Portland General Electric
121 SW Salmon Street · Portland, Ore. 97204

November 1, 2019

via email
puc.filingcenter@state.or.us

Public Utility Commission of Oregon
201 High Street, Ste. 100
P. O. Box 1088
Salem, OR 97308-1088

Attn: Filing Center

RE: **Docket UE 230 - Annual Boardman Decommissioning Update - 2019**

Enclosed for filing in the above referenced matter please find the following:

Electronic copy of:

- **Discussion and Summary (Attachment A)**
- **2019 Updated Boardman Coal Plant Decommissioning and Demolition Plan (Attachment B)**

While PGE is proposing to maintain the currently authorized costs included in Schedule 145, we are supplementing the record in docket UE 230 (Boardman Tariff Advice Filing) to include an updated decommissioning and demolition plan. This document, prepared in 2019 by AECOM Technical Services, Inc., provides a Level 3 detailed decommissioning cost estimate for three scenarios: 1) decommissioning and partial demolition, 2) decommissioning and complete demolition, and 3) decommissioning and partial demolition followed by complete demolition at a later date. PGE will be evaluating the potential for and value proposition of future use scenarios at Boardman during 2020 and expects to provide an update and share the results of this process during the middle part of 2020.

Please direct any questions regarding this filing to Greg Batzler at (503) 464-8644. Please direct all formal correspondence, questions, or requests to the following e-mail address pge.opuc.filings@pgn.com.

Sincerely,

Jay Tinker

Jay Tinker
Director, Regulatory Affairs

BOARDMAN TARIFF UPDATE

SCHEDULE 145

DISCUSSION

I. Boardman Tariff Advice Filing

Pursuant to Order No. 11-242 in docket UE 230, Portland General Electric Company (PGE) submits this Supplemental Filing that provides new information regarding the Boardman Power Plant Decommissioning Adjustment Tariff (Schedule 145). This filing updates the information in support of docket UE 230 (Boardman Tariff Advice Filing) to include a new decommissioning and demolition plan, supporting the planning and preparation for the decommissioning and demolition of the Boardman Power Plant (Boardman).

The new plan documents provide a revised and more detailed look at decontamination, decommissioning and demolition than PGE's previous decommissioning studies. The new decommissioning study also contemplates a partial decommissioning option that would allow PGE to evaluate whether there is a potential for beneficial reuse for PGE customers of the Boardman assets. Additionally, final decommissioning and demolition costs are, to some extent, still uncertain prior to PGE securing an actual bid package from a qualified contractor and commencing work.

While the current estimate is greater than PGE's previous decommissioning forecast, based on the range of uncertainty with a Class 3 study of -20% to +30%,[1] PGE recommends no change in the current forecasted revenue requirement associated with the decontamination, decommissioning, and demolition of Boardman. In 2021, PGE plans to

[1] As defined by AACE International – The Authority for Total Cost Management (AACE)

conduct decommissioning activities and issue a request for proposal (RFP) and secure a services contract for demolition work. PGE will continue to update Schedule 145 on January 1 of each year, to account for updates to the load forecast and decommissioning costs, among other factors.

II. Background

The Oregon Regional Haze Plan (Haze Plan) and Oregon Utility Mercury Rule (Rule) requirements for Boardman led PGE to evaluate the risks and benefits of making substantial investments in new emissions controls against the risks and benefits of ceasing plant operations. In its Integrated Resource Plan (IRP) submitted November 2009 (LC 48), PGE presented the Public Utility Commission of Oregon (Commission or OPUC) with alternative scenarios ranging from a complete shutdown in July 2011 to installing all pollution control equipment required to fully comply with the Haze Plan and the Rule. During the IRP process, additional alternatives were evaluated, and PGE's final recommendation, acknowledged by the Commission, included the cessation of coal-fired operations by the end of 2020.

The Commission adopted Staff's recommendation to include an increase in depreciation/amortization expense and the decommissioning costs related to the planned Boardman plant closure advancing from 2040 to 2020 in PGE's revenue requirement, subject to the following conditions:

1. Beginning June 15, 2012, PGE will submit an annual informational report to all parties in the UE 230 proceeding that will include the current balance of dollars

collected for decommissioning and any relevant changes to PGE forecasts of future decommissioning costs;

2. PGE shall submit its November 1st Annual Update as a supplemental filing to this docket (UE 230).

III. Prior Studies

In January 2011, PGE contracted with Black & Veatch (B&V) to conduct a decommissioning study for Boardman, with the purpose of estimating future decommissioning costs, including all known potential liabilities. For this study, B&V assumed that (1) decommissioning would begin December 31, 2020 and (2) that the site would be returned to substantially the same conditions as before the plant was constructed.

Because there was approximately ten years remaining until the cessation of coal-fired operations, B&V's study was relatively high-level in nature and focused exclusively on providing a cost estimate for decommissioning the plant and associated facilities. The B&V study did not provide information regarding the potential strategies, methods, or procedures to employ for the successful planning and execution of decommissioning.

In 2015, PGE engaged CH2M Hill Engineers, Inc. (CH2M) to prepare a decommissioning and demolition plan, a closure strategy plan, and a Rough Order-of-Magnitude (ROM) cost estimate for Boardman to support the initial stages of planning and preparation for the potential decommissioning and demolition of the plant. While the initial decommissioning study from B&V focused solely on providing a high-level estimate of plant decommissioning costs, the primary focus of CH2M's plan was to provide PGE with (1) actionable steps for the use of developing final closure planning documents and

(2) a roadmap for closing Boardman and handling associated tasks. In short, CH2M provided both general and specific information that PGE can use for the planning, budgeting, and demolition of Boardman.

IV. AECOM Study

In 2019, PGE tasked AECOM Technical Services, Inc. (AECOM) with updating the Decommissioning and Demolition (D&D) Plan and associated cost estimate to support the planning and preparation for three potential scenarios: 1) the partial demolition of Boardman and lay-up plan for cold, dark, and dry implementation at the site, with a beneficial reuse purpose eventually realized; 2) the partial demolition of Boardman and lay-up plan for cold, dark, and dry implementation at the site, with complete demolition occurring at a later date; or 3) the full demolition of Boardman with no lay-up or potential beneficial reuse. The AECOM study leverages and is a continuation of the planning and preparation work included within the 2015 study, along with a more detailed Level 3 cost estimate.

The prior study and the more recent AECOM study categorizes the Boardman D&D project into three phases: planning, engineering, and execution. The planning phase (Phase 1), which began in 2015 (as outlined in the 2015 study), is projected to continue into 2020. This phase includes initiating the permitting process, updating the D&D Plan including cost estimates (provided here as Attachment B), Site Certificate termination planning, and additional analyses and planning, as outlined in the D&D plan.

The engineering phase (Phase 2) began in 2019 and will continue through 2020. This phase will include an Environmentally Regulated Materials (ERM) survey, the

continuation of permitting, an updated closure strategy, and additional D&D planning. Focus will be on clearly defining work scopes in order to facilitate competitive bid packages and specifications with contractual and project risk mitigation requirements, including prohibiting certain high-risk approaches. In addition, an economic evaluation will be conducted to estimate cost and risk associated with recovery, re-use, and recycling of materials.

Finally, the execution phase (Phase 3) will occur once coal-fired operations are ceased and will include coal yard reclamation, mining or closing of the ash disposal facility, Carty separation activities, and either 1) demolition and ERM abatement of the coal-related assets, decommissioning of the remaining Boardman assets to cold, dark, dry, and safe status, or 2) full decommissioning and demolition of the plant. Additional activities include: pre-demo and post-demo decontamination, possible site restoration, project monitoring, construction administration, and construction management.

A full copy of AECOM's plan, including detailed cost estimates and schedule is included as Attachment B to this filing.

V. Future Use Strategy

PGE is aiming to decide by the end of 2020 whether to commence with a full or partial demolition of the facility, prior to beginning the decommissioning process. PGE is currently exploring if there is value associated with potential beneficial reuse of the plant and equipment, once coal-fired operations have ceased at Boardman. PGE would like to explore, and begin conversations with potential research partners, if the remaining plant infrastructure could operate as a "test-bed" facility to evaluate potential dispatchable, non-

greenhouse gas (GHG) emitting energy or capacity technologies and/or grid services. If the decision is made to lay-up Boardman, in order to evaluate research, development and deployment (RD&D) of non-emitting technologies, we believe that a maximum of five years is an appropriate length of time to assess these alternatives. PGE is also looking at investigatory timeframes of approximately two years in length, where research could be conducted prior to the point at which demolition activities would naturally occur assuming no layup of facilities. Utilizing this type of strategy may give PGE the most amount of flexibility, without an incremental increase in costs. Any reuse of Boardman assets for power or grid-related functions would require compliance with all applicable state and federal regulations and permitting requirements. If no alternatives can be shown to be beneficial for customers and consistent with PGE's clean energy and GHG reduction commitments, then the remaining portions of the Boardman facility would be demolished, except for several support buildings and strategic infrastructure that can be used to support business continuity and emergency functions (i.e., large water and fuel tanks to support equipment and personnel in the event of a regional disaster).

Prior to the final determination of demolition strategy and approach, PGE is reaching out to potential research partners to gauge interest and value in proceeding with a lay-up of the plant. This outreach will likely be followed by developing and releasing a request for information (RFI) in the first quarter of 2020. The RFI responses will then be collected and reviewed through the middle part of 2020. Depending on the quality and assessed viability of the responses, PGE with either move forward with a more detailed request for proposal (RFP) or it may update and re-release a second (and final) RFI at a

later date. If no interest emerges at any point in this process, PGE will proceed with full decommissioning.

VI. Recommendation

PGE does not request any change at this time to the current revenue requirement estimate for Boardman decommissioning costs. Adjusting Schedule 145 costs based on the results of AECOM's plans would be premature as the cost estimate is still subject to a range of variability that is within the amounts currently projected to be collected by the end of 2020. PGE plans to revisit the amount of Schedule 145 collections against expected D&D project costs prior to November 1, 2020. Additionally, PGE will plan to update the OPUC in 2020 on its activities with potential RD&D partners and to share the results of and seek feedback on its RFI process. PGE will also update the OPUC prior to proceeding with a partial decommissioning strategy or pursuing any RFP, if any viable responses are received during the RFI phase.

Updated Boardman Coal Plant Decommissioning and Demolition Plan

Prepared for:
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October 16, 2019

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Acronyms and Abbreviations

ACM	Asbestos-Containing Material
AECOM	AECOM Technical Services, Inc.
AHERA	Asbestos Hazard Emergency Response Act
AMP	Air Monitoring Plan
BCP	Boardman Coal Plant
BG	Below Grade
CABR	Calcium Bromide Injection
CCR	Coal Combustion Residuals
C&D	Construction and Demolition
CFR	Code of Federal Regulations
CGS	Carty Generating Station
CHI	Calcium Halide Injection
D&D	Decommissioning and Demolition
DEQ	Oregon Department of Environmental Quality
DOT	Department of Transportation
DSI	Dry Sorbent Injection
EFSC	Energy Facility Siting Council
EPA	U.S. Environmental Protection Agency
EPP	Environmental Protection Plan
ERM	Environmentally Regulated Materials
IR	Investment Recovery
LCP	Lead-Containing Paint
MSCCAA	Multi-Species Candidate Conservation Agreement with Assurances
NF	Non-Friable
NMP	Noise Monitoring Plan
NPE	Negative Pressure Enclosure
NTEC	Nuclear and Thermal Energy Council
OAR	Oregon Administrative Rule
ODOE	Oregon Department of Energy
OHA	Oregon Health Authority
OSFA	Oregon Office of the State Fire Marshal
OSHA	Oregon Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyls
PGE	Portland General Electric
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
QC	Quality Control Plan
RACM	Regulated Asbestos-Containing Material
RCRA	Resource Conservation and Recovery Act
RFP	Request for Proposal
RMA	Return Material Authorization
RML	Radioactive Materials License
RMP	Recycling Management Plan
SPCC	Spill Prevention, Control, and Countermeasure
SWPPP	Stormwater Pollution Prevention Plan
TCP	Traffic Control Plan
TRI	Toxics Release Inventory
TSCA	Toxic Substances Control Act
TSI	Thermal System Insulation
WPCF	Water Pollution Control Facility Permit
XRF	X-Ray Fluorescence Device

1. Introduction

Portland General Electric (PGE) has tasked AECOM Technical Services, Inc. (AECOM) with updating the Decommissioning and Demolition (D&D) Plan and associated cost estimate to support the planning and preparation for the partial demolition of the Boardman Coal Plant (BCP or the Site) and 5-year lay-up plan for cold, dark, and dry implementation at the Site. The BCP is a 617-megawatt coal-fired facility located adjacent to Carty Reservoir on Six Mile Canyon, approximately 13 miles south-southwest of Boardman, Oregon. The plant was constructed in the late 1970s and operation commenced on August 3, 1980. The plant is scheduled to stop burning coal on December 31, 2020. The demolition and closure are referred to herein as the "project".

1.1 Background

The BCP site is located between Six Mile Canyon and Poverty Ridge adjacent to the north side of the Carty Reservoir. The plant site encompasses approximately 200 acres south of the Columbia River. The site topography is relatively flat and marked by flat ridges with gentle slopes descending into the shallow canyon. The terrain features sparse vegetation with sagebrush, thistle, juniper, and sand and wind-eroded soil (Bechtel, 1982).

1.2 Objectives

The initial objective of BCP Decommissioning is to remove all equipment and areas associated with coal, dry sorbent injection (DSI), activated carbon and halide injection, and ash handling and storage; to abate environmentally regulated materials (ERM) where practical; remediate any residual contamination from plant operations; and close out the coal yard and ash disposal area.

The balance of the plant will be put in an inactive state, allowing the opportunity to restart key equipment for reasons described below, while keeping the facility protective of employees, the public, and the environment.

Although there is no scenario under which PGE would seek to reactivate Boardman as a conventional fossil-fuel-powered generating facility or transfer it to another party for that purpose, PGE believes there may be potential for beneficial reuse of the non-coal-related Boardman assets for PGE customers. This may include using alternative fuels for renewable or non-carbon producing power generation; service as a research and development testing center for the power industry; or development of other concepts to assist with power and grid reliability and resiliency or ensuring resource adequacy. PGE believes that a 5-year timeframe is appropriate to assess these alternatives. Any reuse of Boardman assets for power or grid-related functions would require compliance with all applicable state and federal regulations and permitting requirements. If no alternatives can be proven beneficial for customers and consistent with clean energy strategy and commitments, then the remaining portions of the Boardman facility will be demolished, except for several support buildings and infrastructure.

1.3 Work Overview

The project will occur in three phases: planning, engineering, and execution. The planning phase (Phase 1) began in 2015 (by others) and AECOM began work in January of 2019 and will continue into 2020. The planning phase will include initiating the permitting process, an updated D&D Plan, a revised cost estimate for partial demolition and 5-year lay-up plan, Site Certificate termination planning with PGE and the Oregon Department of Energy (ODOE), Carty-Boardman utility separation memorandums, potentially an ash disposal area cap analysis, a scenario evaluation memorandum addressing possible end uses of BCP, assessing salvage and investment recovery (IR) options, high-level O&M planning, and procurement of Phase 2 services.

The engineering phase (Phase 2) will occur in 2019 through 2020 and will include an ERM survey, continuation of permitting, updated closure strategy, D&D planning, further development of the lay-up plan for non-coal-related assets, development of detailed demolition, remediation, and abatement plans, drawings, and risk based specifications, asset inventory transfer or valuation, site and structure specific risk assessment, contractual and schedule risk register, utility isolation of the Carty Generating Station (CGS), and procurement of Phase 3 services including demolition and abatement contractor bids. A specialized vetting process will be utilized to short-list best-in-class contractors with the ability to execute the project in a safe and timely manner. Focus will be placed on clearly-defined work scopes in order to facilitate competitive bid packages and specifications with contractual and project risk mitigation requirements, including prohibiting certain high-risk approaches. In addition, an economic evaluation will be conducted to estimate cost and risk associated with recovery, reuse, and recycling.

The execution phase (Phase 3) will occur in 2020 thru 2022 and will include coal yard reclamation, mining or closing of the ash disposal facility, Carty separation activities, demolition and ERM abatement of the coal-related BCP assets, decommissioning of the remaining BCP assets to cold, dark, dry, and safe status (lay-up), pre-demo and post-demo decontamination, possible site restoration, project monitoring, construction administration, and construction management. The execution phase encompasses pre-demolition and demolition activities. Pre-demolition activities will consist of completing the isolation of the CGS, placing the BCP into cold, dark, dry, and safe status, performing decontamination and ERM abatement, and completing asset/IR. Demolition activities will consist of demolition and ERM abatement of all structures not designated to be laid-up to -2 feet below grade (BG) while leaving all foundations, roads, parking areas, rail lines, and transmission lines in place.

