EXHIBIT NO. ___(RJR-21)
DOCKETS UE-17____/UG-17____
2017 PSE GENERAL RATE CASE
WITNESS: RONALD J. ROBERTS

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, **Complainant,** **v.** **PUGET SOUND ENERGY,** **Respondent.**	**Docket UE-17____** **Docket UG-17____**

TWENTIETH EXHIBIT (NONCONFIDENTIAL) TO THE PREFILED DIRECT TESTIMONY OF

RONALD J. ROBERTS

ON BEHALF OF PUGET SOUND ENERGY

JANUARY 13, 2017

Colstrip Units 1 & 2 Demolition Cost Estimate

November 4, 2016

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Attachments

1.Executive Summary

HDR Engineering, Inc. (HDR) was retained by Puget Sound Energy (PSE) to conduct a demolition cost estimate for Units 1 & 2 power generation assets located at Colstrip Steam Electric Station. This study's purpose is to provide a retirement cost estimate to decommission and demolish each of these generating units upon retirement. The cost to remediate, close or perform legacy management or monitoring of ash ponds, ash settling ponds and coal yard areas are not included in this study.

The Colstrip Steam Electric Station consists of 4 coal fired boilers with a total generating capacity of 2,272 megawatts. The Colstrip steam generating station is located in Rosebud County approximately 2 hours east of Billings, MT. The facility consists of two boilers with a combined generating capacity of 712 megawatts. The power plant also has the following supporting facilities: Sulfur Dioxide Scrubber Units, limestone processing building, ash handling & storage equipment, coal handling and storage equipment, two concrete chimneys and two cooling towers as well as a number of control buildings and facilities operations support structures.

2.Demolition

2.1. Colstrip Units 1 & 2

2.1.1. Demolition Costing Methodology

The Colstrip Units 1 & 2 demolition estimate was developed using a "bottom up" approach, where the cost estimates were developed using site-specific quantity estimates based on as-built drawings showing site layout, equipment general arrangement drawings, plant elevation drawings, and a site visit performed on October 13, 2016. A comprehensive list of the facilities to be demolished as well as the tasks associated with each of the demolition activities can be found in the attached estimate spreadsheet "**Colstrip_Estimate_Spreadsheet.xlsx."**

Once these tasks were determined, HDR used the information to quantify the building materials that are associated with each structure at the site. The materials quantified include construction and demolition debris, concrete, as well as ferrous and non-ferrous scrap steel. Industry standard demolition means and methods were applied to the quantified building materials to calculate the production rate at which demolition labor and equipment could safely and efficiently demolish the structures associated with Colstrip Units 1 & 2. The means and methods and production rates are based on the qualifications, judgments and expertise of HDR's Decommissioning Team. The majority of the structures are assumed to be demolished using conventional labor and heavy equipment to remove the structures to grade. For cost estimating purposes it was assumed that explosive demolition would be used to demolish the two chimneys located on the site. For the purposes of this study three decommissioning and demolition cost options were prepared.

Option A: Units 1 thru 4 at the Colstrip Steam Electric Facility are shut down and there are no operating facilities that need to remain or be protected that would restrict demolition means and methods. All environmental concerns such as asbestos, universal waste, plant chemicals, PCB oil and lube oils will be removed from Units 1 and 2 and properly disposed off site.

Option B: Units 3 & 4 remain operational while the complete demolition of Units 1 & 2 occurs. Demolition means and methods will be modified to protect the Auxiliary building and all operations that are to remain.

In this option all asbestos, universal waste and PCB oil associated with Unit's 1 and 2 will be removed and disposed off site and all plant chemicals and lube oil will be transferred to Units 3 & 4 for re-use.

Option C: In this option all asbestos, universal waste and PCB oil associated with Units 1 and 2 will be removed and disposed off site. All plant Chemicals and lube oils will be transferred to Units 3 & 4 for re-use and the plant will be idled in place. Once this is competed Units 1 & 2 will remain in a cold, dark and dry condition until Units 3 & 4 are shut down. At that time all four units will be demolished simultaneously.

Once the production rates and material quantities were established, hourly labor and equipment costs, as well as disposal and recycling fees, were applied to estimate the overall cost of demolition. Labor rates were taken from RS Means labor categories for General Laborers, Foreman, Equipment Operators, Project Managers, and Equipment Mechanics currently used in Billings, MT. Equipment rates are similar to those used by national demolition firms that utilize specialized demolition equipment and tools to perform this work. Verbal price quotes were received on October 21, 2016 from Schnitzer Steel located in Billings, MT for scrap steel recycling costs. Construction and demolition debris is assumed to be disposed of with in a 2 hour radius of the plant. The disposal cost was assumed to be at a rate of $65 a ton and a cost of $77 a ton was used for transportation costs. Construction and demolition debris is generally defined as waste generated as a result of construction, renovation or demolition, such as wood, glass, carpet, ceiling tile, fixtures and furniture.

Unit rates were developed for the collection and disposal of the universal waste, consisting of batteries, CFC's, florescent light bulbs, light ballasts, electronic waste and fire extinguishers. HDR's Decommissioning Team has seen Universal Waste removal and disposal costs range from $0.10 to $0.25 a square foot. For the purposes of this study HDR has assumed $0.15 per sq ft for the disposal of Universal Waste at the Colstrip site. Additionally HDR has assumed that backfill materials will be sourced locally within 30 miles of the site at no cost to the demolition contractor. However, this estimate has accounted for labor and materials to haul backfill material to the site.

Once the demolition cost estimates were developed, HDR used historical data from facilities of similar vintage, size and megawatt capacity to evaluate the accuracy of the PSE demolition cost estimates.

HDR's Decommissioning Team has first hand knowledge of the data provided in **Table 1** from previous coal-fired power plant demolition projects performed between the years of 2009 and 2016. **Table 1** illustrates previous power plant demolition indices that were used as a comparison point for the Colstrip Units 1 & 2 demolition estimate. The indices used include tons per megawatt, asbestos abatement cost and demolition cost per ton. It should be noted that the below costs are for demolition, asbestos abatement, Universal Waste disposal, intake and discharge closure, backfill and final site grading only. Any pre-demolition decontamination work, such as the removal of coal ash from structures and the removal of lubricants, greases and chemicals, is not included in the table. These costs represent the cost for the above listed work plus the total revenue from the sale of scrap steel.

Table 1

Project Name	Mega-watts	Tons	# of Units	Years Built	Cost	Tons/ Megawatt	Cost per Ton*
Watts Bar	240	15,000	4	41-41-42-43	$6,056,417	63	$403.76
RH Gorsuch	200	23,326	4	51-51-51-51	$9,221,146	117	$395.32
McDonough	682	31,366	2	63-64	$15,712,179	46	$500.93
Barbados Island	200	16,423	5	24-48	$5,941,463	82	$361.78
Martins Creek	300	18,292	2	56-57	$5,337,041	61	$291.77
Xcel Cherokee Station	420	12,100	4	57-62	$12,017,342	29	$993.17
Duke Edwardsport	144	13,324	3	44-49-51	$5,633,317	93	$422.79

Xcel High Bridge	276	41,100	2	56-59	$21,677,070	149	$527.42
Exelon Delaware Station	125	16,423	2	53-53	$4,506,312	131	$274.39
Powerton Station	1785	31,460	2	72-75	$13,255,187	18	$421.33
AEP Breed Plant	500	32,104	1	60	$7,746,816	64	$241.30
PSEG Sewaren NJ	115	12,941	1	60	$2,100,846	113	$162.34
PPL Holtwood	108	14,033	1	72	$3,176,978	130	$226.39
Branch	1600	108,000	4	61	$40,729,000	67.5	$377.12
Chesapeake	650	45,000	4	52-54-59-62	$16,920,000	69.23	$376.00
Sutton	575	18,726	3	54-55-72	$11,282,000	32.57	$602.48
Cogentrix	135	8,775	2	88-88	$2,400,000	65	$273.50
Canadys Station	489	14,500	3	62-64-67	$8,469,000	29.65	$584.07
John Sevier	800	54,000	4	55-55-56-57	$28,872,000	67.5	$534.67
AEP Phillip Sporn	1105	58,000	5	50-50-51-52-60	$26,089,722	52.49	$449.82

**Inclusive of demolition, asbestos abatement, intake and discharge closure, backfill, and final site restoration.*

For a point of comparison the data in **Table 2** represents the same data as shown in **Table 1** for Colstrip Units 1 & 2 Option A. It should be noted that the Colstrip scope includes removal of chemicals, lubricants and backfilling of ponds which were not included in the scope of work listed in **Table 1**.

Table 2

Project Name	*Mega-Watts*	*Tons*	*# of Units*	*Years Built*	*Total Cost*	*Tons/Megawatt*	*Cost per Ton*
Colstrip Units 1 & 2	712	40,561	2	75-76	$8,156,790	57	$201.10

For the Colstrip Units 1 & 2 demolition estimate study, HDR has provided a summary of the individual task costs as well as scrap salvage quantities and values in a summary cost sheet ("Summary" tab of **"Colstrip_Estimate_Spreadsheet.xlsx"**). Back up data has also been provided in the cost sheet that details the individual labor, equipment, disposal and scrap salvage for each structure and task associated with the demolition work ("DetailSum" tab of **"Colstrip_Estimate_Spreadsheet.xlsx"**). This information details how each individual cost was derived.

2.1.2. Decommissioning and Demolition Cost Considerations

The scrap steel market is very volatile and currently at one of it's all time lows. Scrap steel pricing can vary from month to month depending on many global factors. **Table 1** demonstrates that the cost to demolish similar size and vintage power plants can vary significantly from plant to plant. The biggest driving factor for these variations is the value of scrap steel at the time of demolition. In the past 10 year period, scrap steel prices have varied in price from as low as $100/ton to as high as $500/ton and has greatly affected the net cost to demolish a coal-fired power plant. For the purposes of this study we have assumed the scrap still will be shipped by truck to Billings, MT for recycling. The Billings scrap steel market is comparable with other scrap steel markets in the country currently. However, given the Colstrip plant's remote location transportation costs are significantly reducing the scrap salvage return for this project. Approximately 25% of the Plate and Structural and No1 Heavy Melt scrap steel revenue for the Colstrip plant is being used to cover transportation costs. Sheet steel and Rebar are at a negative cost due to the low value for this commodity and the distance to market.

Other variables that can affect the cost of demolishing a coal-fired power plant include the design and age of the structure. Colstrip Units 1 & 2 are built slab on grade and so this reduces the need to backfill a large basement area which can be as much as 40% to 50% of the demolition costs. Because the boilers on Colstrip Units 1 & 2 are externally hung boilers this will help reduce the overall demolition cost. Some power plants are enclosed structures with brick, concrete or sheet metal siding which requires more work

to process and dispose or recycle the external brick, concrete or sheet steel versus a structure that is not constructed with those materials on the exterior. Concrete chimneys can result in a very large cost differential from one power plant to the next. In most instances where adequate space is available, the means and methods for demolishing a large concrete chimney will be to "fell" the chimney like cutting down a tree either mechanically or through the use of explosives. This is the method that would be employed at the Colstrip facility. However, if there are structures nearby within the radius of where the chimney could fall, then hand demolition may be required to remove the chimney in a safe and effective manner. If hand removal is required, this can add a factor of 15 to 20 times more to the cost than the mechanical/explosive "felling" methods. For example to demolish a 450' chimney using either explosive or mechanical felling means and methods would cost approximately $150,000. However, to remove that same stack by hand would cost approximately $3,000,000. For estimating purposes we have assumed that explosive means and methods can be employed to demolish the chimneys associated with Units 1 and 2. The cost to demolish the Unit 1 & 2 stacks is approximately $100,000 a piece.

Due to regulatory requirements, many coal-fired power plants have added air emission control facilities. These environmental controls include electrostatic precipitators, Selective Catalytic Reduction (SCR) Units and Flue Gas Desulfurization (FGD) Units, as well as additional chimneys that accompany these structures. These structures are typically large, steel structures that can add a significant amount of scrap steel value when demolishing a power plant. Colstrip Units 1 & 2 are equipped with smaller Sulfur Dioxide Scrubber Units and the scrap value for these units has been accounted for in this study.

The age of the facility can also affect the cost of demolition due to the change in construction materials and the design of the facility. Typically, facilities built after 1970 are of a "lighter" construction type and even though the megawatt capacity may be the same as a 1950s vintage power plant, the amount of scrap steel salvage from the building will typically be less, which can drive up the overall demolition cost due to a lower return on scrap. Power plants constructed in the1950's and 1960's can average 65 tons per mega watt or more. Colstrip Units 1 & 2 where built in 1972 and 1973 and are estimated to have approximately 57 tons of scrap steel per mega watt.

Environmental issues play another key factor in the cost differences in demolishing one power plant over another. The biggest environmental cost associated with power plant demolition work is the removal of asbestos containing materials. Colstrip Units 1 & 2 has minimal asbestos abatement work to be done which contributes to why the cost to demolish Colstrip Units 1 & 2 is lower relative to power plants of similar size as show in **Table 1**. Polychlorinated Biphenyl (PCB) contamination is typically the second greatest environmental cost driver in a power plant demolition project. If building materials are contaminated with PCBs, this can drive up the cost of demolition due to the expensive disposal cost associated with PCB contaminated materials. There is no evidence that building materials in Colstrip Units 1 & 2 are contaminated with PCB's. Therefore, we have assumed that no PCB impacted demolition waste will need to be disposed of as part of the decommissioning activities. However, PCB oil filled equipment is present in the facility. The cost to drain, clean and dispose of the PCB oil identified at Colstrip Units 1 & 2 has been accounted for in this study and can be found under the "Environmental Cost" section on the ("Summary" tab of **"Colstrip_Estimate_Spreadsheet.xlsx"**).

Lastly, construction labor can be a significant variable. Depending on the labor laws in the region and/or the Owner's desire to use union or non-unionized labor, the hourly cost for demolition can vary significantly. Additionally, labor costs typically increase on a yearly basis as a result of cost of living wage increases. Once the Colstrip Steam Electric Station facility is shut down a union presence will cease to exist at the plant. Demolition work is primarily performed by the laborer and heavy equipment operator trades. Given that there is not a strong laborer and operators union in the Colstrip area it is assumed that

the demolition work will be perform non-union. HDR based the labor cost for this estimate on RS Means non-union wages currently being used in Billings, MT.

2.1.3.Colstrip Units 1 & 2 Demolition Estimate Scope of Work

HDR performed a site walk down of the Colstrip Units 1 & 2 with PSE on October 13, 2016. During this visit, a complete site survey was performed to identify site demolition cost obligations. Demolition cost obligations identified are included in the detailed pricing estimate for demolition and environmental obligations. Based on this site visit and our review of the drawings provided by PSE, HDR has developed a Class IV concept feasibility study as defined by the American Association of Cost Engineers (AACE) with a (+/- 30% - 50%) degree of accuracy.

The following drawings were used to develop the demolition estimate:

- Boiler Plan Drawings
- Boiler & Turbine Cross Section Drawings
- Coal Handling and Conveyor Drawings
- Sulfur Dioxide Scrubber Units Cross Section & Elevation Drawings
- Stack Drawings
- Office Building Drawings
- Water Treatment Plant Drawings
- Lime Storage Drawing
- Google Earth Aerial View Measurements
- Site Plot Plan Drawings

Based on our review of information made available to HDR, the probable cost to demolish the Colstrip Units 1 & 2 steam generating station is:

Option A: $8,158,790
Option B: $14,147,728
Option C: $293,353

Details can be found in the **"Colstrip_Estimate_Spreadsheet.xlsx."** The key assumptions used in developing this cost are presented below.

2.1.4 Key Assumptions

Option A – Key Assumptions

- Complete removal of above-grade structures described in the detailed pricing spreadsheet.
- It is assumed that all gross accumulations of coal and ash have been removed from the facilities.
- The following structures, as identified on the limits of demolition drawing, are assumed to be "common structures": Warehouse, Machine Shop, Training Center, NAES Building, Auto Shop, Waste Site, Fuel Crew Building, Buildings & Grounds Building, Truck Scale, Administration Building, Security Building, Auxiliary Service Building and 4 main storm drain ditches.
- The following non- CCR ponds will be backfill with locally sourced fill, Pond C – North and Pond C South.
- All ponds are assumed to be unlined and have no soil berms around them.
- All ponds are assumed to have a depth of 25' below surrounding grade elevation.
- This estimate assumes that the ponds are drained and cleaned of any non-suitable fill material prior to commencement of decommissioning activities.
- Conventional removal of two 250' tall stacks and associated slabs.

- Removal of all slabs and foundations down to 3' below grade.
- Removal and proper disposal of Universal Waste including batteries, mercury switches, PCB light ballasts, fluorescent light bulbs, fire extinguishers, and air conditioning unit CFCs prior to demolition.
- The site will be graded to provide for positive site drainage and will follow existing site contours.
- This estimate does not include the removal of asphalt paving.
- Import of backfill for areas where slabs have been removed. This pricing assumes that the backfill material can be sourced with in 30 minutes of the site at no charge.
- It is assumed that all brick, block and concrete masonry debris material will be crushed to 2" and used as backfill material on site.
- All metallic debris will be recycled and credited back to the cost of the project.
- It is assumed that all non-masonry and non-metallic building debris can be landfilled at a rate of $65 a ton within a 2 hour radius of the facility.
- All labor pricing is based on 2016 Billing MT. RS Means non-union rates.
- All equipment pricing is based on specialized demolition equipment rates which are assumed to be standard for the industry.
- Ferrous metals recycle pricing is based on quoted price from Schnitzer Steel, Billings, MT., on October 21, 2016:
  - #1 Heavy Melt: $85 GT
  - Plate and Structural: $95 GT
  - Sheet Steel: $55 GT
- Non-ferrous metals recycle pricing is based on quoted price from Schnitzer Steel, Billings, MT., on October 21, 2016:
  - Insulated Wire: $1.30 per pound
  - 316 Stainless: $0.20 per pound
  - 304 Stainless: $0.20 per pound
  - 6061 Aluminum: $0.50 per pond
  - Brass: $1.30 per pound
- For purposes of this study, it is assumed that none of the equipment will have a salvage value in excess of the scrap value of the materials in the equipment at the time of the decommissioning study. All equipment, steel, copper, and other metals will be sold as scrap. Credits for salvage value are based on scrap value alone. Resale of equipment and materials is not included.
- Scrap values are based upon the materials at the site at the time of the study and do not take into account changes of materials (such as replacing boiler tubes) over the plant life.
- All building materials are clean and can be readily disposed or recycled. The disposal of any regulated waste or hazardous materials other than those listed in the **"Colstrip_Estimate_Spreadsheet.xlsx"** have not been included in this estimate.
- All transmission switchyards, substations and lines are excluded from the decommissioning cost estimate.
- Stormwater management procedures are assumed to require only the use of readily available best management practices, e.g., silt fence and hay bales will be required during demolition.
- A demolition permit and permitting for the transportation of heavy equipment hauling are the only permits that will be required. Any other permits or modifications to existing permits that may be needed to perform this work have not been included.
- The assumed duration for all demolition work is based on the man-hours estimated to perform the demolition. See detailed schedule in **"Attachment A - Deconstruction Schedule."**

Option B – Key Assumptions (All assumptions are as stated above in Options A with the following additions**)**

- Option B assumes that the Auxiliary Building and Units 3 & 4 will be operating during the demolition of Units 1 & 2. In order to perform this work safely a physical separation of the Turbine Hall will be made from the Auxiliary building and Unit 2 will be deconstructed using a crane to pick the structure down. See Option B demolition plan drawing. Re-sheeting of the Auxiliary Building has not been included in this cost.
- Any costs for the utility disconnects or re-routes needed to de-couple Units 1 & 2 from Units 3 & 4 have not been included in this estimate.
- Items found in the "Chemical Storage" tab of **"Colstrip_Estimate_Spreadsheet.xlsx"** and the "Petro Storage" tab of **"Colstrip_Estimate_Spreadsheet.xlsx"** will be transferred to Units 3 & 4 for reuse.

Option C – Key Assumptions

- Option C assumes that Units 1 & 2 will be retired and remain idled until Units 3 & 4 are ready to be demolished. Units 1 & 2 will be put into a **Cold, Dark & Dry** condition. Items found in the "Chemical Storage" tab of **"Colstrip_Estimate_Spreadsheet.xlsx"** and the "Petro Storage" tab of **"Colstrip_Estimate_Spreadsheet.xlsx"** will be transferred to Units 3 & 4 for reuse.
- Items found in "Asbestos Unit Rates" tab of **"Colstrip_Estimate_Spreadsheet.xlsx"** and the "PCB" tab of **"Colstrip_Estimate_Spreadsheet.xlsx"** will be removed and disposed of.
- This cost does not include the cleaning of bulk ash or coal from facilities or equipment.
- This cost does not include bringing Units 1 & 2 to a zero energy condition. The cost to disconnect, re-route or de-couple any utilities from Unit 1 & 2 or between Units 1 thru 4 is not included in this cost.

3. Environmental Liabilities

3.1. General Methodology

To understand the liabilities associated with the Colstrip Units 1 & 2 facility HDR provided a Site Decommissioning Questionnaire to PSE. The questionnaire was used to assist PSE in identifying environmental conditions onsite that should be considered for this study. The questionnaire is also used to identify environmental concerns that may have cost implications for decommissioning and demolition. HDR took into consideration current and legacy environmental conditions related to decommissioning the facility. For the purposes of this study, the following items were considered as part of the process for estimating the environmental liabilities for each facility:

- Legacy Conditions. Legacy conditions include but are not limited to, historical uses of the property that may have continuing obligations subsequent to demolition based on the information obtained in our review of documentation provided by PSE and the interview process. An example of a legacy environmental condition would be a long-term groundwater monitoring requirement, either on-site or off-site, or past site uses that may require future monitoring such as an old landfill.
- Continuing Legal Obligations. Ongoing legal obligations (exclusive of CCR) related to environmental actions, engineering controls, institutional controls, and/or consent orders. An example would be a lawsuit or state consent order requiring long-term evaluation, assessment or reporting requirements that would extend beyond decommissioning of the facility or would require renegotiation as part of facility shut-down, decommissioning, or demolition.
- Continuing Remedial Obligations. Continuing obligations related to ongoing monitoring or remedial obligations due to a past PSE activity that is being addressed as part of a current corrective action program. An example may be operating a treatment system, measuring water levels, or sampling to maintain a permit.
- Open Spills. Open Spills or releases requiring assessment or corrective action.

3.2. Summary of Legacy Obligations

Based on our review of the information and interviews completed with representatives at the facility, no ongoing obligations have been identified with the exception of the following:

- Open Spills. Two spills were identified for the Site and provided by PSE in their checklist. These spills have been cleaned or remediated.

No continuing legacy obligations remain for these facilities. This is based on HDR's cursory review of legacy obligations.

3.3. Decommissioning Obligations

For most deconstruction and demolition projects, it is necessary to reduce stockpiles of raw materials, petroleum products and hazardous materials in advance of plant shutdown. This will minimize the amount of material that will require management and/or off-site disposal. It is recommended that at the time of decommissioning for Colstrip Units 1 & 2 PSE will work to reduce inventories of any petroleum products and/or hazardous materials that are no longer being used at the facility prior to the demolition contractor beginning work.

Remaining decommissioning obligations include the reduction, recycle, or disposal of petroleum products and hazardous materials at each of the facilities including asbestos.

3.4. Petroleum and Hazardous Materials Methodology

For the purpose of this study, HDR acquired petroleum and hazardous materials quantities and locations based on PSE's response to HDR's Site Decommissioning Questionnaire for the Colstrip Units 1 & 2 facility. For costing purposes, the following assumptions were made:

- The information provided in the Site Decommissioning Questionnaire is true and accurate;
- The maximum volumes specified in the questionnaire were used for costing and schedule;
- If no market for reuse or recycling was identified for a specific product or material, a cost was obtained for disposal; and
- All products would require a vendor to remove, recycle and/or dispose of the material (financial debit).

Based on quantities provided by PSE HDR contacted Mountain States Environmental Services (MSES) in Billings, MT to receive unit cost rates for the removal and disposal of the following:

PCB Oil
Process Chemicals
Diesel Fuel
Lube Oil

3.4.1. Petroleum Methodology

This estimate has accounted for the cost to drain and transport the petroleum products to be disposed of. HDR has provided a summary of the individual task costs in ("Petro Storage" tab of **"Colstrip_Estimate_Spreadsheet.xlsx"**).

3.4.2.Process Chemicals Methodology

This estimate has accounted for the cost to drain and transport the process chemicals to be disposed of. HDR has provided a summary of the individual task costs in ("Chemical Storage" tab of **"Colstrip_Estimate_Spreadsheet.xlsx"**).

3.4.3.Asbestos

This estimate has accounted for the cost to remove and dispose of asbestos containing materials. HDR has provided a summary of the individual task costs in ("ACM" tab of **"Colstrip_Estimate_Spreadsheet.xlsx"**).

PSE identified the follow items & quantities to be Asbestos containing:

- Roofing 4562
- Mastic 1,000 SQ. FT.
- Gaskets 12 EA.
- Pipe Elbows 2 EA.

PSE assumes the following items are asbestos containing. Based on knowledge of similar power plants of similar size and vintage HDR's Decommissioning Teams assumed the following quantities.

- Roof Flashing 1,400 LF
- Roof Penetrations 140 EA
- Electrical Wire 8,900 LF

3.4.4.Lead Based Paint

Based on the age of the Colstrip facility, the presence of lead based paint is expected to be limited or not present at all.

Under the Resource Conservation and Recovery Act (RCRA), certain hazardous wastes are not subject to regulation if recycled.

The following materials are hazardous wastes but are not subject to RCRA Subtitle C regulation when recycled:

- Scrap metal — Scrap metal that is not excluded under 40 CFR 261.4(a)(13). See 40 CFR 261.6(a)(3)(ii).

Based on this regulation, lead based paint located on steel structures during demolition is exempt when recycled. Steel will be recycled for market value and included in the demolition costs for recycled steel. No costs have been included specific to lead based paint because no specialized remedial measures are required.

3.4.5.Polychlorinated Biphenyl (PCB)

This estimate has accounted for the cost to remove and dispose of PCB oils in equipment. No PCB impacted building materials are anticipated to require disposal. HDR has provided a summary of the individual task costs in ("PCB" tab of **"Colstrip_Estimate_Spreadsheet.xlsx"**).

4.Applicable Regulations

This section provides a list of Federal and State statutes, rules and regulations dealing with the prevention of environmental pollution and the preservation of public natural resources that relate to this

work. This list is not an all encompassing list. It is the responsibility of the contractor performing this work to be aware of and abide by all applicable federal, state and local regulations that govern their work.

Federal

Code of Federal Regulations (CFR) **Title 40-Protection of the Environment**, **Chapters I-Environmental Protection Agency**, Subchapter I-Solid Wastes, Parts 260 to 299.

EPA Solid Waste Disposal Facilities and Practices

a. 40 CFR 257 - Criteria for Classification of Solid Waste Disposal Facilities and Practices

EPA Hazardous Waste Management General Requirements

b. 40 CFR 260 - Hazardous Waste Management

EPA **Generator** Requirements (Import and Export) of Hazardous Waste

c. 40 CFR 262 - Standards Applicable to Generators of Hazardous Waste

EPA **Transporter** Recordkeeping and Discharge Regulations

d. 40 CFR 263 - Standards Applicable to Transporters of Hazardous Waste

CFR (Title) 40-Protection of the Environment, Chapters I-Environmental Protection Agency, Subchapter D-Water Programs.

Environmental Protection Agency Regulations, 40 C.F.R. Part 15

CFR (Title) 49 CFR Transportation (The following regulations refer to Transportation Regulations under Federal Code for the transport of Hazardous Materials)

General Information and basis for Hazardous Materials Removal

a. 49 CFR 171- General Information, Regulations, and Definitions

Definition and classification of Hazardous Material regulated under these regulations .

b. 49 CFR 172 - Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements

General Requirements for Shippers, Preparation of Hazardous Materials for transportation, class definition and requirements of Hazardous Materials transportation

c. 49 CFR 173 - Shippers - General Requirements for Shipments and Packaging

Transportation Regulations for the transport, loading, unloading of hazardous material including discharge during transportation and limitations of shipment on highways.

d. 49 CFR 177 - Carriage by Public Highway

Refers to the Qualification and Maintenance of storage vessels during shipment (Cylinders, Storage Tanks, Rail Cars etc.)

e. 49 CFR 180 - Rules for Continuing Qualification and Maintenance of Packaging

Clean Air Act Title 42 – Federal regulatory framework for air pollution regulation. Allows government to regulate, investigate, permit, and enforce air pollution regulation.

Clean Water Act of 1977 Title 33 – Enhances and overhauls the Clean Water regulations originating in 1972. Provides increased regulation of navigable water ways and sets goals for the elimination of water pollutions in to surface water streams and rivers.

Water Quality Act of 1987 – Political override reinstating and improving several water regulations that are currently in effect.

Department of Labor, **Title 29** U.S.C. 213 (a) (5), 40 U.S.C. 201, 206; 49 U.S.C. 1653- The following regulations pertain to regulation of worker, worker, safety and right-to-know regarding hazardous materials

The following regulation refers to **Transporter** Right-to-know.

U.S. Department of Transportation Hazardous Substances Title 29, Parts 171 and 172 of the Code of Federal Regulations

Federal Aid Highway Act of 1968, is legislation which explicitly applied the environmental protections of the Department of Transportation Act of 1966 to federal highway projects

OSHA – These regulations pertain to worker health and safety.

CFR Title 29 Occupational Safety and Health Administration (OSHA), Parts 1900 through 1926.

Classifying and communicating information on hazardous materials to employees.

a. 29 CFR-1910.1200 - Hazardous Communications

Eye and face protection standards

b. 29 CFR-1910.133 - Eye and Face Protection

Inhalation and respiratory protection standards, medical and equipment

c. 29 CFR-1910.134 – Respiratory Protection

Design, application, and use of signs or symbols that define specific hazards that could harm workers or the public, or both, or to property damage

d. 29 CFR-1910.145 – Specifications for Accident Prevention, Signs, and Tags

Applies to all occupational exposures to asbestos in all industries covered by the Occupational Safety and Health Act

e. 29 CFR-1910 (OSHA) - 1001 Toxic and Hazardous Substances

Provide employees and their designated representatives a right of access to relevant exposure and medical records

f. 29 CFR-1910.1020 - Records and Exposure

Regulatory framework for worker health and safety procedures for Construction

g. 29 CFR 1926 et. Seq. – Safety and Health Regulations for Construction

Worker protection regulations for exposure to asbestos containing material:

Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite; Final Rules Title 29, Part 1910, Section 1001 and Part 1926, Section 58

Worker Protection regulations for exposure to lead and lead based pint in Construction related activities.
Federal OSHA Section 1926.62, Lead in Construction

The following regulation is meant to prepare comprehensive programs for eliminating or reducing the pollution of interstate waters and tributaries and improving the sanitary condition of surface and underground waters.

Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et. seq. 201, 302, 303, 304, 306, 307, 308, 310, 311, 312, 316, 318,401, 402, 403, 404, 405

This regulation is regarding noise pollution including contraction and specific to equipment emissions.

Federal Noise Control Act of 1972 42 USCA Section 1858 National Emission Standards Act, 42 U.S.C. 1857f-1 to 1857f-7

This regulation established judicial definitions and coastal prohibitions for the United States maritime industry

Oil Pollution Act of 1961,Title 46 33 U.S.C 1001-1015 33 U.S.C. 1007 Parts 2, 35, 78, 93, 97, 167,196 1008-1011 32 C.F.R. 151

The Resource Conservation and Recovery Act (RCRA) gives EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste.

Resource Recovery Act of 1970, 42 U.S.C. 3241-3254f, 3256-3259

This is the first federal effort to improve waste disposal technology. Requiring new cleaner disposal requirements for solid waste.

Solid Waste Disposal Act, 42 U.S.C.3251-3259, 40 C.F.R. Part 30

Asbestos Abatement Projects; Worker Protection Rule

The following regulation all pertains to asbestos protection, including training, disposal, and analytical methods for sampling

Title 40 Part 763, Sub-part G of the Code of Federal Regulations

Title 40, Part 763, Sub-part E of the Code of Federal Regulations

Title 40, Part 763, Sub-part E, Appendix C

Title 40, Part 61, Sub-part A, and Sub-part M (Revised Sub-part B)

The following act provides the framework for including powers to regulate government and civilian use of nuclear materials that can be used on monitoring devices or waste materials.

Atomic Energy Act of 1954 (42 USC Section 2011 et seq.)

Montana Department of Environmental Quality (DEQ)

State laws regulating water in Montana including stormwater

MCA Title 75, Chapter 5 – Water Quality
ARM Title 17.30.1101 – Storm Water

State regulations to reduce air pollution.

Clean Air Act of Montana, Title 75 Environmental Protection, Chapter 2 Air Quality
Asbestos Control, Title 75, Chapter 2, Part 5
Administrative Rules of Montana – Title 17, Chapters 8, 74

Asbestos state regulation to implement and add to the Federal asbestos regulations.

Federal Environmental Protection Agency (EPA) 40 CFR 61Subpart M and the Asbestos National Emissions Standard for Hazardous Air Pollutants (NESHAP)

Asbestos abatement regulation as adapted by Montana Department of Environmental Quality

Montana Demolition Notification with Asbestos Project Permit Application

The following provides for the planning and regulation of solid and waste storage, collection, transportation, processing, treatment, and disposal; requiring municipalities to submit plans for municipal waste management

Montana Solid Waste Management Act 75-10-201, MCA

Administrative Rules of Montana (ARM) Sub Chapters 5,

ARM 17.50.503(1)(C)

ARM 17.50.502(4)

The following provides for the planning and regulation of hazardous waste storage, collection, transportation, processing, treatment, and disposal; requiring municipalities to submit plans for municipal waste management

MCA 2015 Title 75 Chapter 10 Pat 4 Hazardous Waste Management
ARM Title 17 Chapter 53

State regulations governing asbestos and air pollution. Notifications permits (etc.)

Montana Department of Environmental Quality – Bureau of Air Quality
ARM Title 17 Chapter 8

Montana Voluntary Cleanup and Redevelopment Act (VCRA)

Montana lead based paint regulations, worker training etc.

Federal EPA Regulation 40 CFR 745, Subpart E as adopted by Montana Department of Environmental Quality

5.Schedules

A schedule for Options A & B for site decommissioning and demolition has been developed. The schedule has been put in place with the following assumptions:

- The schedule assumes that no reduction of stockpiled chemicals, lubricants and fuel oil has occurred.
- The production rates for the following activities are based on HDR's decommissioning team's industry experience.
- Schedule assumes an unbroken decommissioning timeline without intermediate breaks or reporting that PSE may require in their process.
- Schedule does not include procurement of subcontractors.
- Although some hazardous materials and petroleum removal can be performed concurrently, the schedule assumes that petroleum and hazardous materials removal will occur prior to the start of demolition.
- A schedule has not been developed for Option C. It can be assumed that the removal or transfer of hazardous materials and petrochemicals will take 6 weeks.

5.1. Decommissioning and Demolition Schedule

Decommissioning and demolition schedules are located in the Attachments: A

- **Attachment A: Colstrip Deconstruction Schedule**

6.Waste Management Flow Chart

A waste management flow chart for decommissioning and demolition activities at the Colstrip Units 1 & 2 facility are located in Attachment: B

- **Attachment B: Waste Management Flow Chart**

Attachments

A

Attachment A

Colstrip Units 1 & 2 Deconstruction Schedule

Option A

Task Number	Task Name	20XX												20XX				
		Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
1	Environmental Cleaning																	
2	Out Buildings, Common Structures & Coal Handling Demo																	
3	Turbine Hall Demolition																	
4	Unit 1 & 2 Demolition																	
5	Scrubber 1 & 2 Demolition																	
6	Stack Demolition																	
7	Slab & Foundation Demolition																	
8	Crush Concrete & Backfill																	
9	Pond Closure																	

Option B

Task Number	Task Name	20XX												20XX				
		Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
1	Environmental Cleaning																	
2	Out Buildings, Common Structures & Coal Handling Demo																	
3	Turbine Hall Seperation																	
4	Turbine Hall Demolition																	
5	Unit 2 Demolition																	
6	Unit 1 Demolition																	
7	Scrubber 1 & 2 Demolition																	
8	Stack Demolition																	
9	Slab & Foundation Demolition																	
10	Crush Concrete & Backfill																	
11	Pond Closure																	

B

Attachment B

Waste Management Flow Chart

Construction and Demolition Debris

WASTE STREAM	WASTE DESCRIPTION	SAMPLING FREQUENCY	ANALYSIS	HANDLING
Construction and Demolition Debris	Non Painted /Non Coated Construction and Demolition Debris - gypsum wallboard, dimensional structural lumber, insulation, windows, roofing materials, etc.	All non painted/coated C&D will be managed without sampling.	No sampling will be performed on this material.	All non masonry C&D (gypsum wallboard, dimensional lumber, insulation, miscellaneous architectural/structural components) will be removed using hydraulic excavators with grapples, front end loaders, skid steers and manual labor as needed. The removed non-painted non masonry C&D will be either segregated and stockpiled for/or loaded directly into trucks for transportation and disposal to a client approved Sub Title C landfill.
Non Hazardous Construction and Demolition Debris - **< 5 PPM Lead**	Painted / Coated Construction and Demolition Debris - gypsum wallboard, dimensional structural lumber, insulation, windows, roofing materials, etc.	Prior to any demolition activities, Contractor will take XRF and/or paint chip samples of paint of the various painted C&D components to verify presence and content of lead in the paint. C&D coated with lead based paint "(LBP)" will be sampled in accordance with the receiving landfill, e.g., 12 composite samples per 3000 cubic yards or less for smaller quantities.	EPA SW-846 Test Method 1311 - Toxicity Characteristic Leaching Procedure for Lead.	All non masonry C&D (gypsum wallboard, dimensional lumber, insulation, miscellaneous architectural/structural components) will be removed using hydraulic excavators with grapples, front end loaders, skid steers and manual labor as needed. The removed non masonry C&D will be either segregated and/or stockpiled per analysis results as LBP contaminated or non-LBP contaminated debris for/or loaded directly into trucks for transportation and disposal to a client approved Sub Title C landfill.
Hazardous Construction and Demolition Debris - **> 5 PPM Lead**	Painted / Coated Construction and Demolition Debris - gypsum wallboard, dimensional structural lumber, insulation, windows, roofing materials, etc.	Prior to any demolition activities, Contractor will take XRF and/or paint chip samples of paint of the various painted C&D components to verify presence and content of lead in the paint. C&D coated with lead based paint "(LBP)" will be sampled at a rate of one sample per 500 tons. (Representative Sample per EPA Resource and Recovery Act (RCRA) 40CFR240-280)	EPA SW-846 Test Method 1311 - Toxicity Characteristic Leaching Procedure for Lead.	All non masonry C&D (gypsum wallboard, dimensional lumber, insulation, miscellaneous architectural/structural components) will be removed using hydraulic excavators with grapples, front end loaders, skid steers and manual labor as needed. The removed non masonry C&D will be either segregated and/or stockpiled per analysis results as LBP contaminated debris for/or loaded directly into trucks for transportation and disposal to a Sub Title C landfill.
"Clean Fill" Construction and Demolition Debris	Non Painted /Non Coated uncontaminated masonry Construction and Demolition Debris - brick, block, concrete, rock - **"Clean Fill" As defined in ARM 17.50.502(4)**	All non painted/coated masonry C&D will be identified prior to the start of demolition activities and managed per the Montana DEQ C&D Recycling Policy without sampling.	No sampling will be performed on this material.	All **masonry C&D** - Contractor will perform a visual inspection of all masonry materials prior to the start of demolition activities (due diligence). Materials that appear to be uncoated and/or uncontaminated will be managed as "clean fill" defined as "**Uncontaminated, nonwater-soluble, no decomposable inert solid material. The term includes soil, rock, stone, dredged material, brick, block or concrete from construction and demolition activities. Materials unaffected by a spill or release of a regulated substance will be treated as "clean Fill."** Said material will be crushed to 2" +/- on site, loaded directly into trucks for transportation to a client approved landfill.
"Clean Fill" Construction and Demolition Debris	Painted masonry C&D - brick, block, concrete, rock **not** contaminated with lead based paint (LBP)	Prior to any demolition activities, Contractor will take XRF and/or paint chip samples of paint of the various masonry to verify presence and content of lead in the paint. Materials coated with non-LBP will be identified and delineated prior to the start of demolition activities. These materials will be managed as "Clean Fill" per ARM 17.50.502(4)	No other sampling will be performed on this material.	All masonry C&D - Contractor will perform a visual inspection of all masonry materials prior to the start of demolition activities (due diligence). Materials that are painted will be identified and XRF and/or paint chip sampling will be performed to verify presence of lead in the paint. Material coated with paint that is confirmed as non- lead based paint will not be sampled and will be crushed to 2" +/- loaded directly into trucks for transportation to a client approved recycling facility.
"Asphalt" Construction and Demolition Debris	Asphalt	All non painted/coated asphalt will be managed without sampling as per ARM 17.50.503(1)©	No other sampling will be performed on this material.	All Asphalt - Contractor will perform a visual inspection of all asphalt materials prior to the start of demolition activities (due diligence). Materials that are painted will be identified and XRF and/or paint chip sampling will be performed to verify presence of lead in the paint. Material coated with paint that is confirmed as non- lead based paint will not be sampled and will be crushed to 2" +/- loaded directly into trucks for transportation to a client approved asphalt recycling facility.
"Clean Fill" Construction and Demolition Debris < 450 PPM Total Lead	Painted masonry C&D - brick, block, concrete, used asphalt, rock contaminated with lead based paint	Prior to any demolition activities, Contractor will take XRF and/or paint chip samples of paint of the various masonry to verify presence and content of lead in the paint. Said materials will be identified, delineated and sampled prior to the start of demolition activities. Materials coated with Lead Based Paint will be sampled in accordance with the receiving landfill, e.g., 12 composite samples per 3000 cubic yards or less for smaller quantities.	Masonry C&D materials with Lead Based Paint (LBP) - EPA-846 6020 for Total Lead	All masonry C&D - Contractor will perform a visual inspection of all masonry materials prior to the start of demolition activities (due diligence). Materials that are painted will be identified and XRF and/or paint chip sampling will be performed to verify presence of lead in the paint. Material coated with paint that is confirmed as lead based paint will be sampled and disposed of at a client approved landfill.
"Regulated Fill" Masonry Construction and Demolition Debris > 450 PPM Total Lead but < 5 PPM TCLP	Painted masonry C&D - brick, block, concrete, used asphalt, rock contaminated with lead based paint	Prior to any demolition activities, Contractor will take XRF and/or paint chip samples of paint of the various masonry to verify presence and content of lead in the paint. Said materials will be identified, delineated and sampled prior to the start of demolition activities. Materials coated with Lead Based Paint will be sampled in accordance with the receiving landfill, e.g., 12 composite samples per 3000 cubic yards or less for smaller quantities.	Masonry C&D materials with Lead Based Paint (LBP) - EPA-846 6020 for Total Lead - if levels exceed 450 PPM Total Lead, the material will be sampled per EPA SW-846 Test Method 1311 - Toxicity Characteristic Leaching Procedure for Lead.	All masonry C&D - Contractor will perform a visual inspection of all masonry materials prior to the start of demolition activities (due diligence). Materials that are painted will be identified and XRF and/or paint chip sampling will be performed to verify presence of lead in the paint. Material coated with lead based paint that is > 450 PPM Total Lead and < 5 PPM TCLP (Lead) will be disposed of at a client approved landfill.
"Hazardous Waste" Masonry Construction and Demolition Debris > 450 PPM Total Lead and > 5 PPM TCLP	Painted masonry C&D - brick, block, concrete, used asphalt, rock contaminated with lead based paint	Prior to any demolition activities, Contractor will take XRF and/or paint chip samples of paint of the various masonry to verify presence and content of lead in the paint. Said materials will be identified, delineated and sampled prior to the start of demolition activities. Materials coated with Lead Based Paint should be sampled in accordance with the requirements of the receiving landfill, e.g., 12 composite samples per 3000 cubic yards or less for smaller quantities	Masonry C&D materials with Lead Based Paint (LBP) - EPA-846 6020 for Total Lead - if levels exceed 450 PPM Total Lead, the material will be sampled per EPA SW-846 Test Method 1311 - Toxicity Characteristic Leaching Procedure for Lead.	All masonry C&D - Contractor will perform a visual inspection of all masonry materials prior to the start of demolition activities (due diligence). Materials that are painted will be identified and XRF and/or paint chip sampling will be performed to verify presence of lead in the paint. Material coated with lead based paint that is > 450 PPM Total Lead and > 5 PPM TCLP (Lead) will be managed per EPA Solid Waste Regulations.

Abestos Containing Materials

WASTE STREAM	WASTE DESCRIPTION	SAMPLING FREQUENCY	ANALYSIS	HANDLING
ASBESTOS	Non Friable Asbestos Containing Materials - Floor Tiles, Vinyl Sheeting, Asbestos Containing Asphalt Roofing Materials, Transite, Galbestos, Mastic Coatings, etc.	Material sampling will be performed as needed to determine presence and concentration of suspected asbestos containing materials not previously characterized.	Polarized Light Microscopy "(PLM)" analysis will be performed on bulk samples.	All **non friable ACM** will be removed per applicable Local, State and Federal Regulations. All removal work will be supervised by a Pennsylvania Licensed Asbestos Supervisor. The removed non friable ACM will be immediately loaded into lined roll off boxes for transportation by a licensed transporter to an approved landfill. All loads will be manifested in accordance with Montana Solid Waste Regulations. Copies of all manifests/ shipping papers will be forwarded to the owner's representative. Transporter and disposal facility are listed in the attached Disposal Facility/Contractor List.
ASBESTOS	Friable Asbestos Containing Materials - Pipe Insulation, Thermal System Insulation, Spray-On Fire Proofing, Asbestos Containing Plaster, etc.	Material sampling will be performed as needed to determine presence and concentration of suspected asbestos containing materials not previously characterized.	Polarized Light Microscopy "(PLM)" analysis will be performed on bulk samples.	All **friable** ACM will be removed per all applicable Local, State and Federal Regulations. All removal work all be performed using wet methods by Pennsylvania Licensed asbestos workers and supervisors. The removed friable asbestos will be promptly collected and double bagged and placed into a secured roll off box. Fully loaded roll off boxes will be manifested in accordance with Montana Solid Waste Regulations and transported by a licensed transporter to an approved landfill for disposal. Copies of all manifests/shipping papers will be forwarded to the owner's representative. Transporter and disposal facility are listed in the attached Disposal Facility/Contractor List.

Universal Waste

WASTE STREAM	WASTE DESCRIPTION	SAMPLING FREQUENCY	ANALYSIS	HANDLING
Universal Waste	Regulated Light Bulbs (RLB) - Fluorescent Bulbs, Sodium Vapor, Mercury Vapor, Metal Halide, Neon Vapor, Ultra Violet - UV	Regulated light bulbs are defined by type and do not require sampling and analysis.	None	**REGULATED LIGHT BULBS "(RLB)"** Fluorescent Bulbs, High Intensity Devices "(HID's)" - LB's will be manually removed after all electrical disconnects have been performed. The bulbs will be p-packaged into boxes to prevent breakage. Any broken bulbs will packaged in drums. Packages will be labeled as universal waste and stored in a designated secure area until sufficient quantity is accumulated for transportation and disposal. Transportation and disposal will be performed by the listed contractor.
Universal Waste	Lighting Ballasts	Ballasts labeled as non PCB are exempt from regulatory requirements and do not need to be sampled. PCB ballasts are labeled and will be managed as such. Any ballasts not label will be managed as PCB ballasts.	None	**PCB Ballasts** -PCB Ballasts will be identified and removed from the lighting fixtures after the RLB's have been removed. All non PCB Ballasts will be recycled as metallic debris. The PCB ballasts will be removed from the lighting fixture and packaged into drums to be managed as PCB waste. Transportation and dis[postal will be performed by the listed contractor.
Used Oil	Non PCB Oils - Lubricating, Fuel, Hydraulic, Machining Oils, Anti Freeze	Oils removed from non electrical equipment will be managed as non PCB containing oil. Only oils suspected of being contaminated with a hazardous or toxic contaminant will sampled.	Based on evaluation of the material.	**Used Oils (non PCB)** - Contractor will remove all any residual fuel/lubricating oils after the electrical systems have been disconnected and the mechanical systems have been isolated. The oils will be removed by manually draining the reservoirs by by means of vacuum trucks. Oils that have been manually drained will be stored in drums and/or portable storage tanks in secured designated areas. Contractor will arrange for a vacuum, truck to pick up the stored oils when a sufficient quantity has been accumulated.
Used Oil	Oils Used as Dialetric - Oils from Electrical Equipment such as, Transformers, Capacitors, Motor Starters, Pots	Oils removed from electrical equipment will be collected and sampled for PCB's. Sampling will be performed as needed to verify PCB content.	As needed for verifying PCB content.	**Used Oils (PCB)** - Contractor will perform an environmental sweep throughout the facility prior to the start of any ACM removal or demolition activity. During the initial environmental sweep, Contractor will identify any potential PCB oil residuals, i.e., suspect electrical equipment (transformers, starters, Pots, capacitors, etc.) and stained concrete beneath the suspect electrical equipment. Suspect oil and suspect contaminated concrete will be tested for PCB's. PCB oil and PCB contaminated concrete will be managed per 40CFR 761.
Universal Waste	Mercury Containing Devices - Thermometers, Switches, Thermostats, Flow Meters	Mercury containing devices will be identified by visual inspection. All such devices will be managed as noted in the handling procedure.	None	**Mercury Containing Devices (switches, thermometers, thermostats, etc.)**- Contractor will identify and remove mercury containing devices during the initial environmental sweep. Typically these devices are manually removed and packaged into 5 gallon pails which are then stored in 55 gallon drums. The drums will be labeled as mercury waste and stored in a designated secured area. The drums will be manifested and transported to an approved recycler.
Universal Waste	Refrigerants - Freon related Coolants found in HVAC Units, Water Coolers, Refrigerators, etc.	CFC's will be identified by labels found on the respective equipment. The CFC's will be evacuated and managed per the identifying label. No sampling will be performed	None	**Refrigerants(CFC's) -** Contractor will identify all equipment containing CFC's during the initial environmental sweep. Any portable CFC containing equipment that can readily be moved, will be taken to a staging area to be evacuated by a licensed CFC technician. Large stationary equipment will be evacuated in place. All equipment that has had CFC's removed will be tagged to indicate it is ready for disposition as metallic recyclable debris. All documentation relating to the CFC removal will be forwarded to the owner's representative.
Universal Waste	Electrical Storage Devices- L:ead ACID , Nickel Cadmium, Lithium, etc.	Batteries will be managed as such.	None	**Batteries** - