Plant Site Ponds – Remedy Modification Alternative 4B

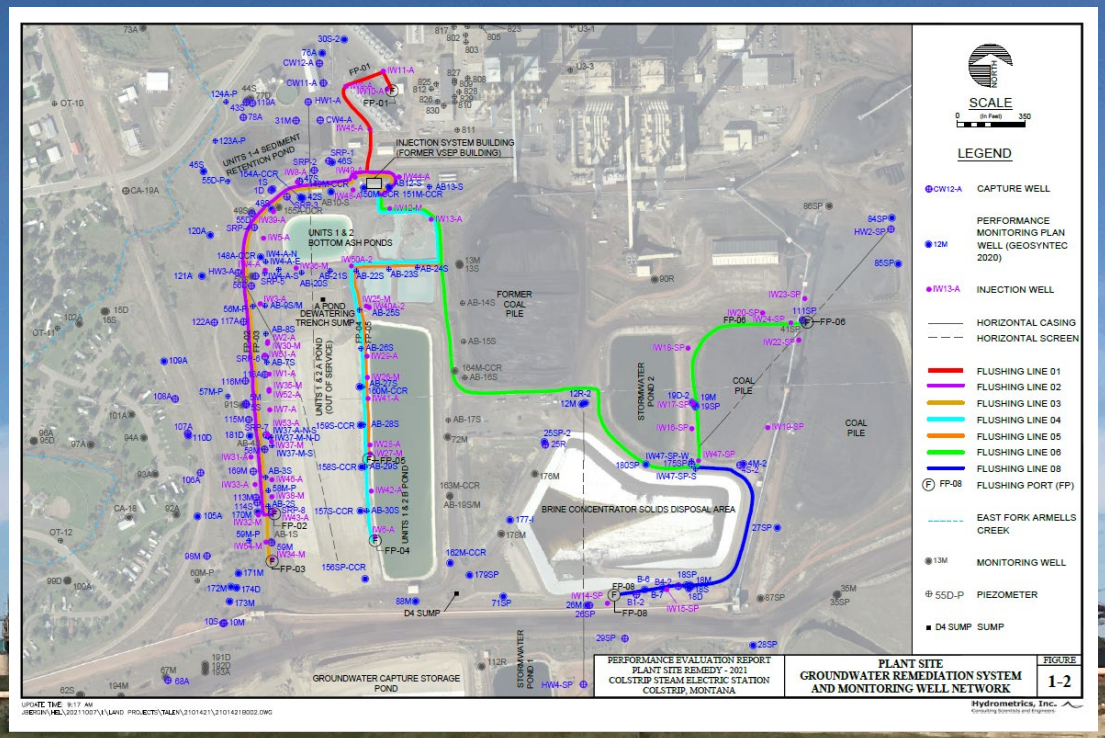
- DEQ's Preliminary Decision
  - Review and agree with Alternative 4B
  - DEQ Decision Document
- *Public Participation*
  - *Posted on website/emailed and notice in papers per AOC requirements for remedy mod decision*
  - *30-Day Comment Period: Ended November 2, 2023*
    - *One Comment Letter – no major issues*
- **Next Steps**
  - **DEQ – Final Remedy Modification Decision Document with Responsiveness Summary – Feb 2024**
  - **Letter to Talen MT, post on website, notice to stakeholders**

- Design process for RD/RA Work Plan Addendum and Updated Closure Plan
  - Landfill design – DEQ Remediation/SW

Plant Site – Groundwater Flushing/Capture

- Operate and Optimize Groundwater Flushing/Capture System
  - Started GW Capture/Flushing Remediation in July 2020
  - Updated analytical to be presented in next Annual Hydrologic Report – Spring 2024
- Modifications in 2025+

Plant Site Remedy Alt 4B will require changes to flushing/capture system in the future

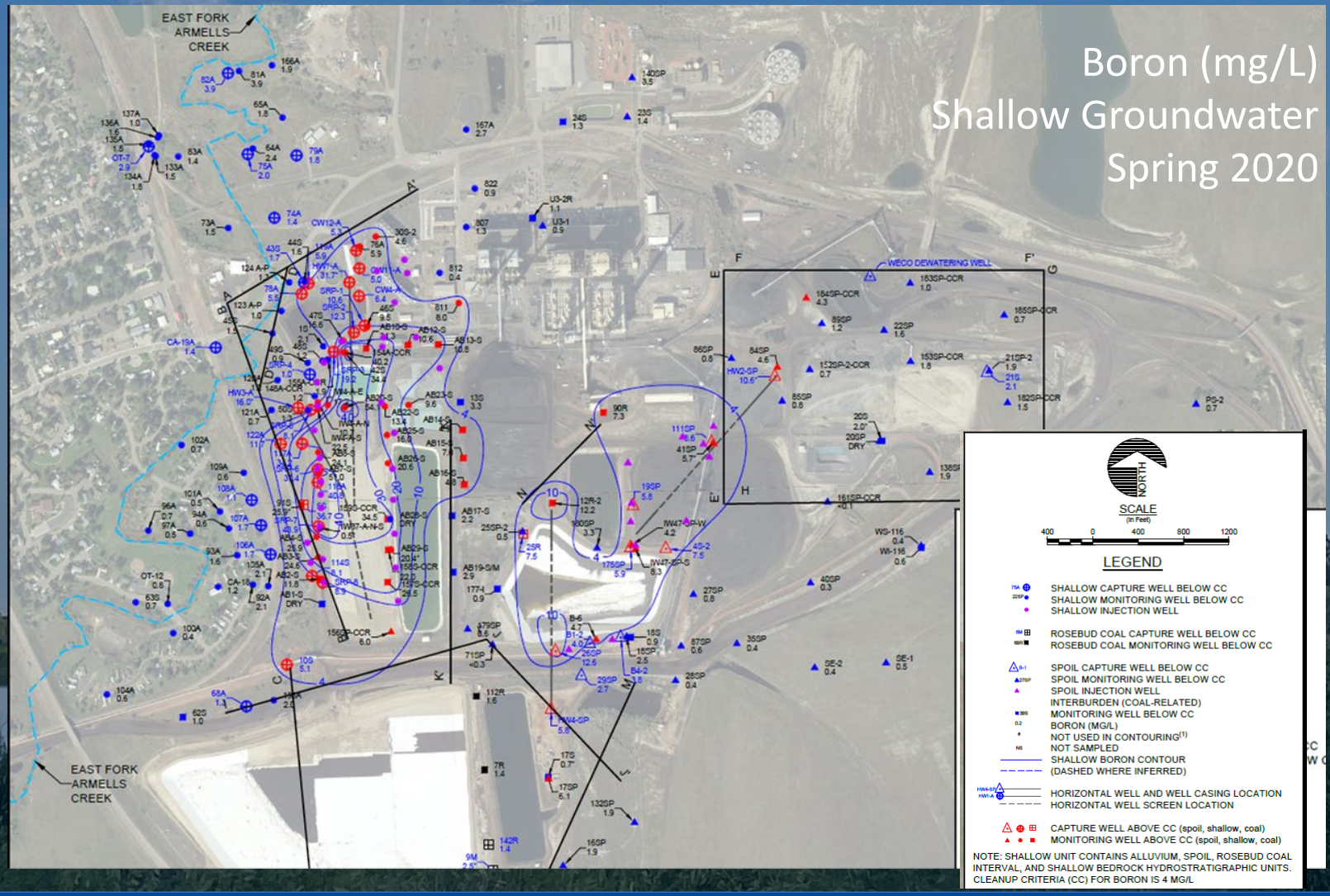


Plant Site – Hydrologic and Remedial Progress

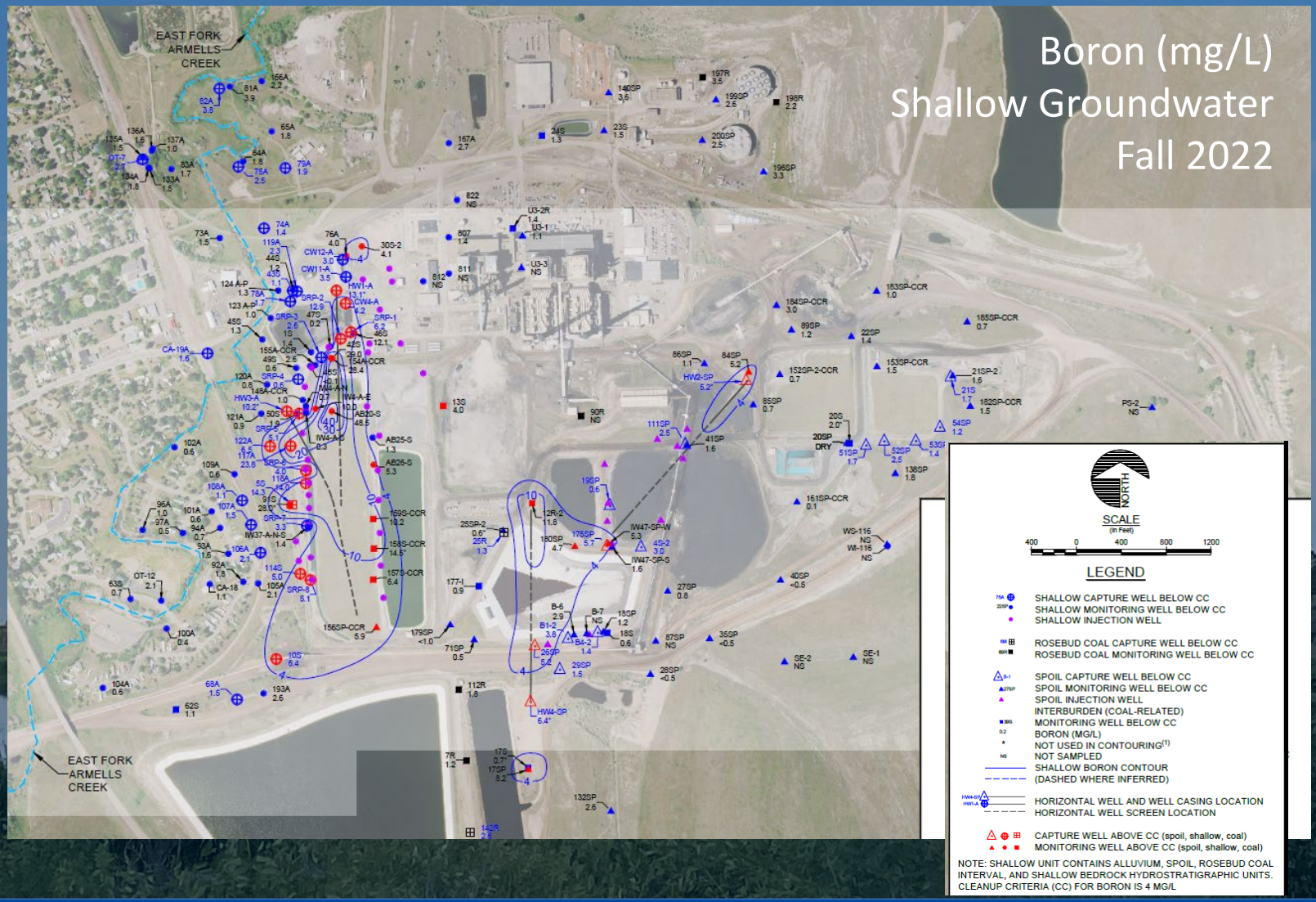
- Hydraulic Capture maintained 2020 through 2022
- Boron and Sulfate plumes primarily in the shallow groundwater and decreases with depth to McKay groundwater and Sub-McKay groundwater
  - Concentrations in wells decreased since 2020
    - Generally, about 50% less wells with cleanup criteria exceedances since 2020
    - Boron: Approx. 40-50% decrease in concentration in wells in shallow and McKay groundwater
    - Sulfate: Approx. 20-50% decrease in concentration in wells in shallow and McKay groundwater

- Continue to watch trends
  - Well-by-well and groundwater unit general trends
  - Statistical analysis/additional data points post-implementation
- Optimization and future possible modifications with landfill implementation

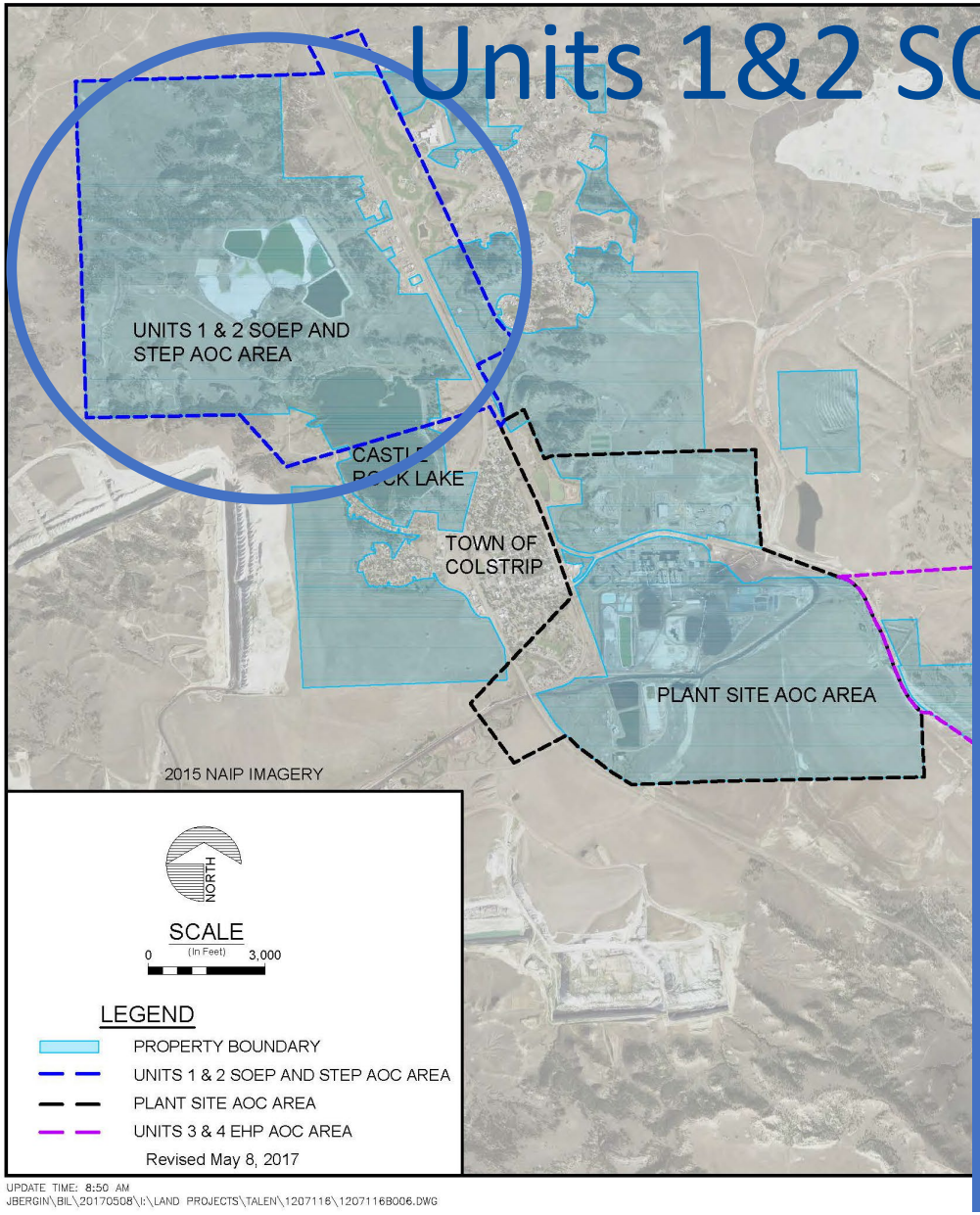
Plant Site – Hydrologic and Remedial Progress



Plant Site – Hydrologic and Remedial Progress



Units 1&2 SOEP/STEP Remedy



- Approved remedy addresses groundwater contamination from coal ash process/disposal ponds and cells
  - Ash dewatering
  - Ash removal to a new landfill (>7.5 M cubic yds)
  - Freshwater flushing and groundwater capture system
  - Additional Measures:
    - Monitored Natural Attenuation (MNA)
    - Permeable Reactive Barriers (PRB)

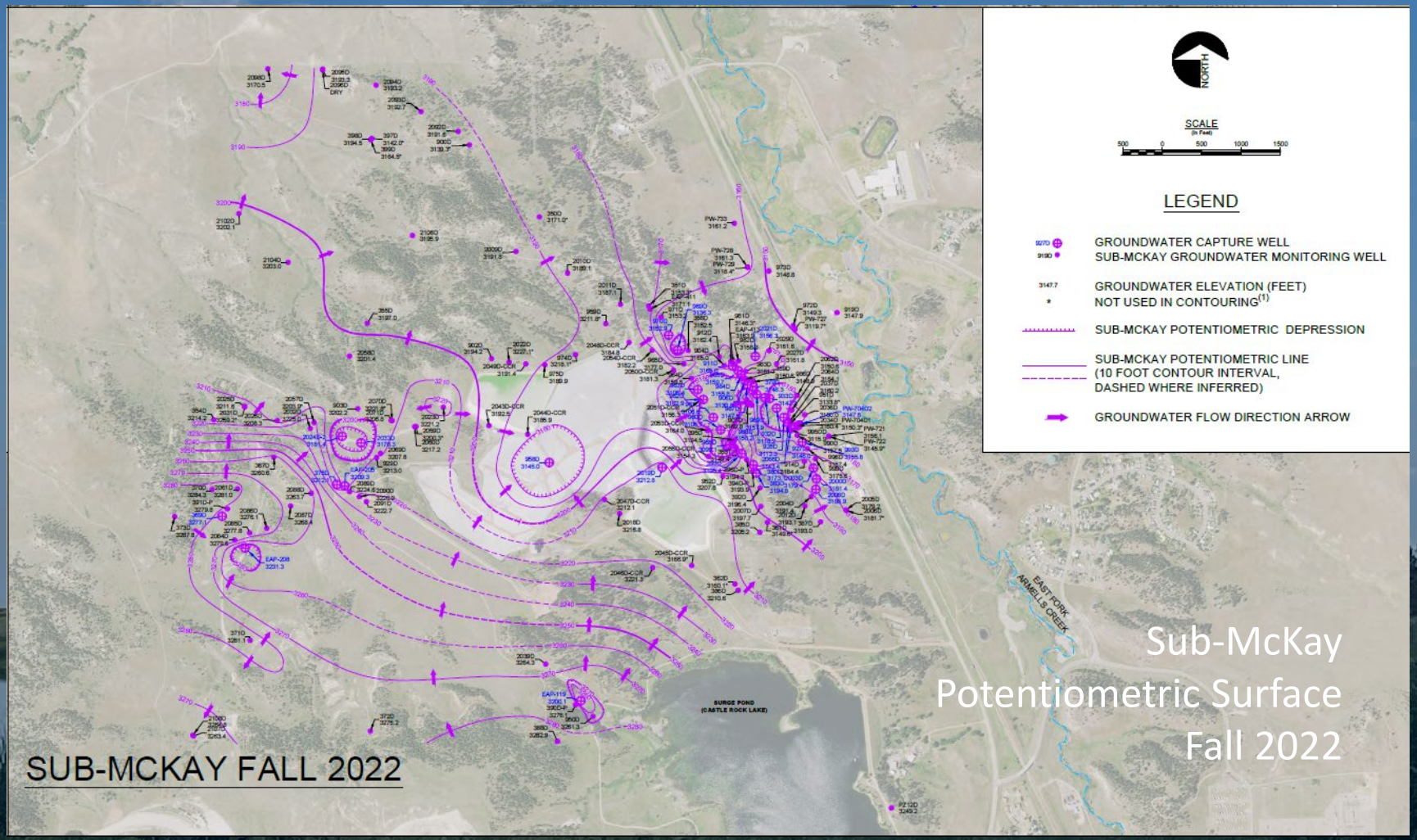
Units 1&2 SOEP/STEP Update

- Groundwater Remedy Started 2nd Quarter 2023 –
  - Small-Scale Capture/Flushing System
    - Annual Review 2024 – Spring 2024

- Remedial Design/Remedial Action (RD/RA) Work Plan
  - Revised RD/RA Work Plan and Landfill Permit Application Materials (Submitted October 18, 2023)
  - In DEQ Review and Comments back on RD/RA WP (Feb 2024)
    - RD/RA Workplan
      - Appendices A-Z
    - Landfill Engineering Report/Design
      - Design Drawings
      - Appendices A-X
- Continued oversight by CPRS under the AOC Process
  - Landfill Design Reviews – CPRS and SW
  - EPA Region 8 CCR Compliance Coordination
    - DEQ coordination and share design documents

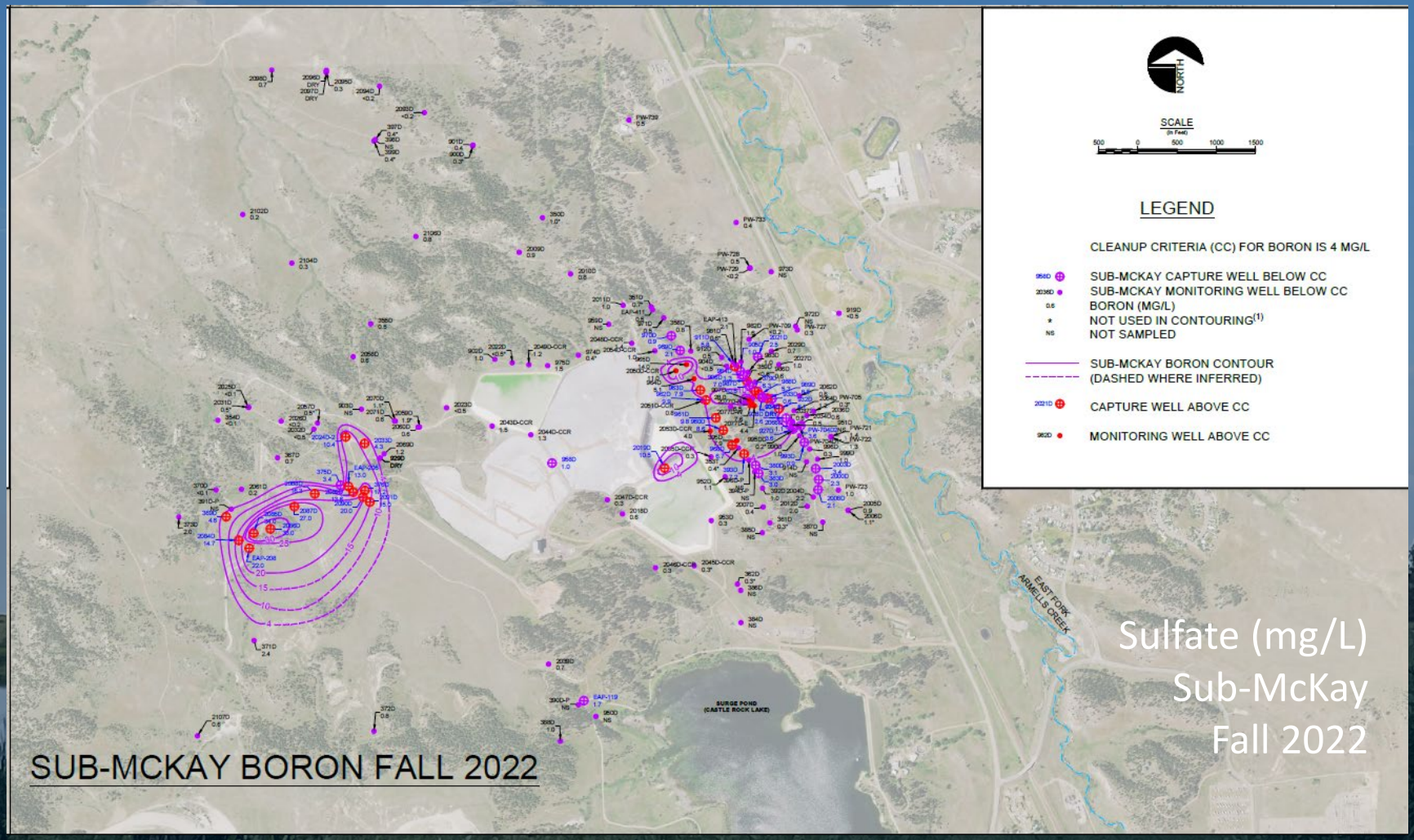
- Alternative 11A – Talen informed DEQ in September 2023 that they are not continuing to evaluate Alternative 11A Request to Amend the Remedy
  - https://deq.mt.gov/News/pressrelease-folder/news-article111

Units 1&2 – Hydrologic and Remedial Progress



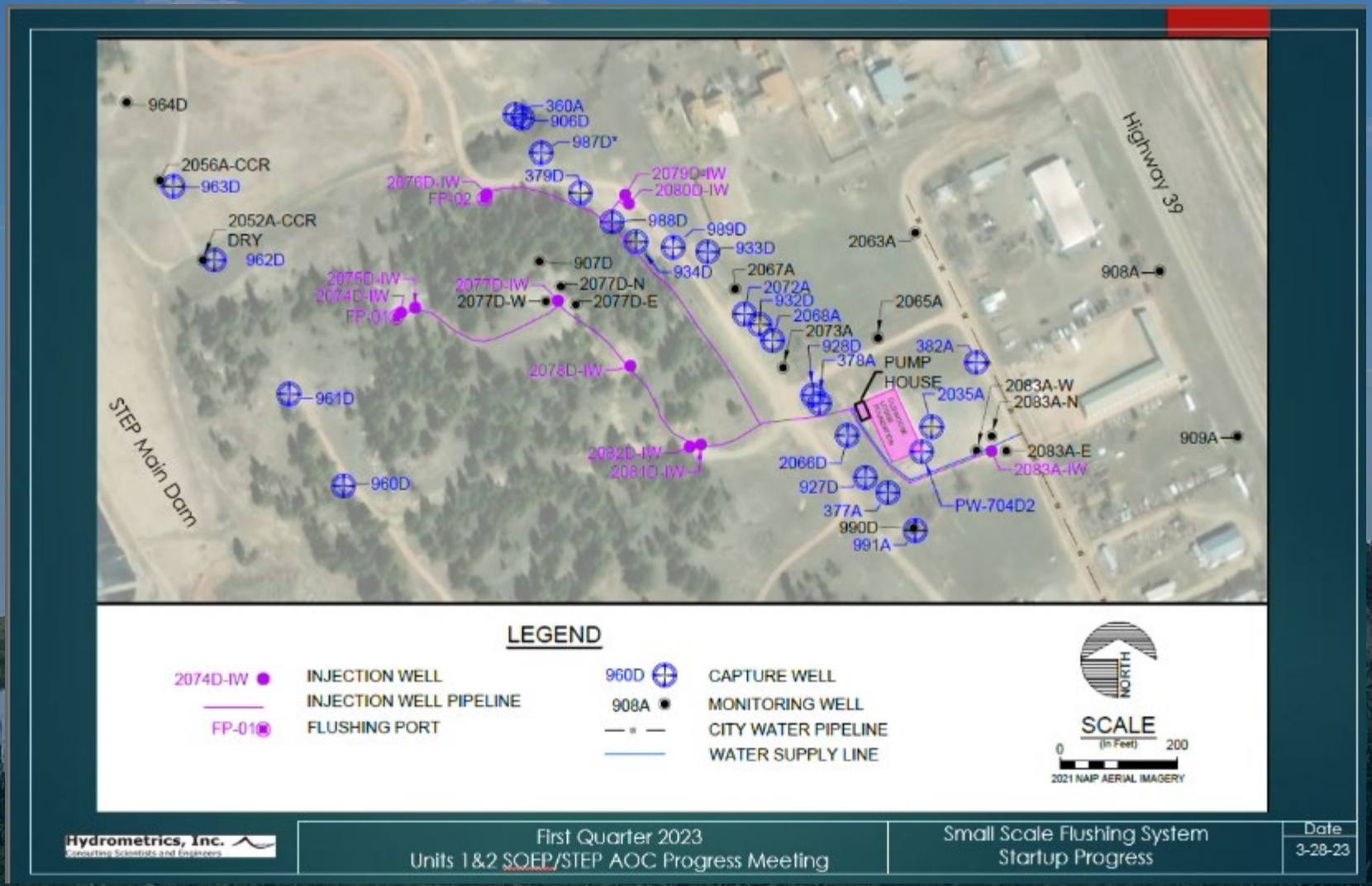
Sub-McKay Potentiometric Surface Fall 2022

Units 1&2 – Hydrologic and Remedial Progress



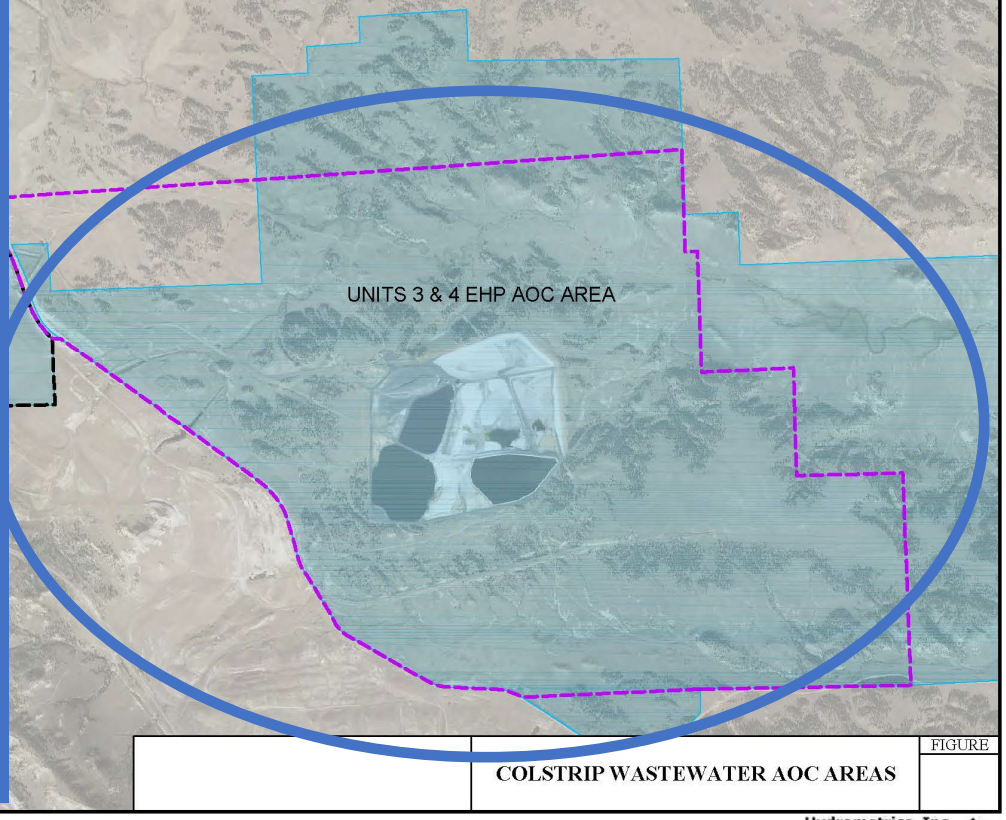
Sulfate (mg/L)
Sub-McKay
Fall 2022

Units 1&2 – Small Scale Flushing/Capture



Units 3&4 Evaporation Holding Pond (EHP) Remedy

- Approved remedy addresses groundwater contamination from coal ash process/disposal ponds and cells
  - Cell Closures (in place) & Ash dewatering
  - Freshwater flushing and groundwater capture system
  - Additional Measures:
    - Monitored Natural Attenuation (MNA)
    - Permeable Reactive Barriers (PRB)



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Hydrometrics, Inc.
Consulting Scientists and Engineers

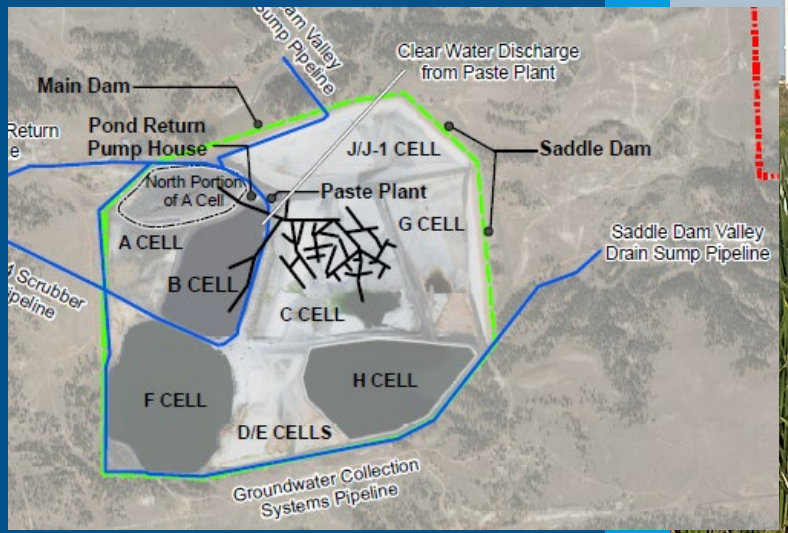
Units 3&4

- Groundwater Remedy Starting –
  - Capture/Flushing System
    - Started July 2023
    - DEQ and Talen – 6-month review in February 2024
    - New Configuration – Dewater ash faster

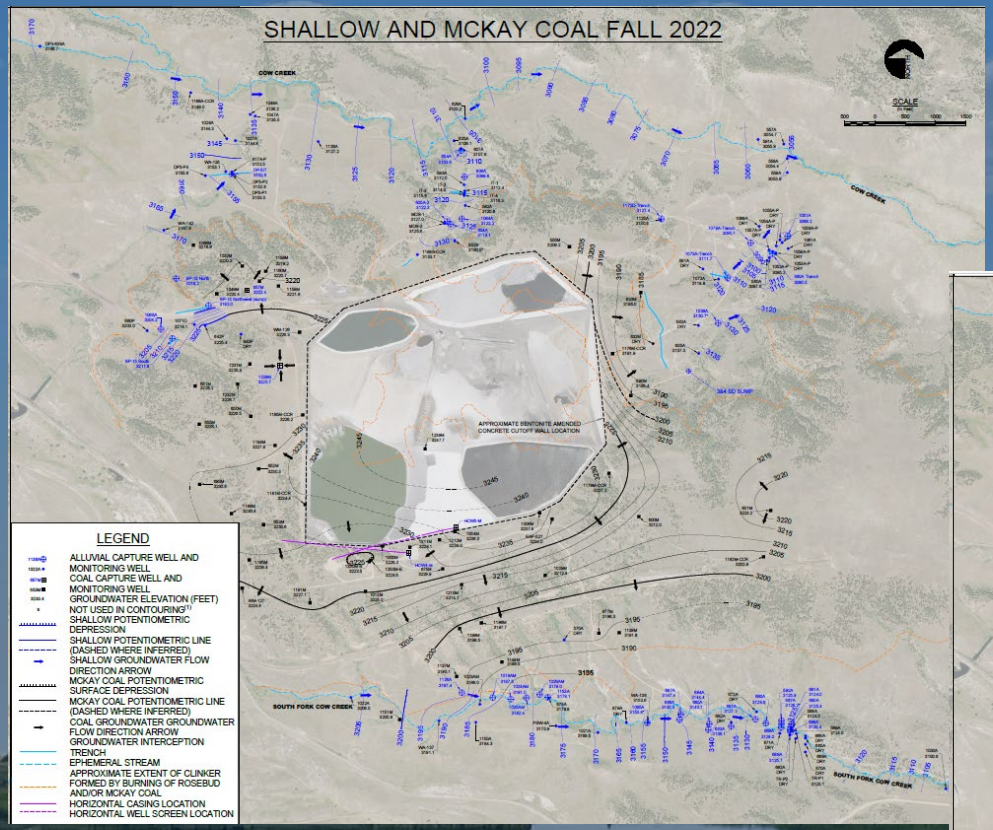
- Remedial Design – RD/RA Work Plan – 2024
  - Submittal by Talen to DEQ
    - Phased submittal
      - Major Model Update – Groundwater Model

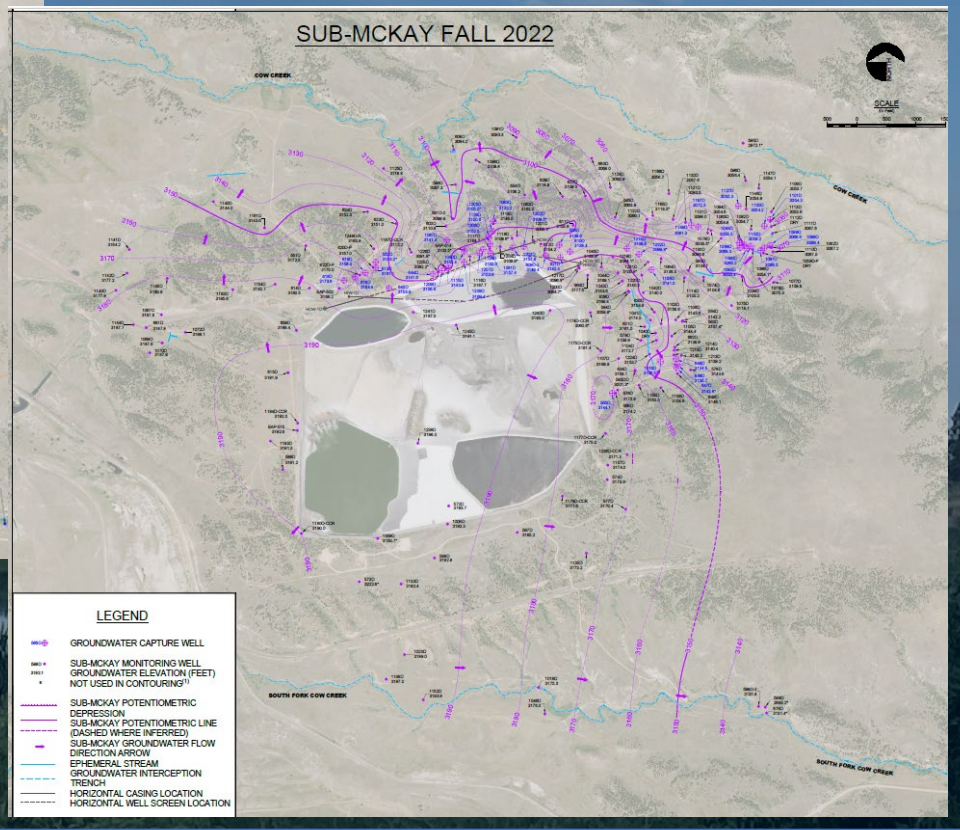
  - MNA and PRB Studies – On-going

- Dry disposal operational –
  - Annual report (January 2024)
    - Meets paint filter test specs
    - Meets requirements for operation



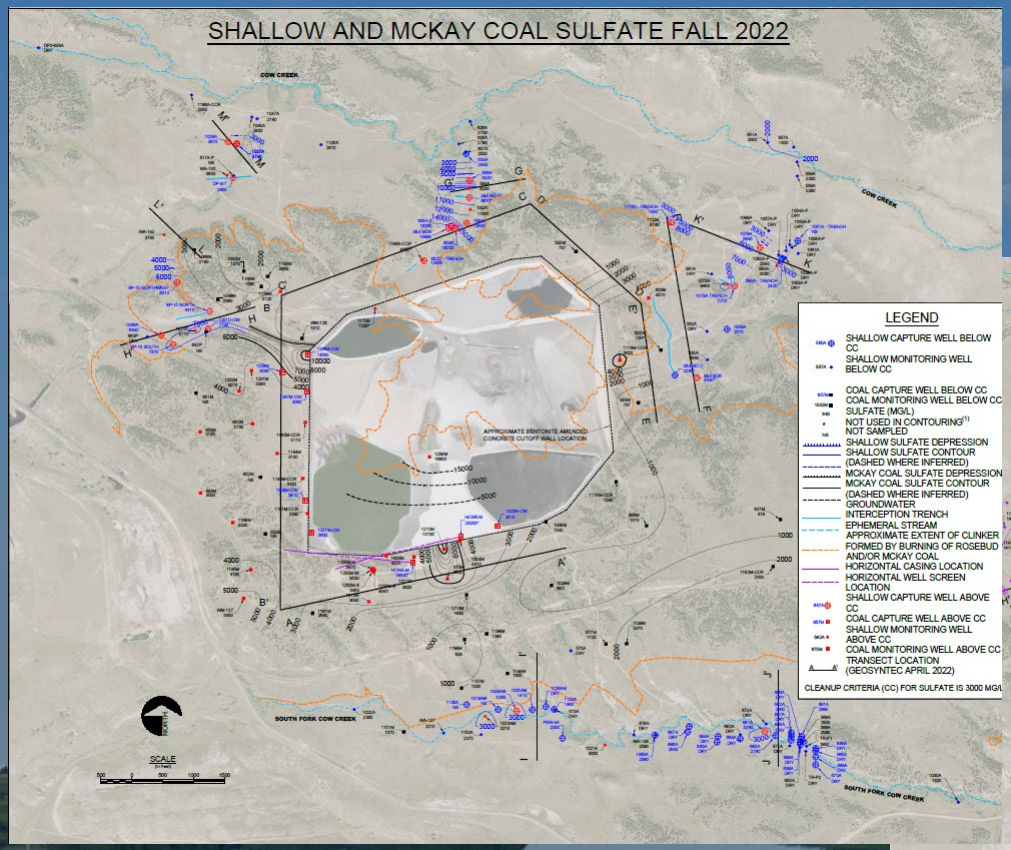
Units 3&4 – Hydrologic and Remedial Progress

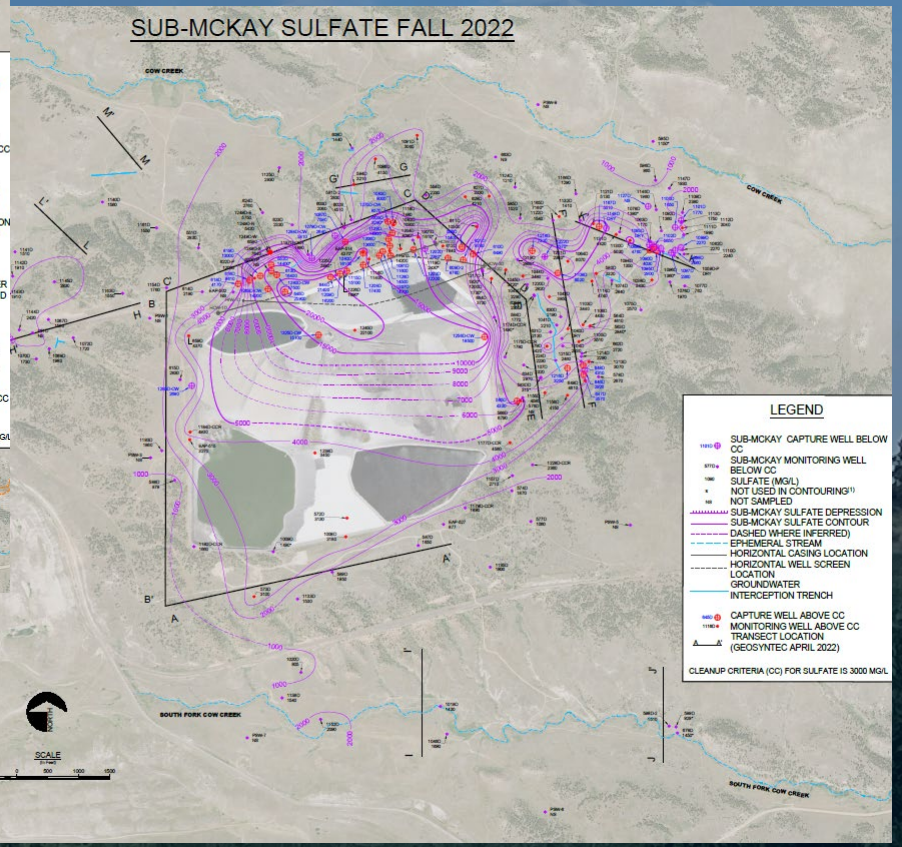




Potentiometric Surfaces
Fall 2022

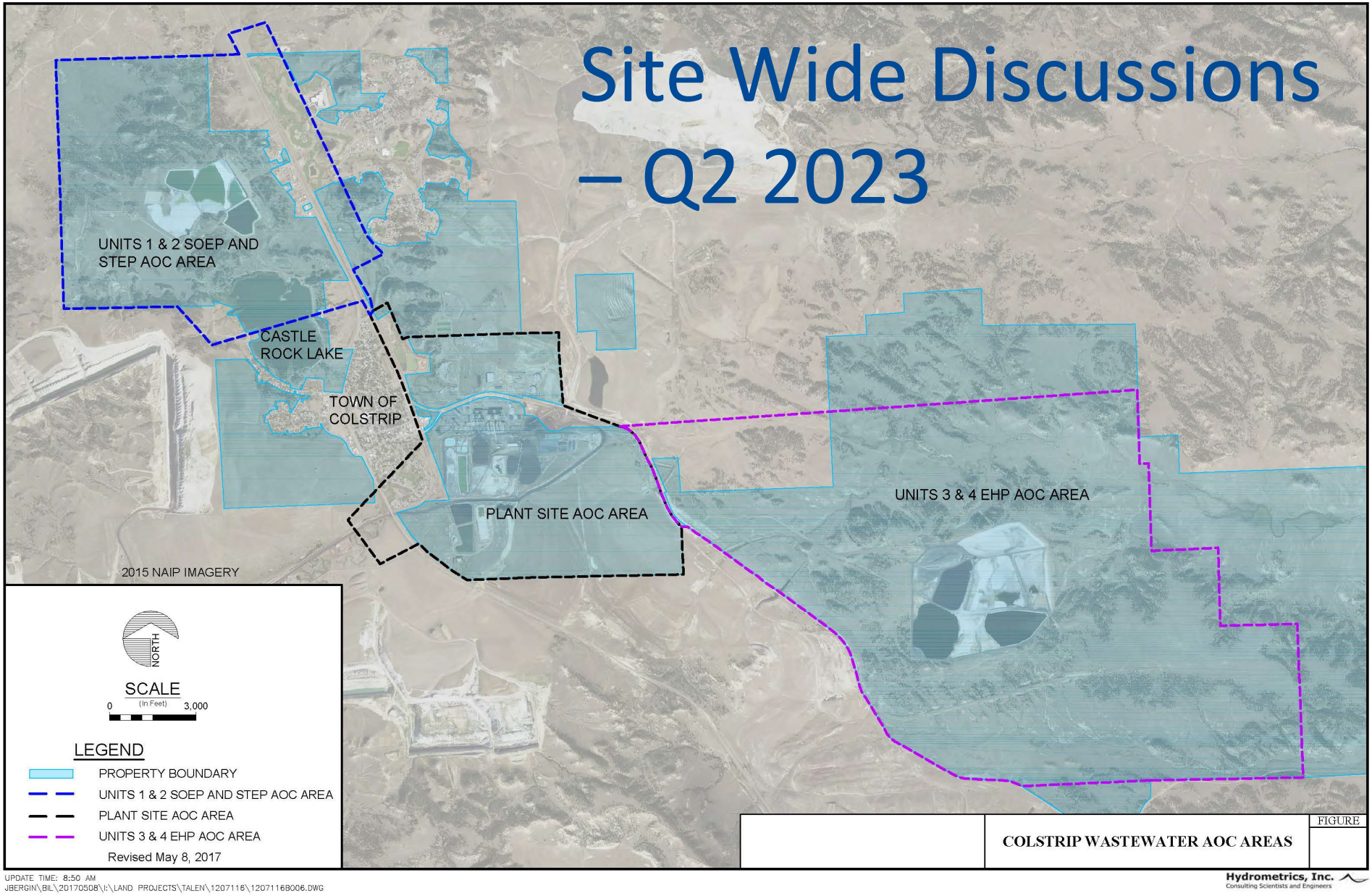
Units 3&4 – Hydrologic and Remedial Progress





Sulfate (mg/L)
Fall 2022

Site Wide Discussions – Q2 2023



AOC Future & Site Wide Activities

- Continued DEQ Review of
  - Plant Site:
    - Potential RD/RA Workplan Addendum on Landfill Design for Remedy Modification
  - Units 1&2:
    - RD/RA Workplan and Landfill Design
  - Units 3&4:
    - Groundwater Model Review
    - RD/RA Workplan Design
- Water Feasibility Study
  - DEQ facilitate continued semi-annual meetings for discussions with Local Government (City/County/State) and Colstrip SES Power Plant Owner Representatives
  - Next Mtg Summer 2024
- Quarterly Stakeholder Mtgs
  - Email sarah.seitz@mt.gov
  - Online slides
- DEQ's Coal Ash Website:
- https://deq.mt.gov/cleanupandrec/Programs/colstrip

CCR Rules – Federal EPA

Talen Montana responsible for self-implementing and reporting for coal combustion residual (CCR) Rule Compliance – website

- *https://www.talenenergy.com/ccr-colstrip/*

- DEQ joined for EPA's CCR Inspection of Colstrip Steam Electric Station CCR
  - July 11 and 12, 2023
  - EPA is reviewing notes and CCR documents
  - EPA will send inspection notes to Talen
- EPA Contact: Doug Knappe – Region 8 EPA - POC
  - *https://www.epa.gov/coalash*
  - No update or inspection report at this time

- DEQ will continue to be part of future discussions
- DEQ and EPA will continue coordination of remedy design, implementation, and progress

CCR Public Notices - Talen

Talen Montana responsible for self-implementing and reporting for coal combustion residual (CCR) Rule Compliance – website

- *https://www.talenenergy.com/ccr-colstrip/*

Talen's Presentation on

- Colstrip Units 1&2 STEP CCR Rule Corrective Measures Assessment Public Meeting
- Colstrip Plant Site CCR Rule Corrective Measures Assessment Alt4B Modification

Connect with us!

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- https://deq.mt.gov/cleanupandrec/Programs/colstrip

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YouTube

References

DEQ Colstrip Coal Ash Pond Cleanup Website:
https://deq.mt.gov/cleanupandrec/Programs/colstrip

MCA Title 75 Chpt 8 – Coal Fired Generating Unit Remediation Act:
https://leg.mt.gov/bills/mca/title_0750/chapter_0080/part_0010/sections_index.html

Talen CCR Rule Website:
https://www.talenenergy.com/ccr-colstrip/

EPA Region 8 CCR: Doug Knappe (Knappe.Doug@epa.gov)