Waste and recycle types include asbestos-containing material (ACM), lead-containing paint (LCP), universal waste, hazardous and non-hazardous waste, and construction and demolition (C&D) waste. Waste minimization techniques have been planned to maximize the amount of material that can be recycled and/or reused. For instance, concrete and existing soil maybe used for backfill material to reduce the volume of material requiring offsite disposal, minimizing the quantity of materials imported for backfill. Materials that will be recycled include ferrous and nonferrous metal, electronic and process equipment, spare parts inventory, and high-value alloys, all of which will be decisively tracked to assure maximum benefit to PGE. Demolition of the selected structures involves a significant amount of ACM removal and lead controls during demolition. The lay-up portion of the project is targeted to decommission only those systems that do not impact the continued life and safety systems and would also allow for the restart of non-coal-related portions of the remaining BCP for potential reuse.

The work will be performed in a sequenced manner, taking into consideration safety, quality, efficiency, and effectiveness. The entire demolition process must be organized and coordinated precisely to assure these considerations are met. The first step in the sequence is to obtain all permits necessary to perform the demolition. Subsequently, tanks and vessels will be decommissioned, and the plant will be shut down with all systems purged by PGE. The exact sequence of work will be finalized during the permitting and preparation of the bid documents, technical specifications, and supporting documents. Some activities will be completed in parallel or intermittently.

1.4 Critical Success Factors

The following factors were identified as critical to the success of the project:

1.4.1 Safety

- Prevent fatalities, lost-time accidents, injuries, vehicle accidents, or damage to protected equipment, with the anticipated goal of zero recordable injuries.
- Safely decommission and demolish all designated structures utilizing the AECOM D4 Management (decommissioning, deactivation, decontamination, and demolition) approach.
- Leave the site in a safe and secure condition.

1.4.2 Environmental

- Incur no notices of violation as a result of project-related activities.
- Avoid waste material onsite or spills (e.g., roadways, river).
- Handle regulated materials and waste within regulatory guidelines.
- Secure all permits on time to support associated work.
- Comply with and successfully transition all operating permits.
- Return the site to a condition that meets applicable environmental regulations.
- Provide a written plan to maintain the remaining ERM in conditions allowing for safe access to the buildings.

1.4.3 Work Quality

- Complete the various project tasks to meet stakeholder (plant, non-PGE organizations, Public Utility Commission, etc.) expectations.
- Engage in strategic coordination and avoid interruption of CGS operations.
- Avoid negative media coverage.
- Provide complete and timely communications with stakeholders.

1.4.4 Schedule

- Maintain an agreeable project schedule among stakeholders.

1.4.5 Financial

- Understand the relationship between scope elements and project cost plan.
- Maintain actual cost versus planned costs.
- Leave the site in a manner that reduces operations and maintenance requirements to the extent practicable.
- Anticipate any cost deviations and provide explanations and recommendations to minimize impact.

Changes necessary to successfully complete the scope of work should be reported to PGE. If project team members foresee that changes to the implementation plan will impact the budget, schedule, or other project constraints, the effect should be determined. Immediate communication with PGE for discussion and follow-up action is required.

1.5 Risk Management

Risk management during the project will include:

- Demolition risk identification and assessment, prior to specification development.
- Development of performance-based specifications with few, if any, scope gaps that could result in change orders.
- Specialized vetting process to select contractors with proven safety and performance records.
- Preparation of documents to support the highest asset recovery financial return with a systematic and comprehensive approach that focuses on safety, compliance and cost-effective solutions.
- Specifications with an, environmental health, and safety focus that incorporates proven mitigation guardrails.
- Contractors developing their own means and methods from performance-based specifications that utilize a proven and tested safe approach to higher-risk demolition activities.
- Full-time personnel to monitor contractor's activities during abatement, remediation and demolition.

1.6 Key Assumptions and Considerations

This D&D Plan has been prepared based on key assumptions and considerations generated to accommodate the anticipated end-use once demolition is complete. Table 1.1 provides the key assumptions and considerations.

Table 1.2. Key Assumptions and Considerations

General	Demolished concrete will be crushed and reused on-site as fill, as practical.
	Settling ponds will be cleaned out and material placed in ash disposal area by PGE before demolition.
	Fly ash storage dome and silos will be emptied.
	Concrete debris in evaporation pond soil stockpile will be crushed and used as backfill.
	Onsite soil from borrow sources will be used, as practical.
	Tanks and systems will be drained except for some residual.
	Two lined sewage lagoons will remain for use by Carty Plant until Carty constructs its own septic system or modifies the current lagoons.
	Rail line will be left in place.
	Microwave on power block structure will be reused.
	Parking lots and paved areas will be left in place.
Demolition	Most structures will be demolished down to -2 feet below existing grade. Ash Silos will be demolished to top of the slab on grade.
	Any underground tanks and associated piping not being retained for future use will be decommissioned per Oregon Department of Environmental Quality (DEQ) requirements.
	Only buildings identified will be demolished. Remaining buildings will be maintained in a manner allowing safe access with escorts (cold, dark, dry, and safe).

	Asbestos abatement of interior materials will be performed prior to demolition. Exterior “galbestos” siding will be removed in close conjunction with demolition but will not be felled or dropped.
	Discharge structure will be left in place
	Intake structure will be protected and remain in place.
	Small wash water pond for decontaminated water will be demolished and backfilled.
	Concrete settling basin for clarifier in coal yard will be removed to -2 feet below surrounding grade and backfilled.
	Site will be graded post-demolition so that water does not pond and the site will be left in a stable condition.

1.7 Sustainability

During the planning, design, and execution of the project, sustainability best practices will be implemented. These include efforts to minimize air emissions, reduce waste, recycle materials, protect sensitive areas, control pollution and utilize local resources. Sustainability requirements and metrics will be incorporated into scopes of work for design and execution. These efforts may include, but are not limited to:

Minimizing air emissions, including greenhouse gases:

- Use cleaner fuel types for on and off-road equipment, including using electric-powered vehicles and equipment when available
- Give preference to or require diesel equipment meeting DEQ’s clean diesel standards (i.e. new or retrofitted vehicles)
- Restrict vehicle idling
- Reduce transportation miles by
    - Disposing of material, such as crushed concrete, onsite as clean fill
    - Using local sources of import materials such as soil and gravel
    - Selling and donating assets and recycling and disposing of wastes locally
    - Hiring local contractors to reduce mobilization and demobilization distances
    - Conducting video and phone meetings to avoid travel
    - Providing alternative personnel transportation such as shuttles

Reducing waste and recycling materials

- Reuse, sell or donate assets which retain value
- Recycle metals and other recyclable materials; use landfill disposal as a last choice for waste management
- Dispose of clean fill on site (also a strategy to minimize emissions, see above)
- Use recycled, reusable and recyclable materials for any temporary structures

Protecting sensitive areas and controlling pollution

- Implement dust, erosion and sediment control best practices (e.g., minimize disturbance areas, wheel washing, dust monitoring and control, erosion and sediment control at site perimeters)
- Use non-toxic or less toxic chemicals
- Monitor and limit noise and light pollution

Considering impacts to employees and the community

- Leverage skills of Boardman employees to complete cold and dark and lay-up activities, and ongoing maintenance of laid-up assets
- Hire local contractors when possible to direct investment back into the local community (also a strategy to minimize emissions, see above)

To ensure that sustainability measures are successfully implemented, PGE will request and consider information on sustainability during procurement, including contractors’ experience with sustainability best practices and tracking on previous projects. The selected contractor will also be required to prepare a written Waste Management Plan

providing details on how sustainable construction/demolition activities will be implemented. Reused, recycled and disposed materials will be tracked throughout site activities to measure success.

1.8 Extent of D&D Activities and Facilities to Remain

The BCP property is currently fully operational and is operated and maintained by PGE and on-site contractors. The CGS property is adjacent to BCP and will remain fully operational after BCP decommissioning. Some systems and portions of the BCP property are currently being utilized by CGS and must be protected and maintained as detailed in the AECOM system isolation memos.

1.8.1 Facilities Scheduled for Demolition

Figures 1.1 through 1.5 show the following facilities for demolition:

- Coal yard support structures
  - Dumper building and supporting infrastructure
  - Thaw shed (rail car positioner)
  - Coal yard clarifier building and settling basin
  - Crusher building
  - Coal yard control building
  - Coal yard lunch room and shower facility
  - Coal yard stacker/reclaimers
  - Coal yard conveyor system (including transfer points)
- Ash handling systems
  - Ash silo
  - Settling tank
  - Ash dome
  - Surge tank
  - Dewatering bins
  - Fly ash and blower house
- Coal operation support systems
  - Activated carbon system
  - DSI system
  - Halide injection system
- Support buildings
  - Vehicle Maintenance Building and misc. sheds
  - Warehouses 6 and 7
  - Coal yard shop
  - Railcar maintenance building
  - Ash contractor building

1.8.2 Facilities to Remain

- Power block
- Support structures (except as identified in 1.7.1)
- Warehouses 1, 2, 3, 4, and 5
- Precipitator building
- Intake structure and pump house
- Admin building and maintenance warehouse
- Underground utilities
- Fuel island
- 300K-Gal water tank and pump house
- Backup transformer, aux transformer, and substation 7.2-kilovolt feed
- Boeing well; domestic water well
- Monitoring wells
- Communication line
- Construction buss power

- Sewage lagoons
- Firehouse
- Helicopter pad
- Tower road
- Back entrance
- Reservoir and dams
- Carty circulation water piping

2. General Description and Sequencing of Work

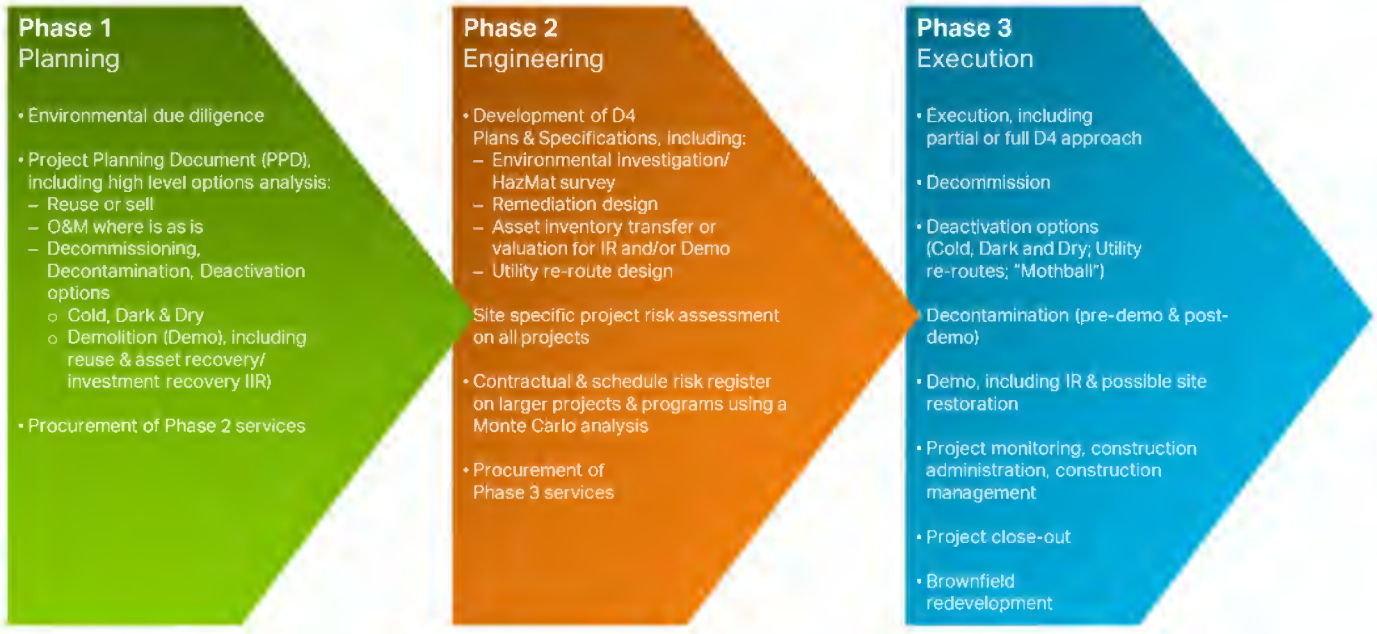
2.1 General

Generally, the project will continue following the Phase 1, 2, and 3 approach, defined by the Project Management Institute (PMI), as detailed in **Figure 2-1**.

- Phase 1 - A framework to provide the Design Team with the most accurate and reasonable planning documents needed to make the best D&D decisions
- Phase 2 - Design and engineering for the development of the Request for Proposal (RFP) scope
- Phase 3 - D&D execution

Phase 1 provides PGE clear options and the basis for detailed Design and Engineer bid documents for Phase 2. Contractors use these Phase 2 documents to provide competitive pricing to safely complete the projects in an environmentally compliant manner in Phase 3.

Figure 2-1. AECOM D4 Power Plant D&D Approach to the PMI Phase 1, 2, and 3 Sequencing



2.2 Site Permits and Their Disposition

2.2.1 Site Certificate

The BCP is operated under a Site Certificate issued by the Nuclear and Thermal Energy Council (NTEC), created in 1971 and subsequently replaced in 1975 by the Energy Facility Siting Council (EFSC). Section IV.A.1 of the Site Certificate establishes the date the Site Certificate was executed as the operative date for determining applicable law. The Site Certificate was “executed” on March 24, 1975; therefore, PGE and the State are bound by the laws and administrative rules in effect on that date. The statutory provisions governing the NTEC on March 24, 1975 were set

forth in ORS 453.305 to 453.595 (1973). The statute authorized the NTEC to "adopt safety standards promulgated as rules for the operation of all thermal power plants and nuclear installations"; however, standards related to closure or retirement were not among those listed (See ORS 453.505(1) (1973)). Because the current site certificate termination and facility retirement rules provided in Oregon Administrative Rule (OAR) 345-027-0110 were not in place when the site certificate was issued, PGE is not obligated to adhere to those rules in the closure and decommissioning of BCP and termination of that site certificate. As follows, the only applicable rule is provided in 345-26-095, requiring PGE to provide the Council with an annual financial report demonstrating financial and physical plans for retirement of the plant, or any changes in the status of these contracts and retirement plans.

Per this determination, PGE will provide ODOE with the final D&D Plan, including the financial and physical plans for retirement of the facility (OAR 345-26-095). There is no "action" by ODOE or the Council.

2.2.2 Applicable Permits

The overall goal for permits pertaining to operation of BCP is to phase out those that are considered unnecessary, with measures/triggers dependent on milestones within the decommissioning process.

2.2.2.1 Water Pollution Control Facility Permit

Waste streams associated with the BCP, including sewage, ash, wastewater, and stormwater are managed per a Water Pollution Control Facility Permit (WPCF) issued by DEQ and governed by EFSC. This permit (File #70795) covers both BCP and CGS. The WPCF permit and associate plans (i.e., Operations, Monitoring & Maintenance Plan and Groundwater Monitoring Plan) will be modified to account for anticipated changes in waste streams that occur as a result of closure and decommissioning. Conditions associated with the ash landfill will be moved into a separate WPCF permit, so that the ash landfill does not become part of the environmental obligations associated with CGS.

2.2.2.2 Title V Air Quality Permit

Boardman air emissions are permitted through DEQ's Title V program. Like the WPCF, the Title V permit is a shared permit for BCP and CGS (25-0016-TV-01). Following decommissioning of the BCP, conditions specific to Boardman will be removed. PGE will alert DEQ to the decommissioning of BCP via the renewal application, due August 2020.

2.2.2.3 Acid Rain Program

PGE will notify the U.S. Environmental Protection Agency's (EPA) Clean Air Markets Division after ceasing operation of BCP. PGE will submit a Retired Unit Exemption form to EPA in the first quarter of 2021.

2.2.2.4 Radioactive Materials

Boardman's coal monitoring equipment includes a total of 56 fixed gauge radioactive sources, which are permitted under an Oregon Radioactive Materials License (ORE-90735). To prevent exposure, the covered equipment must be removed before most other decommissioning activities begin. The contractor selected to remove, package and ship or transfer the sources will be permitted by the State of Oregon. Once all radioactive sources are removed and the ownership transferred, the Radioactive Materials License (RML) will be terminated. There is no published guidance available on termination of an RML; in early 2020, PGE will work with the Oregon Health Authority (OHA) to identify the process for terminating the license and any other associated requirements.

In addition to the fixed gauge radioactive sources licensed under the RML, Boardman has a hand-held x-ray fluorescence device (XRF), which is registered with the OHA under a portable gauge license. At the end of operations, the XRF license must either be transferred to another facility, or the device returned to the manufacturer and the license terminated.

2.2.2.5 Underground Storage Tanks

Boardman currently operates two fiberglass USTs for diesel and gasoline fuel, permitted by DEQ (25-833). Currently, use of the USTs is planned to continue after ceasing coal operations to support any emergency responses.

2.2.2.6 Domestic Water System

Boardman and Carty share a domestic water system registration with the Oregon Department of Water Services (State ID # 90513). Use of the domestic water system by both Carty and remaining Boardman staff will continue after decommissioning.

2.2.3 Compliance Programs

In addition to the permit-related programs listed above, there are several compliance programs with requirements for management through decommissioning. These programs include the Multi-Species Candidate Conservation Agreement with Assurances (MSCCAA), the Coal Combustion Residuals (CCR) Rule, the Spill Prevention, Control,

and Countermeasure (SPCC) Rule under the Oil Pollution Prevention Program, the Toxics Release Inventory (TRI) Program mandated by the Emergency Planning and Community Right-to-Know Act, the Hazardous Substation Information Program under the Oregon Community Right-to-Know and Protection Act, and hazardous and toxic waste management compliance under the Resource Conservation and Recovery Act (RCRA) and the Toxic Substances Control Act (TSCA).

2.2.3.1 Multi-Species Candidate Conservation Agreement with Assurances

The MSCCAA is a voluntary agreement signed in 2004, and valid through 2029. Under the agreement, PGE dedicated 880 acres of habitat as a Conservation Area and committed to various conservation and monitoring measures. PGE will modify the agreement with its partners. PGE is currently coordinating with the U.S. Fish and Wildlife Service on a path forward for the MSCCAA following Boardman closure.

2.2.3.2 Coal Combustion Residuals

The Boardman ash disposal area is regulated by the EPA's CCR Rule, a self-implementing program under RCRA. Operations, maintenance, monitoring, and closure of the disposal area must all be conducted in compliance with the Rule. In accordance with the CCR Rule, PGE has a Closure Plan and a Post-Closure Plan prepared and publicly available. Disposal area closure will be completed in accordance with the Closure Plan, beginning in 2019 with an evaluation of final cover system approaches and determination of potential beneficial reuse. The Closure and Post-closure plans will be updated as necessary following the cover system evaluation. Under the CCR Rule, closure of the ash disposal area must start within 30 days after the disposal area receives the known final receipt of material, or removal for beneficial reuse of waste, or 2 years after not receiving or removing any waste (with extensions possible). Once started, closure must be complete within 6 months (again, with extensions possible).

2.2.3.3 Oil Spill Prevention, Control and Countermeasure

The BCP oil SPCC program is voluntary, based on PGE's assessment of oil spill risk and not on regulatory requirements. As a result, closure and decommissioning of BCP is not subject to regulatory deadlines to update the Plan based on changing site conditions. If oil handling processes do not change significantly, iterative updates to Boardman's SPCC during decommissioning will not be needed because there will be no increase in risk. During decommissioning, the site must continue to follow the provisions of the existing SPCC plan for any oil storage remaining on site and use proper containment for all oil-related activities. Decommissioning activities involving oil products should incorporate SPCC best management practices. If oil storage capacity is expected to increase during decommissioning, the process should be evaluated and documented in advance. The inspection schedules in the Plan should also be re-evaluated to ensure inspections based on routine use of equipment will be sufficient for decommissioning activities.

2.2.3.4 Toxics Release Inventory

As a facility that combusts coal to generate power for distribution into commerce, Boardman uses various chemicals above EPA reporting thresholds, requiring reporting of chemical usage annually to the EPA's TRI. The 2020 report will be PGE's final report, in which closure and decommissioning of the facility will be noted.

2.2.3.5 Hazardous Substation Information Program

BCP is required to submit annual Hazardous Substation Information surveys to the Oregon Office of the State Fire Marshal (OSFM). In addition to continued annual surveys, substantive changes to chemical storage locations and volumes during and after decommissioning will require submission of an updated survey to the OSFM within 30 days of the change.

2.2.3.6 Hazardous and Toxic Waste Management

Operation of Boardman generates small amounts of wastes regulated by RCRA and TSCA, including various characteristic wastes, polychlorinated biphenyl (PCB) contaminated materials, and ACM. The facility has typically qualified as a Conditionally Exempt Small Quantity Generator under RCRA, but as a best practice, all PGE facilities comply with Small Quantity Generator requirements at minimum. The site will continue to properly manage hazardous and toxic waste through D&D, in accordance with RCRA and TSCA. Decommissioning may result in unused products being disposed of as hazardous waste; special attention will be paid to the volume of RCRA waste generated during decommissioning and the resulting compliance requirements based on generator size. Effort will also be made to work down product storage levels during 2020 to minimize the amount of unused product remaining at the end of operations. Waste generated during the closure process will be disposed of under the Boardman RCRA ID (ORD088592233).

2.2.3.7 Asbestos Abatement Notification

The contractor will need to submit two notifications related to asbestos abatement: one to DEQ and one to Oregon's Occupational Safety and Health Administration (OSHA). Both agencies require a 10-day notification period prior to the start of abatement. The DEQ notification should include both asbestos abatement and demolition.

2.3 Planning Documents

The following are documents used during the planning phase. This is not a comprehensive list but rather identifies the most current documents:

- Boardman Decommissioning Scenario Evaluation Memo
- Carty-Boardman Utility Isolation Memos (Potable Water, Fire Water, Sewage, and Raw Water)
- Updated Boardman D&D Plan and updated cost estimate for coal-related asset demolition and 5-year lay-up of remaining non-coal-related assets
- RFP Budget Proposal documents for contractor bid pricing. These documents were prepared by AECOM and the resulting bid submittals were solicited from contractors by AECOM independently of PGE
- Ash disposal area cap options analysis
- Risk Management Plan

2.4 Sequencing of Work

Project work will be performed in a sequenced manner with emphasis on safety, quality, efficiency, and effectiveness. The entire demolition process must be organized and coordinated precisely to ensure these considerations. For the purpose of this Closure Strategy Plan and ROM cost estimate, it is assumed that the first sequence of tasks will be to obtain all permits necessary to perform the demolition and establish work and demolition lay-down areas.

Once permits are obtained, the plant will be prepared for demolition by removing hazardous materials and salvage materials. PGE will purge all systems. In the next sequence, demolition of all remaining structures will occur. Following demolition, the next sequence will encompass transport and disposal of waste, recycled materials, and salvaged equipment. The final sequence will consist of final grading and site restoration. The actual demolition sequence may differ depending on the demolition contractor or demolition program manager selected by PGE.

A comprehensive RFP package (or set of packages) needs to be assembled and distributed to prequalified bidders. Upon contract award and with all permits in place, the following tasks will be completed in a generalized conceptual sequence:

- Verify that decommissioning and plant shutdown has occurred.
- Establish stormwater controls per an approved stormwater permit.
- Remove any residual waste (non-hazardous and hazardous) from tanks, vessels, equipment, and from spills.
- Perform asbestos and LCP abatement and stabilization, except where abatement of siding and gaskets happens concurrently with demolition activities.
- Remove residual coal from coal yard and dispose of offsite.
- Demolish/dismantle/abate coal-related facilities and structures including the coal conveyance system, ash handling system, and various support structures.
- Clean wastewater ponds and discharge channel.
- Crush concrete for use as backfill.
- Abandon underground utilities to -2 feet BG (except stormwater systems). Cap all piping and conduits left in place.
- Abandon utility trenching and associated piping. Cut and cap lines.
- Complete backfill and grading of the site using onsite soils and crushed concrete.
- Complete site restoration including remaining environmental remediation.

3. Pre-Demolition Activities

The pre-demolition execution activities for the BCP D&D consist of engineering and construction of Carty Plant support system isolation; performance of an ERM survey; cold and dark implementation; decontamination; abatement and asset recovery; waste characterization, handling, transportation, and disposal planning; and recycled material handling, transportation, and planning. It is anticipated that these activities will occur between January 2019 and December 2020.

Pre-demolition activities at the BCP will be conducted in accordance with applicable regulations and will be performed by contractors licensed by the Oregon State Contractor's Licensing Board.

3.1 Engineering and Construction of Carty Plant Support System Isolation

Before the BCP goes cold and dark, several key systems that currently support the Carty Plant through the BCP will need to be isolated. The process for isolation will include preparing the engineering plans and an engineering estimate, obtaining funding, soliciting services and contracting, and completing the construction elements. The engineering plans for the Carty Plant isolation will be completed in 2019 and will include the design plans, specifications, and engineering cost estimate. The design will include all elements required to isolate the Carty Plant from the existing systems of the BCP. Note: some isolation issues may change depending on final resolution of the four related Isolation Memos.

The Carty Plant isolation must consider the following:

- Electrical currently is obtained through the power block. Carty to pull from switchyard or 230- kilovolt line.
- Communication microwaves need to be relocated.
- Service water needs to be maintained.
- Existing ponds will be used for sewage or a septic system will be installed.
- Domestic water will be connected upstream of Boardman.
- Carty Plant circulation water pipes will be protected during demolition.

3.2 Performance of ERM Survey

A demolition design-level survey for ERM will be conducted by AECOM in Q3 2019. The ERM survey will supplement the previously conducted ERM surveys conducted in 2006 and 2017. The design-level ERM survey will be conducted by properly accredited personnel including Asbestos Hazard Emergency Response Act (AHERA)-accredited building inspectors and Oregon-licensed lead inspectors. The design-level ERM survey will identify and quantify the following ERM materials:

- ACM
- Universal waste (mercury tubes, switches, thermostats, radioactive sources)
- LCP
- PCB in bulk materials
- Refrigerants
- Hazardous waste
- Radiological waste

AECOM will perform an assessment for LCP using a combination of an X-ray diffraction analyzer and confirmation paint chip sampling. Demolition work impacting lead-containing materials (at any detectable levels) triggers the Oregon OSHA Lead in Construction Code. LCP does not need to be removed prior to demolition but engineering controls must be used to reduce worker exposures and prevent releases to the environment. AECOM's LCP sampling will also identify those areas of LCP in poor condition that may require stabilization (removal or encapsulation) prior to building demolition and on-going management for buildings, structures, and equipment in the "lay-up" areas. The anticipated LCP waste generated as part of the stabilization will be classified as a hazardous waste and the design work will minimize the generation of hazardous lead waste.

The ERM design survey will also identify elemental lead applications in building elements such as roof flashings, vent coverings, and lead packing in valves. The focus will be on painted materials that require waste characterization for demolition and disposal. Metal components with LCP are typically recycled during demolition and material

segregation operations. Painted components that may end up in an offsite landfill and not recycled will be sampled unless previous reporting indicates the presence of lead.

AECOM will prepare and submit a written report documenting the findings of the additional investigation with an estimate of quantities. Based on this information, the abatement design documents will be prepared.

3.3 Decontamination/Decommissioning

Decontamination of the buildings, structures, and systems will occur prior to demolition. A decontamination plan will include a detailed description of the decontamination work to be conducted, along with a description of the methods and procedures to be employed.

Specific elements of the decontamination plan will address methodology and procedures, site preparation, required containment setup, engineering and work practice controls, personal protective equipment (PPE), waste labeling, waste storage/containerization, waste transport/disposal, personnel decontamination, and cleanup.

The decontamination will include the removal of all remaining liquids, gas, and solids from piping, tanks, vessels, equipment, and components. Decontamination will involve accessing the components by cutting, opening, etc. to allow the liquid, gas, and solids to be removed. This process requires careful planning and execution. Residual waste will be handled, stored, transported, and disposed of in accordance with local, state, and federal regulations. Typical procedures for the abatement of existing facilities are listed below.

The decontamination planning scope of work will include performing surveys to locate, characterize, and remove quantities of environmentally hazardous and objectionable material. The data will be used by the contractor to establish implementation plans and to collect, package, and prepare for waste shipment. PGE will identify the appropriate waste profile to be utilized. This includes elevators and associated steel structures, boilers, tanks, pumps, preheaters, ductwork, conduit, evaporators, piping (including the piping containing fuels and oil that may require cleaning prior to removal), structural steel, stairs and handrails, and all other items within the limits of work. Should PGE elect to perform these activities in advance, some savings associated with reduced subcontractor costs may be realized.

Cold methods will be used for “first-breaks” and creating “air-gaps” on equipment such as pipes, enclosed vessels, and tanks. PGE will complete this work in advance of turning the plant over to the demolition contractor. PGE plant staff performing this work is advantageous to the project because of system knowledge, which increases the safety and thoroughness of the work. In addition, PGE plant staff will be able to protect systems that may be necessary if the site is repurposed. Additionally, using plant staff may reduce costs. If the demolition contractor performs the work, PGE plant staff should oversee the work to ensure all systems are air-gapped.

Plumbing, electrical, and other utilities will be disconnected, capped, or cut prior to decontamination as required to safely perform the work.

Engineering will be completed as necessary to ensure any equipment and piping removed as part of the decontamination from the power plant structure is adequately supported and restrained during demolition in a manner that meets all applicable codes and requirements.

Any pits, tunnels, and trenches within and adjacent to the turbine and boilers will be opened, cleaned, and made safe with the replacement of removed or repaired deck plates or handrails as appropriate. Material removed from the pits and trenches will be disposed of in accordance with all applicable laws.

Special care will be taken to decontaminate the ash silo. The ash silo is currently full of ash, which is flowable. Specialized contractors will be brought in to empty and clean the silo prior to demolition.

3.3.1 Soil Remediation

Nine areas of potential soil contamination were identified. These areas were sampled in 2017 for various contaminants of concern. Of the nine areas, four were identified for additional investigation or soil removal. The four areas are the shooting range berm, auto repair shop, coolant leak area, and east industrial waste pile. This section describes these areas and the proposed mitigation.

3.3.1.1 Shooting Range Berm

The shooting range is located along the west side of a soil stockpile created from excavation of the evaporation pond. Additional investigation is needed for arsenic and chromium. Material is expected to be impacted with lead from bullet rounds. As a mitigation measure, this material will be excavated and the soil will be disposed of at an approved offsite

disposal facility. No backfill is required as the non-impacted portion of the stockpile will be used as backfill for the demolition activities.

3.3.1.2 Auto RepairShop

There is documentation of an oil spill at the auto repair shop that was previously cleaned up. Soil staining was observed in lined wash ponds and auto wash rack. Visually stained soil will be excavated with the soil disposed of at an offsite approved disposal facility. The excavated area will be backfilled with clean soil and graded to match existing adjacent grades.

3.3.1.3 Coolant Leak Area

Benzo(a)pyrene was detected in soil samples exceeding occupational risk-based concentrations. Additional sampling and soil removal will be performed. The excavated soil will be disposed of at an offsite approved disposal facility. The excavated area will be backfilled with clean soil and graded to match existing adjacent grades.

3.3.1.4 East Industrial Waste Pile

Petroleum hydrocarbons were detected in the soil pile, warranting additional sampling. If additional sampling finds concentrations above risk-based screening levels, the soil will be excavated and disposed of at an offsite approved disposal facility. The excavated area will be backfilled with clean soil and graded to match existing adjacent grades.

3.4 Cold and Dark Implementation

The planned activities for making the lay-up portions of the BCP cold, dark, dry, and safe generally include the identification of systems, equipment, and machines that will be deactivated then drained of oils, solvents, fluids, and decommissioned. Systems and equipment associated only with coal use will be decommissioned and removed (where feasible). For other systems and equipment that are not integral to life/safety issues, decommissioning will occur. PGE and AECOM will decide which systems and equipment will be put on the cold, dark, and dry list. Systems and equipment integral to life/safety will remain operational.

3.5 Abatement and Asset Recovery Process

ERM abatement activities will include pre-demolition abatement, abatement during demolition, and abatement/stabilization of ERM for remaining “lay-up” areas. The work will be performed by appropriately licensed and qualified contractors. As part of the abatement design, qualifications of the abatement contractors will be requested. Abatement contractors will go through a pre-qualification screening and then will be invited to bid on the work. The abatement work will be detailed in the Project Demolition and Abatement Project design prepared by AECOM. AECOM’s Project Design will include the Scope of Work for demolition support and for “lay-up” of the remaining structures and systems.

Based on current site knowledge, the majority of ACM scheduled for removal includes the asphaltic-coated, non-PCB containing metal siding, roofing, and undercarriage (“galbestos”) of the following buildings/structures:

- Dewatering bins penthouse (walls and roof)
- Dewatering bins base (walls)
- Ash silo base (walls)
- Surge tank (walls)
- Settling tank (walls)
- Dumper building (walls and roof)
- Transfer point #1 (walls and roof)
- Transfer point #2 (walls and roof)
- Transfer point #3 (walls and roof)
- Transfer point #4 (walls and roof)
- Transfer point #5 (walls and roof)
- Thaw shed (walls and roof)
- Crusher building (walls and roof)
- Emergency dump structure (walls, roof, and undercarriage)
- Conveyance support #1 (walls, roof, and undercarriage)
- Conveyance support #2 (walls, roof, and undercarriage)
- Conveyance support #3 (walls, roof, and undercarriage)
- Conveyance support #4 (walls, roof, and undercarriage)
- Transfer station (walls, roof, and undercarriage).

3.5.1.1 Abatement Design

The abatement design will be performance-based, requiring abatement contractors to prepare and submit a detailed work plan for each of the project areas. In addition to pre-bid work plan submittals, the abatement contractor will prepare abatement plans prior to the initiation of activities. These plans will include a detailed description of the abatement work to be conducted, along with a description of the abatement methods and procedures to be employed.

Specific elements of the abatement plans will address certifications/training requirements, methodology and procedures, site preparation, required containment setup, engineering and work practice controls, PPE, worker exposure assessment (air monitoring), waste labeling, waste storage/containerization, waste transport/disposal, personnel decontamination, worker hygiene facilities, and general housekeeping and clean-up.

The abatement design documents will:

- Be prepared by an AHERA-accredited project designer.
- Include technical specifications outlining submittal requirements, training and certifications, air monitoring, engineering controls, removal, packaging, waste disposal, clearance, and recordkeeping.
- Identify materials for removal, repair, and/or stabilization. Damaged ERM in buildings to remain will be included in the abatement design for removal, repair, and stabilization.

3.5.1.2 ERM Management Plan

During the design-level ERM survey, destructive sampling will be performed in buildings slated for demolition. In the remaining buildings, the ERM survey will focus on the suspect materials requiring labeling under OSHA and necessary maintenance for the 5-year “lay-up” period. Suspect materials requiring destructive sampling which could alter the integrity of the system will be assumed to contain asbestos and/or lead.

The installation of asbestos warning signs and labels will be included in the abatement scope of work. The goals of the asbestos labeling include compliance with OSHA hazard communication standards and to support the maintenance of these materials during the “lay-up” period under the ERM Management Plan. An ERM Management Plan will be prepared for the buildings and materials remaining. The ERM Management Plan will include the following:

- Objectives
- Roles and Responsibilities
- Required Notifications Procedures
- ERM Survey Information
- Spill/Response Procedures
- Prohibited Activities
- Periodic Surveillance and Re-Inspections
- Labeling and Warning Signs
- Recordkeeping

3.5.2 Asbestos

Following the completion of the design-level ERM survey, ACMs in buildings and structures slated for demolition will be removed by a DEQ licensed asbestos abatement contractor. Current site knowledge suggests that the most significant ACM identified is the exterior siding, roofing, and undercarriage of buildings/structures. As such, demolition will require close coordination with abatement.

Specifications for stripping, removal, and disposal portions of the abatement work will conform to the current regulatory standards and the procedures determined during the planning and design phases. Typical procedures for asbestos abatement are listed below in Table 3.1.

Table 3.1 ACM Identification and General Removal Procedures

ACM Type	National Emission Standards for Hazardous Air Pollutants Category	OSHA Classification	Engineering Controls
Vinyl floor tile and mastic	Cat. 1 non-friable (NF)	Class II	Regulated Area, demarcation tape, critical barriers, wet removal, prompt waste packaging and disposal
Asphaltic siding ("Galbestos")	Cat. 2 NF	Class II	Regulated Area, demarcation tape, critical barriers, wet removal, prompt waste packaging and disposal
Valve and flange gaskets	Cat. 1 NF	Class II	Regulated Area, demarcation tape, critical barriers, wet removal, prompt waste packaging and disposal
Joint compound and wallboard	Regulated ACM (RACM)	Class II non-intact	Negative pressure enclosure (NPE), Regulated Area, demarcation tape, critical barriers, wet removal, prompt waste packaging and disposal
Paper backing associated with vinyl floor sheeting	RACM	Class II non-intact	NPE, Regulated Area, demarcation tape, critical barriers, wet removal, prompt waste packaging and disposal
Window caulking and glazing compounds	Cat. 2 NF	Class II	Regulated Area, demarcation tape, critical barriers, wet removal, prompt waste packaging and disposal
NF: non-friable, RACM: regulated ACM			

When mechanical means are used to remove ACM, Regulated Areas will be demarcated using barrier tape and required asbestos signage and critical barriers consisting of 6-mil polyethylene (poly) sheeting installed over openings, doors/entrances, walls, and ceiling. For Class I, Class II non-intact, and RACM abatement, negative air machines will be installed and exhausted to the building exterior, creating an NPE. All workers inside Regulated Areas will wear appropriate PPE.

Removal of all ACM will be performed using manual means and wet methods. Removed ACM will be placed into 6-mil poly bags, which will then be sealed and labeled in 6-mil poly asbestos bags. Airless sprayers or other wetting devices will be used to keep materials adequately wet during the removal process. Asbestos-containing mastic will be removed with floor buffers, bead-blasters, or razor scrapers and owner-approved mastic remover. If floor buffers or bead-blasters are used, the work will be performed in an NPE. Removed exterior panels and associated washers will be packaged in two-layers of 6-mil poly with asbestos labels. The abatement contractor will be responsible for packaging the ACM panels in a manner acceptable with the disposal site. OSHA and DEQ air monitoring will be performed throughout abatement activities.

Regulated Work Areas for the RACM/Class I and Class II non-intact ACM will be demarcated using barrier tape and required asbestos signage. The 6-mil poly sheeting will be placed over openings, doors/entrances, walls, and floors, prior to removal. Negative air machines will be installed and exhausted to the building exterior, creating an NPE. Using manual means and wet methods, ACM will be placed into pre-labeled, 6-mil poly bags, sealed, double-bagged, and properly labeled, including EPA identification number(s). After material has been removed, the substrate will be detail-cleaned to remove any residual ACM, and surfaces will then be encapsulated. OSHA and DEQ air monitoring will be performed throughout abatement activities.

Each Regulated Work Area for friable thermal system insulation (TSI) will be demarcated using barrier tape and required asbestos signage. The poly sheeting will be placed over openings, doors/entrances, walls, and floors, prior to removal. Negative air machines will be installed and exhausted to building exteriors, creating a localized Negative Air, or the NPE. Using manual means and wet methods, TSI will be "glove-bagged" over drop-cloth poly. Boiler/tank insulation removal will be completed via gross removal inside the containment area. ACM will be placed into pre-labeled, 6-mil poly bags, sealed, double-bagged, and properly labeled, including EPA identification numbers. After material is removed, the substrate will be detail-cleaned to remove any residual ACM, and surfaces will be encapsulated. Workers will wear the appropriate PPE and OSHA Personnel Exposure Air Monitoring will be performed throughout removal and detail-cleaning.

Work areas will be demarcated via barrier tape and required signage for ACM reported to contain less than 1 percent asbestos, which includes interior drywall walls, window putty, and ceiling tile mastic. Walls will be removed via mechanical means and poly sheeting drop cloths may be placed below ACM, for the drywall removal using wet methods, before placing into bags or directly into a poly-lined construction debris bin. As necessary, high-efficiency particulate air (HEPA) vacuums will be used to detail clean areas. Workers will wear the appropriate PPE and OSHA Personnel Exposure Air Monitoring will be performed throughout removal and detail-cleaning.

ACM roofing and siding will be manually removed, then bagged or lowered to the ground via enclosed chutes. Roof penetration mastic and all materials will be kept adequately wet while being abated. An enclosed chute may be erected to allow for bulk removal of roofing, loaded directly into open-top bins lined with poly sheeting. Final cleaning will be accomplished by wetting/misting any remaining material, prior to placing directly into single, clear poly bags. As necessary, HEPA vacuums will be used to final clean and detail the roof substrate. OSHA Personnel Exposure Air Monitoring will be performed during the abatement. A 5-point safety harness with lanyard(s) will be used by each worker during elevated work, and the fall protection system and equipment to be used will comply with OSHA requirements.

3.5.3 Lead-Containing Paint

During the design-level ERM survey, paints and coatings will be screened utilizing an XRF and bulk sampling for laboratory analysis. Any detectable level of lead triggers the OSHA lead in construction code. Depending on the demolition activities, some paint chip samples may also be analyzed for other heavy metals with vertical standards such as chromium, arsenic, and mercury. In the required Contractor Work Plan, heavy metals will be addressed including training, administrative controls, engineering controls, and disposal/recycling. Contractors will be fully responsible for compliance with all applicable standards.

Surface coatings will be tested either by an X-ray fluorescence process, or through sampling and laboratory analysis. Flaking or peeling LCP will be removed or encapsulated prior to demolition. The waste product generated during removal will be collected, containerized, and transported offsite for disposal. Should flame cutting or welding be required on surfaces coated with LCP, the LCP will be removed beforehand using appropriate safety measures. Debris from lead stabilization activities are likely to be considered hazardous waste. Specifications for the removal and stabilization of LCP will identify hazardous waste minimization procedures.

It is assumed that demolition debris that contains firmly adhered LCP (e.g., concrete debris with LCP) will not be a hazardous waste and will be managed as nonhazardous debris.

Regulated Work Areas will be established prior to the removal of damaged LCP materials, which will be demarcated using barrier tape and required Lead-Danger signage. Poly sheeting will be placed under surfaces adjacent to damaged LCP, which will be removed via manual means and wet methods. Upon completion of removal, the substrate will be thoroughly encapsulated with an owner-approved encapsulant to stabilize the existing surface(s) prior to building demolition. Workers will wear appropriate PPE and OSHA Personnel Exposure Monitoring will be performed during the work.

All packaged material will be taken directly from the load-out area to poly-lined bins. The LCP will be transported as waste under manifest to federal and state-approved facilities. The generator's copy of the manifest will be provided to the designated point of contact. Throughout the project, a waste manifest log will be maintained. Upon completion of work, manifests will become a part of a final closeout report.

3.5.4 Universal Wastes and Other Hazardous Wastes

Located throughout the BCP are various building components that are regulated under the EPA Title 40 *Code of Federal Regulations* (CFR). The contractor will be responsible for the removal, packing, and disposal/recycling of universal waste in the buildings slated for demolition. For remaining buildings, universal waste will only be removed if it is no longer essential for safe maintenance of the building. The following protocols (3.5.4.1 – 3.5.4.9) provide typical means and methods of handling such materials as part of the abatement and demolition activities.

3.5.4.1 Mercury-Containing Items

Items containing mercury will be isolated and wires clipped, or housing dismantled. Glass ampoules will be removed and then placed in spill-proof plastic containers containing absorbent media. When personnel have removed all mercury-containing items from the facility, the remaining void space in the container will be filled with absorbent. The lid will then be secured, and the drum labeled with the generator information and proper shipping name. The mercury waste stream will be staged for eventual transportation and disposal to an owner-approved disposal facility. Mercury waste will be labeled with a standard "HAZARDOUS WASTE" label, with the description of "Mercury Contained in

Manufactured Articles, 8, UN2809, P.G.III, (Mercury)." This labeling and manifest description will be required for any shipment of mercury waste.

3.5.4.2 Refrigerant Removal

The specific items (e.g., air conditioning units) in structures identified for demolition that contain chlorofluorocarbons will be located and accessed for recovery. A licensed EPA Refrigeration Technician will perform any evacuation activities, confirm evacuation has been completed, and leave valves open to signify that recovery has been completed. Refrigerant recovery and recycling documentation will be provided to the owner.

3.5.4.3 Self-Luminous Exit Signs

For structures that will be demolished, self-luminous self-power lighting exit signs will be removed and packaged per the manufacturer's recommendation. The units will be unbolted from the wall. No attempt will be made to open the body of the exit sign and precautions will be taken by personnel to ensure that the sign is not dropped. Removed exit signs will be placed into manufacture-provided boxes suitable for the shipping of the devices. The boxes will contain up to approximately 10 devices. Each device will be placed into a sealable plastic bag as recommended by the manufacturer. Shipment of these devices will involve the acquisition of a Return Material Authorization (RMA) number provided by the manufacturers. This RMA number will be considered the acceptance and tracking number by the manufacturer. If the manufacturer cannot be located, the exit signs will be securely containerized and disposed of using a specialty waste disposal service.

3.5.4.4 Smoke Detector Removal

As with the self-luminous exit signs, the smoke detectors to be removed will be packaged per the manufacturer's recommendations. The removed smoke detectors will be placed into manufacturer-provided boxes suitable for shipping. The box will contain approximately 35 to 40 devices. Each device will be placed into a sealable plastic bag as recommended by the manufacturer. Shipment of these devices will involve the acquisition of an RMA number provided by the manufacturer. This RMA number will be considered the acceptance and tracking number by the manufacturer. Similarly, should the manufacturer not be available, the abatement contractor will utilize a specialty waste disposal service to properly dispose of smoke detectors.

3.5.4.5 Lead Acid/NiCad Batteries

Any batteries to be removed will be located and the housing cover opened for access. The removed batteries will be staged at the temporary waste storage area for segregation and packaging. Packaging will consist of placement of the undamaged batteries onto wooden pallets. If a battery is found to be cracked, leaking, or if the integrity of the battery is potentially impaired, it will be containerized in designated poly drums or containers at the temporary waste storage area, for eventual consolidation and shipment offsite. All drums will be packaged and labeled according to state or federal requirements. All personnel handling lead acid batteries will be outfitted with appropriate safety gear including but not limited to chemical-resistant polyvinyl chloride (PVC) knee boots, PVC Tyvek Suits, PVC gloves, and hard-hats with goggles and face shield. Any spills will be neutralized with baking soda and water or other approved procedures.

3.5.4.6 Fluorescent Bulbs and HID Lamps

Rolling scaffolding or ladders will be used to support workers on single-story floors. For ceilings of greater height, a motorized lift will be utilized to assist in retrieving light tubes and other lighting fixtures. The tubes and lamps will be removed and placed in Transport, Storage, and Disposal Facility-supplied storage boxes or fiber drums. The box/drum will be sealed, placed on a pallet, and secured with stretch wrap. Full pallets will be transported via forklift to the temporary waste storage area. Boxes will be marked with the customer name and address, and a packing list will be attached to the container. During fluorescent light removal, if any tubes break, personnel will gather the broken items and place them in a plastic container. Plastic containers will then be consolidated in a Department of Transportation (DOT) 17H, 55-gallon steel drum and properly profiled per federal or state regulations.

3.5.4.7 PCB and Non-PCB Ballasts

Lighting ballasts will be removed and containerized for offsite recycling. Although non-PCB containing ballasts can be considered general construction debris, each ballast contains a small amount of dielectric fluid. The fluid is non-PCB containing but should be managed properly through recycling and not shipped to a local landfill as debris. Ballasts will be removed by unbolting the item from the light fixture housing and consolidated in a DOT 17H, 55-gallon steel drum(s). When counting ballasts during lab packing, care should be taken to ensure that no more than 150 small ballasts are placed into a 55-gallon drum. All lab packing will occur in accordance with federal, state, and local regulations. Ballasts will be staged for eventual offsite recycling at an owner-approved disposal facility.

Drums containing PCB ballasts will be labeled with a standard "HAZARDOUS WASTE" label, and the description of "R.Q. Environmentally Hazardous Substance Solid, N.O.S., 9, NA3077, P.G.III, (Polychlorinated Biphenyls)" and "CAUTION CONTAINS PCBs." This labeling and manifest description will be required for any shipment of drummed

PCB-containing ballasts. PCB-containing light ballasts may be transported to an owner-approved recycler/disposal facility for lights. Proper bills of lading and other documentation will be provided to the owner.

3.5.4.8 Oil-containing Equipment

Oil-containing equipment may include any equipment known to have previously contained hydraulic motor or cooling oil. Equipment to be addressed may include but is not limited to the following:

- Elevators
- Electric motors on conveyors
- Pumps
- Diesel-operated compressors and generators
- Transformers

Elevators in buildings to remain will not be decommissioned. Elevators and other vertical conveyance systems in buildings/structures slated for demolition will have the hydraulic fluid currently contained in the elevator's holding tank, turbine controls, and other equipment, removed. Personnel will utilize mechanical (metal or plastic) hand pumps to facilitate oil removal. The oil will be pumped directly into the DOT 17H, 55-gallon steel drum(s), which will be located adjacent to the work area during oil transfer to reduce spillage. Containers will be sealed prior to being moved or transported. Absorbent and/or spill containment booms will be available onsite during oil removal and transfer as a contingency in case of spillage. Drummed hydraulic fluid will be profiled and recycled at a PGE-approved recycling facility.

Similarly, other equipment containing hydraulic or motor oil will be drained and properly disposed of or recycled prior to facility demolition. Electrical transformers located in the project area will be sampled to assure they are non-PCB.

3.5.4.9 Radiation Sources

A total of 56 radioactive material sources are located at the BCP, including radioactive materials in the form of Cesium 137 sealed sources used at the BCP by authority of Oregon Radioactive Material License ORE-90735. (Boardman Fixed Gauges Source Inventory [PGE, 2015]).

These sources are at multiple locations throughout BCP including but not limited to the feeders, crusher building, distribution bins, transfer points, coal dust collectors, lower well, reclaim pits, dumper pit, and belt conveyor and feeder. All radioactive sources will be returned to their manufacturer. If the manufacturer cannot be located, the sources will be securely containerized and disposed of using a specialty waste disposal service.

3.5.5 Asset Recovery Evaluation

As part of the decommissioning process, unneeded assets will be sold for reuse or for scrap metal where possible. There are several categories of materials, including:

- Heavy Equipment – Caterpillars, loaders and rail cars that can be sold through an auction company
- Major Plant Equipment – Pulverizers and steel structures that will be sold as scrap metal by the demolition contractor with a credit to the overall project demolition cost
- Storeroom Material – Will be sold as scrap metal to interested salvage companies
- Support Structures – Contractor to take care of disposal, with the project receiving credit.
- Office equipment – Will be donated to local non-profit organizations

For the demolition areas, based on the Budgetary RFP process, the following IR items were identified in areas of planned demolition:

- Motors

For the demolition areas, based on Budgetary RFP process, the following materials were identified as having potential salvage value:

- Stainless 304 Grade: approximately 25 tons
- #2 copper shear wire/tubing: approximately 4 tons
- Scrap metals (#1 Unprepared): approximately 3,700 tons

Equipment that is determined to have a salvage value will be identified and included in the demolition contractor's scope of work. If turned over to the demolition contractor, the contractor will likely either resell whole or sell as scrap. If the equipment cannot be sold, it will be recycled when applicable or disposed of as a nonhazardous or hazardous waste.

The equipment and components that are sold as salvage will be transported offsite through the main gate by truck or by train. The quantities of this material have been estimated as part of the Budget RFP process, but future market values are highly variable and should be verified at the time of salvage.

The following types of equipment may be moved to another PGE site for redeployment or sold as salvage:

- Tanks
- Pumps
- Turbines
- Generators
- Control Equipment
- Motors
- Furnaces
- Transformers
- Boiler

3.6 Waste Characterization, Handling, Transportation, and Disposal

Waste generated during the demolition of the BCP is anticipated to fall into one of the following waste categories:

- Non-hazardous construction debris
- Universal waste
- Non-RCRA hazardous
- RCRA hazardous
- TSCA regulated material
- Radiological

Waste will be hauled by truck or train from the site to the appropriate disposal facility. Trucks will enter and leave the site from the main gate. Trains will enter and leave on the rail spur that enters the BCP. The trucks will be loaded at the site either from temporary stockpiles or directly from the demolition activities. Water spraying may be implemented to suppress potential dust while loading. Trucks will be covered with tarps prior to leaving the site.

Prior to offsite disposal of any waste, a waste approval package for each waste stream will be prepared. This package will include a waste profile identifying the generator of the waste, analytical summary table(s) applicable to the waste, land disposal restrictions notification for any hazardous waste, a completed waste manifest, and any other applicable information necessary for PGE to complete its review of the disposal package and signature as the generator. The signed profile will then be submitted to the offsite facility for acceptance and approval. Once the approval letter is received from the offsite facility, transportation can be scheduled. Each load of waste material will be manifested prior to leaving the site.

The generator and the transporter must sign the manifest prior to the load of waste leaving the site. A copy of the manifest will be retained onsite for tracking purposes. The original signed manifest will be returned to the address of the generator. The Traffic Control Plan (TCP) will identify transport routes and times for the materials.

3.6.1 Clean Construction and Demolition Debris

An estimated 2,000 cubic yards of C&D debris will be generated as part of the demolition activities. All waste that cannot be used onsite may be transported to and disposed of at a permitted landfill facility.

3.6.2 Non-RCRA Hazardous Waste

Every attempt will be made to recycle or repurpose material during the decommissioning process. For materials that cannot be reused, they will be managed as a waste. Non-RCRA hazardous waste includes the waste identified under the RCRA in 40 CFR 261, Subparts C and D. Non-RCRA hazardous waste generated during the demolition activities may include asbestos, refractory waste, soil, and other waste identified during the demolition. This waste will be disposed of at a permitted landfill facility.

3.6.3 RCRA Hazardous Waste

RCRA hazardous waste generated during the demolition activities may include LCP chips, lead waste from paint stripping activities, and lead removed from batteries (non-universal waste batteries). This waste will be disposed of at a permitted landfill facility.

3.6.4 Universal Wastes and Other Hazardous Waste

The following types of universal waste may be generated during the BCP demolition activities:

- Batteries containing nickel-cadmium and small, sealed, lead-acid batteries that are found in many common business/household items, such as those used in electronic equipment, mobile telephones, portable computers, and emergency backup lighting.
- Mercury-containing equipment, including devices or parts of devices that contains elemental mercury integral to its function (e.g., thermostats, switches, and pressure or vacuum gauges).
- Lamps, including fluorescent tubes and bulbs, high-intensity discharge lamps, sodium vapor lamps, and any other type of lamp that exhibits a characteristic of hazardous waste. Any electric lamp that contains added mercury, whether it exhibits a hazardous waste characteristic or not, is considered a universal waste.
- Universal waste must be shipped to a "destination facility" that treats, disposes of, or recycles a category of universal waste in compliance with the applicable universal waste requirements of Oregon.

3.6.5 Radioactive Waste

Boardman's coal monitoring equipment includes a total of 56 fixed-gauge radioactive sources, which are permitted under an Oregon RML (ORE-90735). These sources are located at multiple locations throughout BCP, including but not limited to the feeders, crusher building, distribution bins, transfer points, coal dust collectors, lower well, reclaim pits, dumper pit, and belt conveyor and feeder. All radioactive sources will be returned to their manufacturer. If the manufacturer cannot be located, the sources will be securely containerized and disposed of using a specialty waste disposal service.

3.6.6 TSCA-regulated Materials

Any light ballast identified as "PCB-containing," ballast without a label, or ballast that contains a leaking capacitor will be disposed of offsite as PCB bulk product waste:

- In an incinerator approved under the TSCA
- In a chemical waste landfill approved under TSCA
- In an RCRA permitted hazardous waste landfill

3.7 Recycled Material Quantities, Disposition, and Transport

Materials that will be generated during demolition activities and can be recycled include metals from fencing, tanks, support beams, piping, miscellaneous building materials, and electronic and process equipment. Additionally, wood, plastic, electrical components, and other miscellaneous materials may be recycled depending on their economic value. Recycled and salvaged materials will be loaded and secured on trucks or trains from the centralized staging areas. The material will be moved offsite through the main gate and transported to a salvage site.

For the demolition areas, based on Budgetary RFP process, the following materials were identified as having potential salvage value:

- Stainless 304 Grade: approximately 25 tons
- #2 Copper shear wire/tubing: approximately 4 tons
- Scrap metals (#1 Unprepared): approximately 3,700 tons

4. Bidding Documents and Procurement

4.1 Bid Document Preparation

Detailed drawings and specifications will be prepared for the competitive bid packages. AECOM will prepare bid documents, technical specifications, and site drawings following the Construction Specifications Institute's Masterspec format 2019.

4.1.1 Bid Walks and Bid Support

Once the bid documents are prepared, mandatory site walk-throughs will be scheduled. The site walk-throughs should allow time for all contractors and their sub-contractors to adequately confirm site conditions and planned approach. The bid walks should also be attended by key project staff from PGE and AECOM. AECOM will help PGE evaluate bids received and support contractor interviews.

4.1.2 Construction Submittals

The selected demolition contractor will prepare and submit the plans identified below as parts of the Contractor's Site Work Plan during the pre-construction submittal package. The work plans will be reviewed and approved by PGE and the owner's representative. Approval of submittals does not relieve the contractor from contractual or regulatory requirements. The bid documents and technical specifications will require the specific submittal procedures including the use of SharePoint to track submittals, comments, actions, and approvals. During the pre-submittal period, the contractor, owner, and owner's representative will establish clear lines of communication and expectations for the project pre-construction submittals. The focus will be on communication and coordination to efficiently agree on general approaches and technical requirements and minimize the "back and forth" that can occur during submittal reviews.

The Contractor's Site Work Plan will be submitted in electronic format in the prescribed order and properly indexed for easy search and review. There will be an established file naming structure to assist with version control. Based on the size and nature of this project, AECOM feels that the submittal process can be managed through SharePoint and does not warrant a third-party submittal management system.

Planning documents will be prepared by the selected demolition contractor as part of the pre-demolition activities for the BCP. These plans will serve as a guide for conducting the demolition in an efficient, effective, and compliant manner. The plans outline the policies and procedures that will be implemented to minimize the impacts to the environment, public, and local community. The plans will provide the procedures for regulatory compliance, as well as means and methods for waste minimization and diversion. The bid documents and technical specifications will outline the submittal requirements and will focus on reducing redundant information where feasible. The primary plan documents are detailed in the following sections.

4.1.2.1 Demolition Work Plan

The Contractor's Demolition Work Plan will serve as the general plan that outlines the demolition activities, procedures, methodology, chronology, and schedule. The work plan will also address project management, personnel, monitoring, and reporting requirements.

All work will be performed in accordance with applicable requirements of the OSHA Construction Industry Standards and PGE's project/site safety requirements. The contractor will provide PGE the opportunity to review and object to any portion of contractor safety programs, abatement and demolition plans, work plans, and other submittals. In addition to other submittals, the contractor will:

- Establish, publish, and enforce a site-specific safety program, in accordance with the D&D specifications, that meets federal, state, and PGE BCP requirements.
- Provide worker orientation, supply and maintain contractor and worker-supplied safety equipment, and have and maintain adequate equipment related to fire protection within work zones.
- Obtain all contractor licenses necessary to perform the subject work in the State of Oregon.

4.1.2.2 Traffic Control Plan

The TCP will address project-specific information for vehicular control relating to the demolition-related field activities at the BCP. The purpose of the TCP is to provide guidelines and procedures for traffic control and flow on and around the BCP while construction activities are in progress. A TCP will have to be in place for demolition, excavation, grading, decontamination, waste treatment, waste hauling, and restoration.

The TCP will discuss the locations of major ingress and egress at the BCP, major onsite and offsite roads that will be used by project personnel vehicles for heavy equipment mobilization and demobilization, and material transportation to and from the BCP. The TCP also discusses traffic routes, major roadways, circulation patterns, and volumes and numbers of various vehicles that are expected at BCP during specific project activities. The TCP will be tailored to meet the threshold requirements specified in the Noise Monitoring Plan (NMP).

4.1.2.3 Site Noise Monitoring Plan

The NMP will address project-specific information for noise control relating to the field activities at the BCP. (Note: Under the Safe Work Plan, the contractor will address worker noise exposure monitoring and protection). The purpose of the NMP is to provide guidelines and procedures for noise control and monitoring on and around the BCP while demolition activities are in progress. Demolition activities will include demolition, abatement, excavation, grading, decontamination, waste treatment, waste hauling, and restoration. The noise performance standards will be included in the bid documents and technical specifications and will include datalogging monitors and portable sound-level meters.

Noise monitoring will be implemented if necessary. If needed, engineering controls might include limiting work during certain hours, days, or months.

The purpose of this plan is to provide information regarding the following topics:

- Submittals required to monitor and control noise
- Construction limitation (noise levels and equipment operations)
- Receptor locations to be monitored and monitoring equipment to be used
- Noise reduction measures needed to meet noise level limitations
- Monitoring and noise reduction equipment and materials needed to achieve noise level limitations
- Construction methods to demonstrate compliance with noise monitoring and control requirements

4.1.2.4 Stormwater Pollution Prevention Plan

The Stormwater Pollution Prevention Plan (SWPPP) for construction activities presents the measures to be implemented to minimize sediment and other pollutants in stormwater discharges during demolition activities at the BCP. The project will consist of the demolition of select buildings, structures, and associated infrastructure. The demolished materials will be segregated and stockpiled onsite. Soil from onsite borrow sources will be reused onsite as backfill and graded to existing grade.

The SWPPP has two major objectives:

- Identify the sources of sediment and other pollutants that affect the quality of stormwater discharges.
- Describe the implementation of practices to reduce sediment and other pollutants in stormwater discharges during construction activities. The SWPPP contains BMPs that address source reduction.

The SWPPP will comply with the requirements of the National Pollutant Discharge Elimination System program—specifically, the General Construction Activity Stormwater Permit program. Regulated sites, including “site grading over 1 acre,” are generally required to develop a SWPPP and a Stormwater Monitoring Sampling, and Reporting Program.

The following are proposed elements of the SWPPP:

- Site description
- BMPs to be implemented for construction activities
- BMPs to be implemented for erosion and sediment control
- Non-stormwater management
- Waste management and disposal
- Implementation of other approved plans
- Post-construction (demolition) controls
- Site inspections and monitoring
- Responsible personnel
- Personnel training
- Certification of compliance

- SWPPP review and modifications

The BMPs will provide measures and controls necessary to mitigate potential pollutant sources. The SWPPP will include supporting site maps, plans, details, along with site-specific inspection and monitoring reporting forms. The demolition contractor will be responsible for the application of the SWPPP as part of the permitting process. The SWPPP performance standards will be included in the bid documents and technical specifications.

4.1.2.5 Environmental Protection Plan

The Environmental Protection Plan (EPP) presents information regarding the environmental management program to be conducted for this project. The purpose of this plan is to present the environmental regulatory requirements for the construction activities. The environmental performance standards will be included in the bid documents and technical specifications. The EPP will help ensure that planning for activities associated with the environmental management program at the Site are conducted in a systematic and well-documented manner. The EPP also details environmental compliance procedures and waste management, as well as regulatory, procedural, and training requirements associated with conducting demolition activities.

4.1.2.6 Waste Management Plan

The purpose of the Waste Management Plan (WMP) is to present the waste management practices and procedures to be followed during the demolition activities, and to establish procedures that maximize the recycling, reuse, and diversion of materials generated during demolition of BCP buildings and structures. The WMP identifies waste management activities conducted during the storage, preparation, and disposal of waste (including waste characterization, packaging, storage, and management while in storage). The transportation and disposal of waste materials at appropriate facilities are also included. The WMP provides information on how waste, including potentially hazardous waste associated with demolition activities, will be managed and disposed of with efficiency. In addition, a secondary goal is to ensure that waste minimization practices are followed, to the extent practical, to reduce the volume of waste that will be generated, stored, and removed from the site. However, the actual methods and techniques employed during demolition of BCP will be the choice of the demolition contractor.

BMPs will be used and materials and equipment will be slated for recycling or reuse when economically practical. Waste reduction and minimization will be a priority.

4.1.2.7 Air Monitoring Plan (AMP)

The AMP will be implemented to ensure that effective air emission control measures are used onsite and to monitor the air quality concentration of pollutants resulting from the proposed demolition project. Morrow County ordinance and OAR 340-208 will be required to address potential emissions of fugitive and asbestos-containing dust during excavation and other soil-handling activities. Demolition plans and specifications will specify engineering controls (moisture conditioning of soil), appropriate PPE, and monitoring equipment (high-volume samples, personal monitoring) to be used, as appropriate.

The demolition activities will involve demolition, excavation, stockpiling, loading, offsite disposal, and recycling of materials consisting of metal, equipment, and waste. An ambient air monitoring station will be established at the site to perform real-time monitoring of wind speed, direction, barometric pressure, and temperature during demolition and earth-moving activities. Air samples will be collected at the monitoring station and will be analyzed for the airborne contaminants of concern. In addition, a minimum of two datalogging particulate monitors (PM_{10}) will be utilized during the site work. The results of the air quality sampling will be used to determine if there are any air quality compliance concerns or if modifications to the demolition activities are needed. The meteorological data for the general project area, particularly wind speed and direction, will be used to decide on the proper locations of the air monitoring stations.

The AMP will be prepared to ensure that activities associated with the air sampling program at the facility are performed using the EPA document 40 CFR, Part 53, for particulate matter of less than 10 microns, total suspended particulates. Data can be monitored in real-time and alarms/mobile notifications can be programmed, allowing for quick response by site personnel. Air data will be included in weekly reports.

The purpose of this plan is to provide information regarding the following systems and procedures:

- Air quality monitoring system
- Meteorological monitoring system
- Operation and maintenance procedures
- Quality assurance and quality control procedures to be instituted by the air quality program
- Procedures for documentation of activities and data reporting

4.1.2.8 Recycling Management Plan (RMP)

The RMP will be prepared by the select demolition contractor as part of the work plan documents. The RMP will contain the following information:

- Recycling materials by type and quantity
- Local vendors who will accept the recycling materials
- Handling and transportation process
- Waste diversion techniques
- Compliance requirements

4.1.2.9 Quality Control Plan (QC)

The QC will be required to establish the basic objectives of the contractors quality control system. These objectives include the following:

- Ensure that all work adheres strictly to requirements of the contract and governing agencies where the work is being performed.
- Maintain QC procedures to ensure that tasks performed will comply with the contract.
- Prevent deficiencies through preconstruction quality control coordination.
- Detect and correct deficiencies in a timely manner.
- Provide an auditable record of all tests, inspections, procedures, nonconformance, and corrections, and any other pertinent data as required.
- Verify compliance with the contractor's QC procedures, including those QC procedures of subcontractors and suppliers.
- Provide a basis of measuring the contractor's performance for input to Company's Contractor Resource Database.

4.1.2.10 Health and Safety Plan

The Health and Safety Plan will be prepared by the select demolition contractor as part of the work plan documents. The Health and Safety Plan provides safe work practices and control measures used to reduce or eliminate potential hazards. These practices and controls are to be implemented by the party in control of either the site or the hazard. Contractors and employees must remain aware of the hazards affecting them regardless of who is responsible for controlling the hazards. The contractor performs the applicable pre-emergency planning tasks before starting field activities and coordinates emergency response for all onsite parties, the facility, and local emergency-service providers as appropriate. These planning tasks include the following:

- Review the facility emergency and contingency plans where applicable.
- Determine what onsite communication equipment is available (e.g., two-way radio, air horn).
- Determine what offsite communication equipment is needed (e.g., nearest telephone, cell phone).
- Confirm and post emergency telephone numbers, evacuation routes, assembly areas, and route to hospital; communicate the information to onsite personnel.
- Field trailers: post exit signs above exit doors, and post fire extinguisher signs above locations of extinguishers. Keep areas near exits and extinguishers clear.
- Review changed site conditions, onsite operations, and personnel availability in relation to emergency response procedures.
- Where appropriate and acceptable to the client, inform the emergency room, ambulance, and emergency response teams of anticipated types of site emergencies.
- Designate one vehicle as the emergency vehicle, place hospital directions and map inside, keep keys in ignition during field activities.
- Inventory and check site emergency equipment, supplies, and potable water.
- Communicate emergency procedures for personnel injury, exposures, fires, explosions, and releases.
- Rehearse the emergency response plan before site activities begin, including driving route to hospital.
- Brief new workers on the emergency response plan.

5. Demolition-Specific Description of Work

5.1 General Information

At this time, demolition is planned for the coal-related assets. PGE may decide to not lay-up the plant and expand the demolition to all non-essential assets. Demolition methods may change if a larger-scale demolition is undertaken (i.e., stack and boiler demolition). The contractor:

- Will perform jobsite administration including submittals, record keeping, licenses, safety, drug and alcohol testing, medical surveillance program, and all other requirements to maintain a safe and efficient project.
- Will provide transportation and disposal of all recyclable and scrap metals and general construction debris.
- Will evaluate the use of rail transportation for delivery/transportation of materials and equipment offsite, to the maximum extent possible.
- Will be responsible for extraction, dismantling, demolition, rigging, transportation, and disposal of all equipment and materials removed as part of the demolition work. Contractor will have responsibility for any sales tax liability associated with sale of any equipment and material.
- Will be required to coordinate with all onsite contractors during the work, specifically testing, electrical, mechanical/piping, structural, and concrete contractors.
- Will not be permitted to use explosives without prior approval and the appropriate permits.
- Will not be permitted to burn debris and rubbish.
- Will take appropriate measures to avoid accumulating dust in work areas. Contractor will be responsible for keeping haul roads and work areas watered so as not to cause nuisance dusting of plant facilities during the contract.
- Will notify PGE if they encounter any hazardous materials that may impact the safety of employees or that may provide an environmental hazard. Contractor is responsible for the review of PGE-provided ERM survey (once completed). Contractor is not to proceed with work until authorized.
- Will provide HAZWOPER-trained crafts-persons, as required, to execute the work and at least one of the fulltime onsite supervisors and/or the Project Manager (who will have completed the National Demolition Association 40-hour Foundations of Demolition Project Management course).
- Will maintain a daily field log for recording and archiving the daily activities pertinent to the project. At a minimum, the daily activity reports will include items such as the daily attendance of the site-assigned personnel and visitors, site entry logs, use of PPE, quality issues and inspection, visitor logs, daily air monitoring and sampling data, equipment usage logs, environmental survey information, safety and health incident reports, types and quantities of materials excavated and removed from the site, and transactions of asset sales. A comprehensive and customized project documentation profile will be created and maintained for retention and archiving. These logs and reports will always be available for review by PGE.
- Will obtain analytical laboratory results of bulk sampling, ambient air sampling, and OSHA-required monitoring for all abatement work. Laboratory results will be made available to PGE and archived for completion of the Project Closure Report. Daily air monitoring reports will be posted and distributed for review and analysis on a 24-hour turnaround basis as required by the applicable regulatory agencies.
- Will prepare a Project Closure Report that documents all site activities within 30 days of work completion. The report will detail daily site activities, dismantlement, demolition, asset recovery and sales activity, safety and health incidents, and any regulatory or quality compliance violations. The Project Closure Report will also include evidence of methodologies employed for the decommissioning activities, equipment usage, and various sampling protocols and results. The report will be inclusive of, but not limited to, a project operations summary, financial reports, summary of analytical data, air-monitoring reports, bulk sampling reports, shipping documentation, weight slips, quantities of waste materials removed from the site, daily weather conditions, daily supervisors field logs and diary, waste manifests, certificates of disposal, asset transactions or sales, and site sampling data.
- Will protect all areas being demolished via existing fire hydrants and hand-held fire extinguishers during demolition. In the event the existing system is inoperable or removed due to demolition activities, temporary hose lines must be placed in service.
- Will provide engineering and studies as necessary to ensure that the structural integrity of structures and buildings is maintained as demolition progresses.
- Will perform final walks of the decommissioned and dismantled area before demobilization of the project to verify that the scope of work has been satisfied and the area has been rendered safe for re-occupancy.

5.2 Demolition Methods

For the purposes of this D&D Plan, conventional demolition activities are defined as the demolition of smaller structures that are at or just above the elevation of the cab of excavator, bulldozer, loader, or skid steer loader. These conventional demolition approaches/activities shall only be executed by experienced demolition specialists, as they demolish structures, segregate and load out scrap and debris.

Specialized demolition and/or D&D is defined as demolition approaches which require planning and usually involve multiple resources and additional coordination and could include crane dismantlement activities or felling of structures with or without explosives. Generally, specialized demolition approaches are higher-risk activities, as compared to conventional demolition approaches. The contractor shall utilize an experienced demolition subject-matter expert in the planning and oversight of these approaches.

A. Any or a combination of the following demolition methodologies may be allowed:

   1. Conventional demolition methods using bulldozers, loaders, demolition equipped excavators, or cranes with wrecking balls to raze/demolish structures.
   2. Potentially feasible specialized demolition methods are as follows. These are NOT “mandatory” or even “preferred methods”, but acceptable to PGE if executed safely with the required detailed planning and experienced resources.

      a. Dismantlement with cranes and certified operators and riggers.
      b. High-reach and/or ultra-high-reach excavator with the adequate shear and safe boom length to demolish structures.
      c. Safely pulling over structures with adequate cables and equipment which are located at a safe distance away.
      d. If large equipment is utilized on the operating floor (or any other elevated floor), shoring or other safety measures shall be taken to provide a safe working platform. Ramping of debris, crushed stone, concrete, or soil to gain excavator or crane reach for any area, will be evaluated for safety and stability on a case-by-case basis.

   3. Other contractor proposed methodologies subject to pre-approval by PGE

B. Unacceptable approaches include, but are not limited to the following:

   1. Tripping of most other structures which requires worker to be inside and or immediately adjacent to the structure while and/or after the steel frame structure is substantially compromised.
   2. Pushing or pulling over structures which are substantially taller than the equipment, which is also in proximity of the structure.
   3. Working under or close to a structure where debris, scrap, concrete, steel, or other demolished materials can contact workers or the equipment operators.
   4. Extensive pre-cutting or pre-weakening of structural members or other items which substantially compromises the integrity of a building, stack, or structure for any reason.
   5. Unsafe activities which could result in unplanned events, near misses, recordable injuries, or fatalities.
   6. On site stripping and sizing of wire; sorting and sizing of material by hand and or cutting torch.
   7. Crane dismantlement of any structure by riggers and operators that are not certified and specialized in this field and well-qualified (as evidenced by an exceptional safety record). This applies to all contractor individuals, vendors, and sub-contractors.

Work will likely include torch-cutting large steel sections and demolishing with an excavator with shear attachment. AECOM expects that cranes will be used to pick sections of buildings and then, once on the ground, the sections will be processed for recycling, disposal, or site reuse. For the higher structures like the crusher, contractors may use specialty felling equipment that can reach the heights or targeted explosive felling.

In all situations, the “cross-over” bridge connecting the conveyor system to the power block will be methodically dismantled and the openings patched in the power block.

Concrete will be demolished using an excavator with a breaker attachment.

5.3 Mobilization

Mobilization for demolition will occur upon completion of the decommissioning and in conjunction with abatement mobilization. Mobilization will include bringing equipment and personnel to the BCP, establishing the BMPs and engineering controls, setting up lay-down areas for equipment and material segregation, establishing Regulated Areas for asbestos abatement and lead controls, and establishing support trailers.

5.4 Establish a Work Area

The contractor's lay-down and mobilization areas will be clearly identified in pre-construction submittals and will not be approved if they impede required site access for critical operations or safety concerns. The contractor, PGE, and the owner's representative will agree on the lay-down areas and required site controls. It is anticipated that the contractor lay-down areas will be in three to four locations depending on the phase of the work and accessibility to the specific scope of work. All vehicles will enter and exit through the site at a controlled location in order to facilitate load management and compliance with the TCP, including vehicle decontamination and dust control. The contractor will be required to provide weekly updates on the planned work and a 3-week look-ahead schedule for site access and traffic planning.

The contractor will clearly demarcate work areas with warnings signs and tape – asbestos and lead-related work will require specific work area demarcation in accordance with OSHA, DEQ, and the ERM bid documents and technical specifications.

The installation of fencing may be required in some locations to restrict site access and secure the contractor's equipment during demolition. Fencing will be required in areas where warnings signs and tape are not adequate to prevent potential falls and other safety hazards in the work areas. The contractor will be fully responsible for securing the work area and monitoring site access to appropriately authorized visitors through engineering and administrative controls. All site visitors will be required to check in at the contractor's site trailer, complete a site safety orientation, and wear site-required PPE (which may vary depending on the areas of work visiting). Visitors will require escort by the contractor. Subcontractors will be required to complete the contractor's Site Safety Orientation and comply with all required Safe Work Plan submittals as identified in the pre-submittal requirements.

5.5 Coal Yard Support Structures

5.5.1 Dumper Building and Supporting Infrastructure

The dumper building is an approximately 20,000-ft^2 structure located northeast of the coal yard. The building will be demolished to approximately -2 feet BG and the foundation left in place. Non-asbestos materials will be segregated as C&D and recyclable materials. The area around the structure will be graded to match existing surrounding grades. The dumper building and associated thaw shed contain asbestos-containing siding throughout.

5.5.2 Coal Yard Clarifier Building and Settling Basin

The coal yard concrete settling basin for the clarifier is located adjacent to the clarifier, east of the coal yard. The concrete will be broken up and stockpiled for potential reuse as backfill. The structure will be demolished to approximately -2 feet BG, and the excavation will be backfilled and graded to match existing grades.

5.5.3 Crusher Building

The crusher building is part of the coal conveyance system and is an approximately 3,800-ft^2 structure located southwest of the coal yard. The building will be demolished to approximately -2 feet BG, including the foundation. The materials will be segregated as C&D and recyclable materials. The area around the structure will be graded to match existing surrounding grades. The crusher building contains asbestos-containing siding throughout.

5.5.4 Coal Yard Control Building

The coal yard control building is an approximately 1,400-ft^2 structure located southwest of the coal yard, next to the crusher building. The building will be demolished to approximately -2 feet BG, including the foundation. The materials will be segregated as C&D and recyclable materials. The area around the structure will be graded to match existing surrounding grades.

5.5.5 Coal Yard Lunch Room and Shower Facility

The coal yard lunch room and shower facility is an approximately 3,150-ft^2 structure located southwest of the coal yard, next to the coal yard control building. The building will be demolished to approximately -2 feet BG, including the foundation. The materials will be segregated as C&D and recyclable materials. The area around the structure will be graded to match existing surrounding grades.

5.5.6 Coal Yard Stacker/Reclaimers

There are two stacker/reclaimers (SR1 and SR2) located on the south end of the coal yard. SR1 and SR2 will be demolished to approximately -2 feet BG, including the foundation. The materials will be segregated as C&D and recyclable materials. The area around the structure will be graded to match existing surrounding grades.

5.5.7 Coal Yard Conveyor System

The coal yard conveyer system consists of five transfer points (TP1 through TP5), an emergency dump structure, conveyer lines that run above and below ground, four conveyer supports, and a coal transfer station associated with the power block. The system will be demolished to the power block building. The materials will be segregated as C&D and recyclable materials. All projects above the slab will be removed to approximately -2 feet BG. The area around the structure will be graded to match existing surrounding grades. All five transfer points, the four conveyer structural supports, and the coal transfer station contain asbestos-containing siding throughout.

5.6 Ash Handling Systems

The fly ash blower house is an approximately 9,600-ft^2 structure located northwest of the power block. The ash handling system above the slab will be removed to flush with the top of the slab on grade and pedestal foundation. The demolition material will be segregated with the C&D disposed of at an approved offsite landfill. The metal will be recycled, and the concrete processed and sampled for reuse as backfill onsite. The area around the structure will be graded to match existing surround grades.

The fly ash silo and dome are located south and east of the power block, to receive bottom ash and fly ash from their associated systems and to provide a means of unloading the ash into mobile vehicles for final disposal. The silo and dome will be demolished to the top of the slab on grade. The ground around the silo and dome is paved and the pavement of the silo and dome will be left in place.

The demolition material will be segregated and disposed of at an approved offsite landfill. The metal will be recycled, and the concrete processed and sampled for reuse as backfill onsite.

The bottom ash system consists of two dewatering bins, a settling tank, and a surge tank. A closed-loop recirculation water system is provided to minimize water makeup and plant water disposal requirements. The fly ash system consists of a silo to receive the dry ash blown into the silo pneumatically. The tanks are elevated to provide both truck and rail clearance. The base of the dewatering bins, settling, and surge tanks contains asbestos-containing siding throughout.

The fly ash silo unloader room, the dewatering bins enclosure, and the valve enclosure have walls of insulated metal siding and roofs of insulated metal roofing. The surge and settling tanks enclosure have walls of insulated metal siding flashed to the exterior tank surfaces at the top. The roof between the two tanks is metal decking, insulation, and built-up roofing.

5.7 Coal Operation Support Systems

5.7.1 Activated Carbon System

The activated carbon system is located northwest of the ESP building, between the ESP and the power block. PGE or a contractor will empty, air gap, and separate the activated carbon system tank. The activated carbon system above the slab will be removed to flush with the top of the slab on grade and pedestal foundation. The metal will be recycled, and the concrete processed and sampled for reuse as backfill onsite. The area around the structure will be graded to match existing surround grades.

5.7.2 DSI System

The DSI system is located south of the power block and west of the ash handling system facilities. The DSI includes four tanks, stairs, control sheds, transformers, and unloader. PGE or a contractor will empty, air gap, and separate the DSI tanks. The DSI system above the slab will be removed to flush with the top of the slab on grade and pedestal foundation. The metal will be recycled, and the concrete processed and sampled for reuse as backfill onsite. The area around the structure will be graded to match existing surround grades.

5.7.3 Calcium Halide Injection (CHI) System

The CHI system is located on the side of the crusher building. PGE or a contractor will empty, air gap, and separate the CHI system. The CHI system above the slab will be removed to flush with the top of the slab on grade and pedestal foundation. The metal will be recycled, and the concrete processed and sampled for reuse as backfill onsite. The area around the structure will be graded to match existing surround grades.

5.7.4 The Calcium Bromide Injection (CABR) System for Mercury

The CABR system is located on the west side of the crusher building near conveyance support #3. PGE or a contractor will empty, air gap, and separate the CABR injection system. The CABR system above the slab will be removed to flush with the top of the slab on grade and pedestal foundation. The demolition material will be segregated with the C&D disposed of at an approved offsite landfill. The metal will be recycled, and the concrete processed and sampled for reuse as backfill onsite. The area around the structure will be graded to match existing surround grades.

5.8 Support Buildings

The following support buildings will be abated and demolished to approximately -2 feet BG. The materials will be segregated as C&D and recyclable materials. The area around the structure will be graded to match existing surrounding grades.

- Warehouse 2
- Coal yard shop
- Railcar maintenance building
- Ash contractor building

5.9 Concrete Processing

Concrete removed as part of the demolition will be staged and sampled per the EPA and DEQ requirements for sampling porous materials. The purpose is to verify and document that the concrete, when processed, is acceptable to be used as backfill. Concrete with LCP will be removed and disposed of offsite.

The concrete will be processed with hydraulic excavator attachments to pieces that are typically no greater than 2’ x 2’ that are placed into a concrete crusher that includes a magnet used to remove the rebar and other metal reinforcement. The concrete will be processed to a size of 2-inch minus, which is small enough to minimize voids and settlement once placed as backfill.

5.10 Site Restoration, Backfill, and Grading

The demolition areas will be backfilled using the existing soil onsite to the extent possible. Additionally, the concrete from the demolition activities will be used as backfill in basement, pits, and vaults. All areas will be covered with gravel and graded to have stormwater drain away from remaining structures. Areas that were backfilled will be surveyed and placed on as-built drawings.

During the engineering phase, a final grading plan will be developed to manage stormwater. Once final grading is complete, erosion control measures will be placed to prevent erosion and displacement of the final grading soils. Grass seed will be distributed across the new soil areas prior to the rainy season so it is naturally watered to inspire growth.

5.11 Demobilization

Demobilization of equipment and resources will begin once substantial completion is met and all punch-list items and site restoration activities are complete. The contractor will remove or stop service of equipment, temporary power or water, and other utilities (e.g. telecommunication services) and leave the site in an acceptable manner. (Note: if construction fencing is installed and there is the potential PGE may want to keep the fencing, this should be discussed during Bid Planning).

5.11.1 Site Security

Once the backfill and grading is complete, the site will be prepped for non-use by securing any gates and fencing that limit access onto the site. PGE will be responsible for securing remaining buildings, structures, or support systems after the contractor's demobilization from the site.

5.11.2 Demobilization

Demobilization of equipment and resources will begin once substantial completion is met and all punch-list items and site restoration activities are complete.

5.11.3 As-Builts

As-built drawings should be completed to document the surveyed location of the remaining foundations, areas that were backfilled, and locations where piping and utilities were terminated.

6. Coal Yard Reclamation and Closure

6.1 Coal Reclamation and Disposal

The BCP operates a relatively large coal yard with a significant volume of residual coal material. Based on current aerial photos, the area of the current coal yard is estimated to be approximately 80 to 100 acres. It is currently estimated that 50,000 to 100,000 tons of coal material are currently available for reclamation. The primary strategy for this area is to process, reclaim and burn the currently stored coal material during the remaining life of the facility. A portion of this coal material can be reclaimed relatively easily through traditional excavation methods. However, the lower portions of the coal material within the yard contain a mixture of coal and soil and will require additional separation and processing. Within the industry, there is a contractor (RPM Solutions) that specializes in the reclamation of coal yards through a multi-step separation process.

The implementation strategy for the coal yard is to reclaim the existing coal material in 2020 by RPM Solutions, beginning in April 2020. Coal from the reclamation process will be burned within the facility and soil will be returned to the coal yard area.

6.1.1 Backfill andGrading

Due to the separation and removal of coal material, it is anticipated that the current coal yard area will be depressed and will required grading/filling. The depression left from the coal removal will be graded and covered with 2-3 inches of stone/gravel material from an off-site borrow source.

7. Ash Disposal Area Closure

The ash disposal area is currently operated by Boral Resources. Boral has indicated that they would like to mine the disposal area for beneficial reuse of the ash. Beneficial reuse opportunities include cement, gypsum, road base, and stabilization material. End-users include the cement and concrete industries and landfills to stabilize liquid and solid waste. Boral would excavate the material and process it to a size that the end-user could use. One challenge is that Boral's market size is not large enough to remove the material in a timely manner and could take up to 10 to 20 years. PGE is working with Boral on identifying end-users and timeframes to process the material. The outcome of this effort may reduce the size and cost of closure of the ash disposal area. If a significant amount of the material within the ash disposal area can be beneficially reused, alternatives will be evaluated for offsite disposal of the remaining material and appropriate decisions will be made based on life-cycle costs and risk considerations.

If the Boral opportunity is not feasible, the ash disposal area will be closed in accordance with the CCR Rule. However, due to the location of the BCP and the arid nature of the region, it is anticipated that an alternate cover system will be required as the cover system described in the CCR Rule relies on a compacted clay cap and dense vegetative cover system. For the ash disposal area, the recommended strategy involves implementation of a cap alternatives analysis prior to design of the cap system. This cap alternatives analysis will consider the various accepted cap systems (system described in CCR Rule, evapotranspiration cover system, synthetic cover system, etc.) and provide recommendations based on the location of BCP, the availability and characteristics of onsite borrow materials, cap performance, costs, and maintenance considerations. The cap alternatives analysis will provide the basis for the conceptual design and the associated Alternate Cover System Demonstration. For the purposes of strategy, it is currently assumed that an evapotranspiration cap system will be used for closure of the ash disposal area. This type of cap system is used for landfills in arid western states and can likely utilize onsite materials for the construction of the system.

The final cover will be graded to drain surface water from the cover, and the top slope will have a grade of no less than 2 percent. It is anticipated that the evapotranspiration cover system will be constructed using onsite materials. The thickness of the system will be based on design calculations and available materials, but a typical thickness of 36 inches is currently assumed. The cover system will be vegetated with native species to assist with water uptake. Through construction of an evapotranspiration cover system, stormwater outfalls from the disposal area may be able to be eliminated. However, for the purposes of the estimate, a small evaporation pond is currently assumed. Long-term operation and maintenance of the system will primarily consist of erosion repairs and groundwater monitoring as required by the CCR Rule.

8. Soil Remediation

Some degree of soil remediation is expected. As indicated previously, there are four areas requiring additional investigation and/or soil removal: the shooting range berm, auto repair shop, coolant leak area, and east industrial waste pile. The amount of soil removal will be determined after additional characterization occurs in 2021.

The following is a summarized schedule for the D&D work. A more detailed work break-down structure with dates will be provided upon completion of isolation memos and a review of this Draft D&D Plan. Figure 8-1 is a milestone schedule for the project.

9. Cost Estimate

In order to provide the following cost estimates, AECOM prepared a Budgetary Request RFP and invited five contractors to a site walk. Three contractors prepared and submitted proposals as requested in the Budgetary RFP. AECOM reviewed the proposals and pricing and compiled the following cost estimates based on the proposed information. The estimates provided are for budgetary purposes only and assume the work will be performed in 2021 and 2022. Salvage credits are highly variable and can be hard to predict.

The overall cost of decommissioning includes employee severance, D&D, asset write-offs of stock room material, and end of rail car lease costs. Three approaches were evaluated: partial demolition, complete demolition, and partial demolition followed by complete demolition after 5 years. Carrying costs post partial demolition were not included in the cost estimate. Table 9-1 provides a cost summary. Appendix A contains the detailed cost estimates.

Table 9-1 Cost Summary of Demolition Scenarios

Task	Partial Demolition	Complete Demolition	**Partial Demolition** followed by **Complete Demolition**
Planning & design[1]	$1,563,000	$1,563,000	$1,813,000
Decommissioning	$400,000	$400,000	$400,000
Communications relocation	$285,000	$285,000	$285,000
Coal yard reclamation	$5,291,000	$5,291,000	$5,291,000
Disposal area closure[2]	$7,182,000	$7,182,000	$7,182,000
ERM abatement	$3,050,000	$7,940,000	$8,138,000
Environmental assessment & removal[3]	$400,000	$400,000	$400,000
Demolition[4]	$9,263,000	$25,273,000	$29,149,000
Construction management, services during construction	$1,174,000	$3,332,000	$3,729,000
Employee severance[5]	$14,889,000	$14,889,000	$14,889,000
Rail car lease termination	$700,000	$700,000	$700,000
Inventory end of life removal, net of scrap credit[6]	$8,100,000	$8,100,000	$8,100,000
TOTAL	$52,297,000	$75,355,000	$80,075,000

Notes: All costs are in 2019 dollars with no escalation. Costs are ±30%

1. Includes program management, design, assessments, plans, and permitting
2. Assumes closure of disposal area with no ash reclamation and 30 years of groundwater monitoring and operation and maintenance. If ash reclamation occurs, then costs should be less
3. Assumes four sites at $100,000 per site
4. Includes scrap credits. Scrap salvage credits are highly variable and volatile and can be hard to predict and may significantly change the estimated cost higher or lower
5. Retention and severance includes five years of retention program plus severance costs
6. Inventory end of life removal, net of 10% scrap credit

10. References

The following documents assisted AECOM in providing the information included in this Draft D&D Plan.

- Decommissioning and Demolition Plan for the Boardman Power Plant in Boardman, Oregon, prepared by CH2M, dated November 2015
- Closure Strategy Plan for the Boardman Power Plant in Boardman, Oregon, prepared by CH2M, dated November 2015
- Closure Plan Ash Disposal Area PGE Boardman Power Plan, prepared by CH2M, dated September 2015
- Boardman Power Plant Environmentally Regulated Material Survey Results, prepared by CH2M, dated April 2018
- Field Investigation Data Results Report, prepared by CH2M, dated March 2018
- Boardman Synchronous Condenser Conversion Study letter, prepared by Burns & McDonnell, dated January 28, 2018
- Synchronous Condenser Project Economics and Regulatory Considerations, prepared by Burns & McDonnell, dated January 25, 2019
- *Natural Gas Conversion Study,* prepared by Mitsubishi Hitachi Power Systems, dated December 3, 2018
- *Review comments by Ezzat B. Khalafalla of AECOM,* Boardman Synchronous Condenser Conversion Study prepared by Burns & McDonnell, dated January 28, 2018
- *Synchronous Condensers for Transmission Systems*, prepared by General Electric, dated November 15, 2013
- *Scenario Evaluation Memo* prepared by AECOM Technical Services, Inc., dated April 11, 2019
- *Draft Carty Isolation Memos* prepared by AECOM Technical Services, Inc., drafts March 2019

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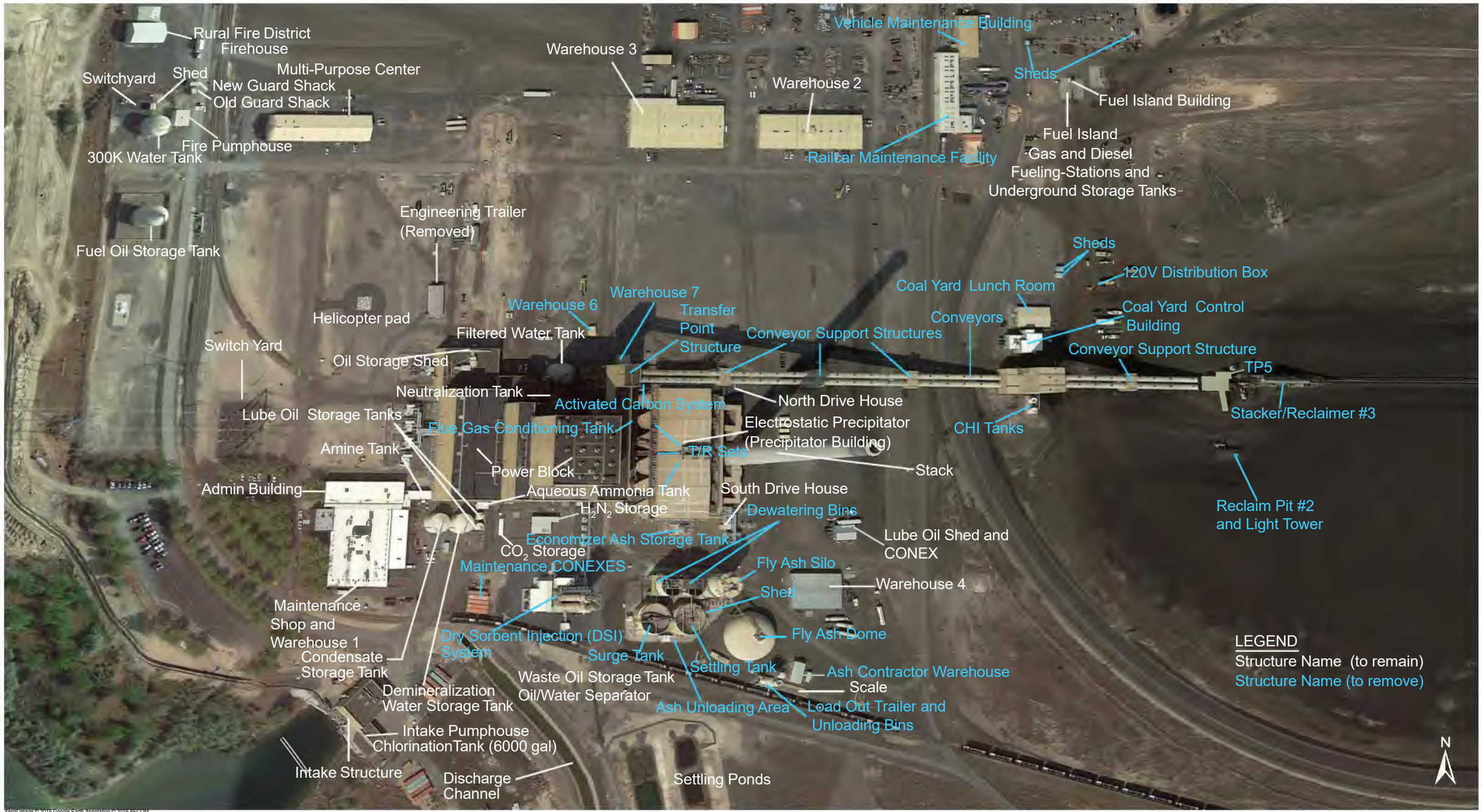
Aerial image © 2015 Google Earth Annotation © 2019 AECOM

SCALE

3000 Feet

Figure 1.1
Discharge Structure
Boardman Power Plant Decommissioning and Demolition Plan
Boardman, Oregon



Aerial image © 2015 Google Earth Annotation © 2019 AECOM

SCALE
300 Feet

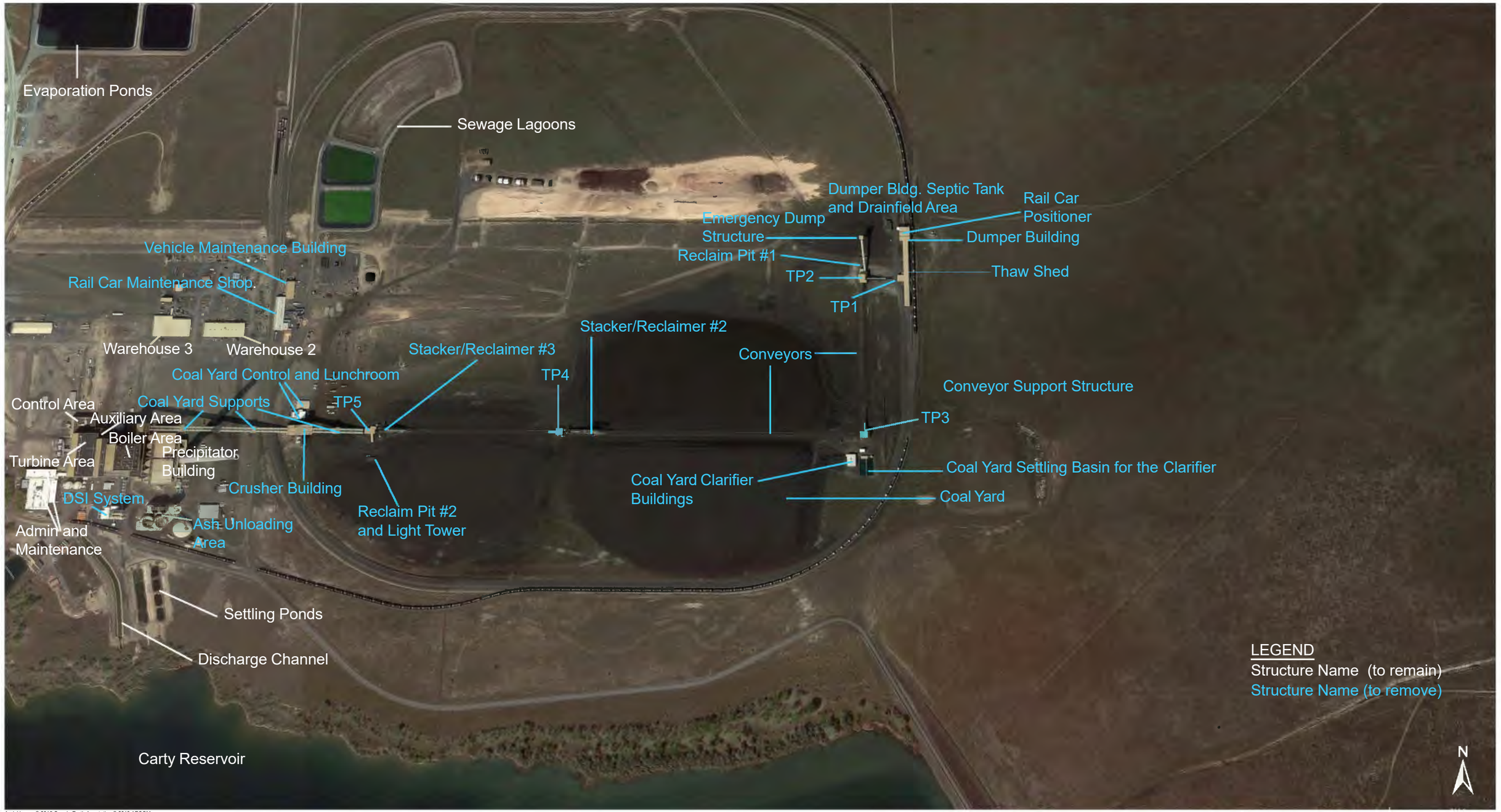
Figure 1.2
Site Structures
Boardman Power Plant Decommissioning and Demolition Plan
Boardman, Oregon

Aerial Image © 2015 Google Earth Annotation © 2019 AECOM

SCALE

200 Feet

Figure 1.3
South Pond Area and Structures
Boardman Power Plant Decommissioning and Demolition Plan
Boardman, Oregon



Aerial image © 2015 Google Earth Annotation © 2019 AECOM

SCALE
700 Feet

Figure 1.4
Coal Yard and Unloading Facility Structures
Boardman Power Plant Decommissioning and Demolition Plan
Boardman, Oregon

SCALE
100 Feet

Figure 1.5
North Area and Structures
Boardman Power Plant Decommissioning and Demolition Plan
Boardman, Oregon

APPENDIX

Appendix A. Detailed Cost Estimates

OWNER'S REP CONSTRUCTION MONITORING AND PROJECT MANAGEMENT (PARTIAL)

TASK	ITEM	UNIT	QUANTITY	UNIT COST	ESTIMATED COSTS	AECOM NOTES / ASSUMPTIONS
1	ABATEMENT MONITORING	PER DAY	60	$2,500	$150,000	Based on contractor's estimated schedule. Includes labor, ODCs, analytical onsite, lab analytical
2	DEMOLITION DUST AND CONTAMINANT MONITORING	PER DAY			$0	Currently in the Contractor's SOW but here as a place holder
3	DEMOLITION MONITORING	PER DAY	160	$2,500	$400,000	Based on contractor's estimated schedule. Includes onsite labor and ODCs
4	DEMOLITION MANAGEMENT	PER DAY	160	$2,500	$400,000	Based on contractor's estimated schedule. Includes onsite labor and ODCs
5	ENVIRONMENTAL CLEAN-UP MONITORING/SAMPLING	EST.	1	$75,000	$75,000	Based on contractor's estimated schedule. Includes labor, ODCs, lllab analytical
6	REPORTING	EST.	1	$75,000	$75,000	Close-out reports and weekly reporting
7	PROJECT MANAGEMENT	WEEK	40	$1,850	$74,000	
	TOTAL				**$1,174,000**	

OWNER'S REP CONSTRUCTION MONITORING AND PROJECT MANAGEMENT (COMPLETE)

TASK	ITEM	UNIT	QUANTITY	UNIT COST	ESTIMATED COSTS	AECOM NOTES / ASSUMPTIONS
1	ABATEMENT MONITORING	PER DAY	400	$1,750	$700,000	Assumes 1 person average 20 month schedule plus analytical
2	DEMOLITION DUST AND CONTAMINANT MONITORING	PER DAY			$0	Currently in the Contractor's SOW but here as a place holder
3	DEMOLITION MONITORING	PER DAY	960	$1,600	$1,536,000	Assume 2 people 24 months
4	DEMOLITION MANAGEMENT	PER DAY	480	$1,600	$768,000	Assume 1 person 24 months
5	ENVIRONMENTAL CLEAN-UP MONITORING/SAMPLING	EST.	1	$75,000	$75,000	Assume 1 person plus analytical
6	PERMITTING	EST.			$0	Removed because in Planning Task
7	REPORTING	EST.	1	$75,000	$75,000	Close-out reports and weekly reporting
8	PROJECT MANAGEMENT	WEEK	96	$1,850	$177,600	Assumes 96 weeks (24 months)
	TOTAL				**$3,331,600**	

ENVIRONMENTALLY REGULATED MATERIALS (ERM) ABATEMENT COSTS (PARTIAL)						
TASK	ITEM	UNIT	QUANTITY	UNIT COST	ESTIMATED COSTS	AECOM NOTES / ASSUMPTIONS
1	DESIGN-LEVEL ERM SURVEY	LS	1	$115,000		Included in Planning Task
2	ASBESTOS ABATEMENT FOR DEMO	LS	1	$2,900,000	$2,900,000	Abatement of structures/systems to be demolished. Mainly exterior siding but also includes gaskets and other ACM identified to date.
3	ASBESTOS ABATEMENT/REPAIR FOR REMAINING	LS	1	$30,000	$30,000	Removal of interior ACM in remaining and repairs of exterior damaged ACM.
4	LEAD-CONTROLS DURING DEMOLITION	LS	1	$30,000	$30,000	Includes some lead HW disposal from stabilization prior to demo plus added adminstrative and engineering controls associated with Lead in construction
5	LEAD STABILIZATION/REPAIR FOR REMAINING	LS	1	$30,000	$30,000	Includes some lead HW disposal from stabilization in remaining buildings
6	UNIVERSAL WASTES FOR DEMOLITION	LS	1	$35,000	$35,000	
7	ERM MANAGEMENT PLAN INCLUDING LABELING AND TRAINING	LS	1	$25,000	$25,000	Development of ERM Management Plan, training site resources, ACM labelling for OR-OSHA compliance.
8	ANNUAL ESTIMATED O&M COSTS FOR ERM IN REMAINING	YR	5	$30,000	$150,000	Annual costs for reinspections, plan review, and assumed repairs for 5 years
	TOTAL				**$3,200,000**	

ENVIRONMENTALLY REGULATED MATERIALS (ERM) ABATEMENT COSTS (COMPLETE)						
TASK	ITEM	UNIT	QUANTITY	UNIT COST	ESTIMATED COSTS	AECOM NOTES / ASSUMPTIONS
1	DESIGN-LEVEL ERM SURVEY	LS			$0	Included in Planning Task
2	ASBESTOS ABATEMENT FOR DEMO	LS	1	$7,742,000	$7,742,000	Abatement of structures/systems to be demolished. Mainly exterior siding but also includes gaskets and other ACM identified to date.
3	ASBESTOS ABATEMENT/REPAIR FOR REMAINING	LS	1	$10,000	$10,000	Removal of interior ACM in remaining and repairs of exterior damaged ACM. Admin Building etc.
4	LEAD-CONTROLS DURING DEMOLITION	LS	1	$90,000	$90,000	Includes some lead HW disposal from stabilization prior to demo plus added adminstrative and engineering controls associated with Lead in construction
5	LEAD STABILIZATION/REPAIR FOR REMAINING	LS	1	$10,000	$10,000	Includes some lead HW disposal from stabilization in remaining buildings (e.g., admin building)
6	UNIVERSAL WASTES FOR DEMOLITION	LS	1	$88,000	$88,000	
	TOTAL				**$7,940,000**	

ENVIRONMENTALLY REGULATED MATERIALS (ERM) ABATEMENT COSTS (PARTIAL AND REMAINDER IN 5 YEARS)						
TASK	ITEM	UNIT	QUANTITY	UNIT COST	ESTIMATED COSTS	AECOM NOTES / ASSUMPTIONS
1	ASBESTOS ABATEMENT FOR (PARTIAL)	LS	1	$3,200,000	$3,200,000	Abatement of structures/systems to be demolished. Mainly exterior siding but also includes gaskets and other ACM identified to date.
2	ASBESTOS ABATEMENT REMAINDER IN 5 YEARS	LS	1	$4,720,000	$4,720,000	Abatement of remainder in 5 years
3	LEAD-CONTROLS DURING DEMOLITION (PARTIAL)	LS	1	$30,000	$30,000	Includes some lead HW disposal from stabilization prior to demo plus added adminstrative and engineering controls associated with Lead in construction
4	LEAD STABILIZATION/REPAIR FOR REMAINING	LS	1	$10,000	$10,000	Includes some lead HW disposal from stabilization in remaining buildings (e.g., admin building)
5	LEAD-CONTROLS DURING DEMOLITION (REMAINING)	LS	1	$90,000	$90,000	Includes some lead HW disposal from stabilization prior to demo plus added adminstrative and engineering controls associated with Lead in construction
6	UNIVERSAL WASTES FOR DEMOLITION (PARTIAL)	LS	1	$35,000	$35,000	
7	UNIVERSAL WASTES FOR DEMOLITION IN 5 YEARS	LS	1	$53,000	$53,000	
	TOTAL				**$8,138,000**	

LANDFILL CLOSURE ESTIMATED COSTS						
TASK	ITEM	UNIT	QUANTITY	UNIT COST	IMPOUNDMENT CLOSURE COST	AECOM NOTES / ASSUMPTIONS
1	COVER ALTERNATIVES ANALYSIS / ALTERNATIVE COVER SYSTEM DEMONSTRATION/CONCEPT DESIGN	LS	1	$75,000	$75,000	Will provide the basis for cap system selection and design, and will address the requirements of the CCR rule.
2	LANDFILL CLOSURE DESIGN / BID PACKAGE PREPARATION	LS	1	$250,000	$250,000	Includes borrow invesitigation, detailed design, and bid package development.
3	LANDFILL SITE PREPRATION / FINE GRADING	CY	25,000	$12	$300,000	Includes landfill fine grading in preparation of cap placement
4	COVER MATERIAL EXCAVATION / PLACEMENT	CY	210,000	$15	$3,150,000	Includes 3 feet of on-site material placed loosely for an assumed Evapotransporation Cover System.
5	VEGETATION	AC	43	$4,000	$172,000	Assumes native vegetation to assist in the Evapotransporation Cover System performance.
6	PERIMETER DITCH / ACCESS ROAD	LF	6,000	$200	$1,200,000	
7	EVAPORATION POND	CY	1,000	$100	$100,000	Assumed needed for Evapotranspiration Cover System to facilitate no discharge condition. Includes excavation, liner installation, and emergency overflow structure installation.
8	OPERATIONS & MAINTENANCE	YR	30	$64,500	$1,935,000	Assumes annual O&M costs are $1,500/acre/yr for the landfill cap area. Assumes reduced cost from typical due to (1) limited to no need for mowing and (2) no discharge monitoring. Includes long-term groundwater monitoring
	TOTAL				**$7,182,000**	

COAL YARD RECLAMATION AND CLOSURE ESTIMATED COSTS						
TASK	**ITEM**	**UNIT**	**QUANTITY**	**UNIT COST**	**CLOSURE COST**	**AECOM NOTES / ASSUMPTIONS**
1	2020 RPM MOBILIZATION	LS	1	$388,000	$388,000	Cost based on 2019 RPM Solutions Proposal
2	2020 RPM COAL PROCESSING/RECLAMATION	LS	1	$1,771,000.00	$1,771,000	Cost based on 2019 RPM Solutions Proposal
3	2020 RPM SITE RECLAMATION / RESTORATION	LS	1	$298,000	$298,000	Cost based on 2019 RPM Solutions Proposal
4	2020 RPM DEMOBILIZATION	LS	1	$226,000	$226,000	Cost based on 2019 RPM Solutions Proposal
5	misc removal and offsite disposal of debris or other material	TON	5,000	$37.50	$187,500	Engineer's estimate
6	BACKFILL WITH (OFF-SITE) STONE / GRAVEL	CY	32,267	$75	$2,420,000	Assumes depression filled with an average of 3 inches of stone/gravel over coal yard area (approximately 80 Acres) obtained from off-site borrow area.
	TOTAL				**$5,290,500**	

DECOMMISIONING AND DEMOLITION OF COAL YARD AND ASSOCIATED STRUCTURES

TASK	ITEM	UNIT	QUANTITY	UNIT COST	ESTIMATED COSTS	AECOM NOTES / ASSUMPTIONS
1	MOBILIZATION AND TRAINING	LS	1	$325,500	$325,500	
2	COAL YARD SUPPORT STRUCTURES AND CONVEYANCE SYSTEMS	LS	1	$5,700,000.00	$5,700,000	
3	COAL OPERATION SUPPORT SYSTEMS AND OTHER TANKS/VESSELS	LS	1	$1,729,140	$1,729,140	
4	ASH HANDLING EQUIPMENT AND OTHER ITEMS IN AREA	LS	1	$1,790,155	$1,790,155	
5	SITE RESTORATION	LS	1	$280,000.00	$280,000	
6	CREDIT FROM INVESTMENT RECOVERY	LS	1	($562,000)	($562,000)	Highly variable depending on market. Does not include sales tax
	TOTAL				**$9,262,795**	

DEMOLITION OF SITE BUILDINGS (COMPLETE)

TASK	ITEM	UNIT	QUANTITY	UNIT COST	ESTIMATED COSTS	AECOM NOTES / ASSUMPTIONS
1	MOBILIZATION AND TRAINING	LS	1	325,500	$325,500	
2	DEMOLITION	LS	1	30,500,000	$30,500,000	Excludes structures to remain (e.g., Admin building)
3	CREDIT FROM INVESTMENT RECOVERY	LS	1	-5,553,000	($5,553,000)	Highly variable depending on market. Does not include sales tax
	TOTAL				**$25,272,500**	

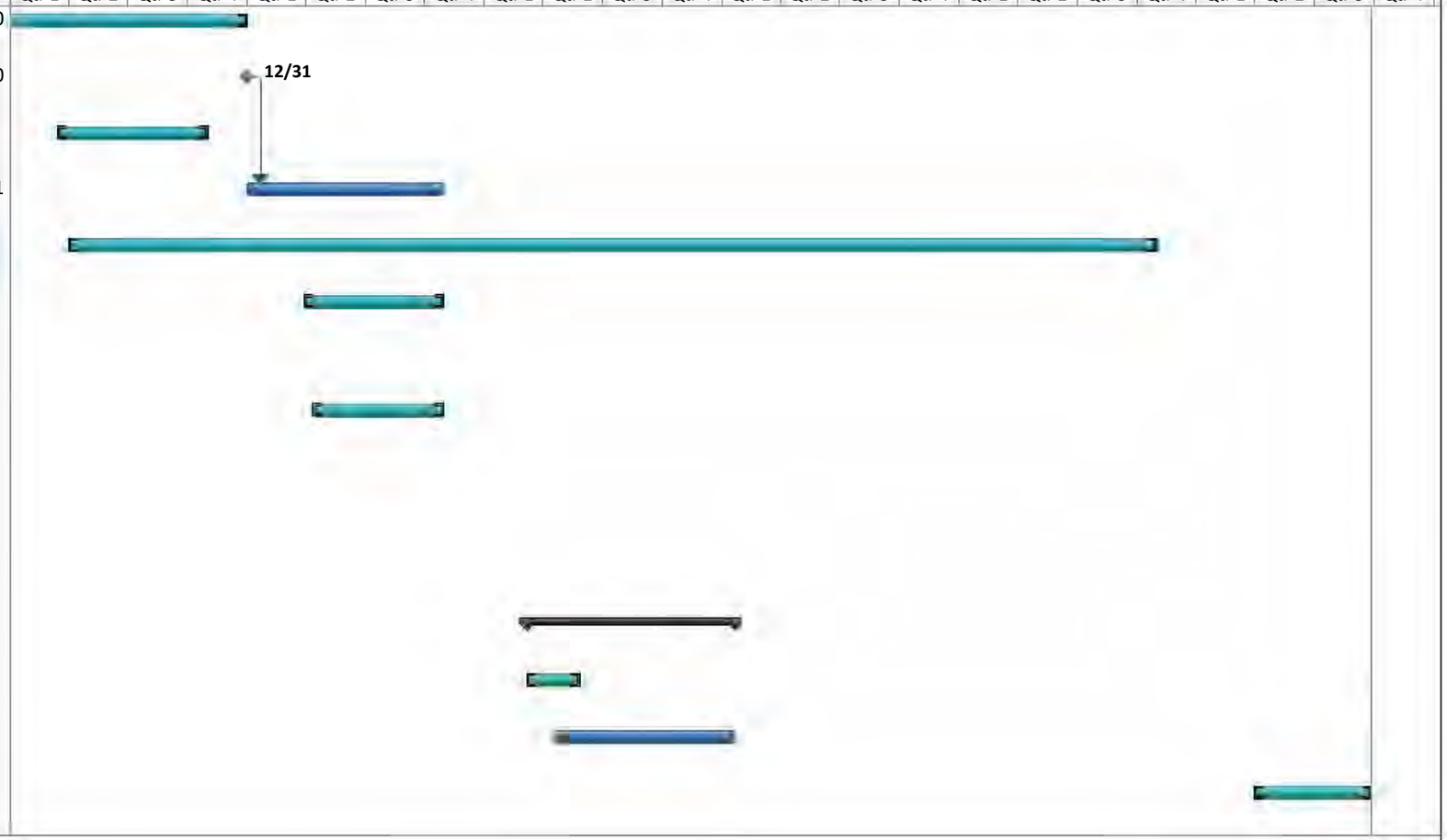
DEMOLITION OF SITE BUILDINGS (PARTIAL THEN 5 YEARS REMAINING)

TASK	ITEM	UNIT	QUANTITY	UNIT COST	ESTIMATED COSTS	AECOM NOTES / ASSUMPTIONS
1	PARTIAL DEMOLITION	LS	1	9,262,795	$9,262,795	Includes credit from asset recovery/salvage but not Stores
2	DEMOLITION (REMAINDER IN 5 YEARS)	LS	1	19,886,046	$19,886,046	Excludes structures to remain (e.g., Admin building). Includes salvage/asset recovery but not Stores (added 20% to remaining for remob/etc.)
	TOTAL				**$29,148,841**	

DECOMMISSIONING						
TASK	**ITEM**	**UNIT**	**QUANTITY**	**UNIT COST**	**ESTIMATED COSTS**	**AECOM NOTES / ASSUMPTIONS**
1						
2	PGE LABOR AND OUTSIDE SUPPORT	EST.	1	$400,000.00	$400,000	Needs a more detailed breakdown of contractors and vendors to provide this support. Depends on LOE by PGE. This is a placeholder.
3						
4						
5						
6						
7						
	TOTAL				**$400,000**	

Boardman Decommissioning Schedule - Partial Demolition of Coal Related Assets Only

ID	Task Mode	Task Name	Duration	Start	Finish
1		Planning and Design	523 days	Tue 1/1/19	Thu 12/31/20
2		Plant Shutdown	0 days	Thu 12/31/20	Thu 12/31/20
3		Coal Yard Reclamation	167 days	Sun 3/15/20	Sat 10/31/20
4		Decommissioning	216 days	Thu 12/31/20	Thu 10/28/21
5		Disposal area mining	1198 days	Wed 4/1/20	Fri 11/1/24
6		Boardman-Carty separation	155 days	Mon 3/29/21	Fri 10/29/21
7		Environmental assessment and remediation; pond cleanout	145 days	Mon 4/12/21	Fri 10/29/21
8		**Coal Related Assets**	**230 days**	**Mon 3/7/22**	**Fri 1/20/23**
9		ERM abatement	60 days	Mon 3/7/22	Fri 5/27/22
10		Demolition	200 days	Mon 4/18/22	Fri 1/20/23
11		Disposal area capping	130 days	Mon 3/31/25	Fri 9/26/25



Project: Decommissioning plan sc
Date: Wed 10/9/19

Task	Project Summary	Inactive Milestone	Manual Summary Rollup	Deadline
Split	External Tasks	Inactive Summary	Manual Summary	Progress
Milestone	External Milestone	Manual Task	Start-only	
Summary	Inactive Task	Duration-only	Finish-only	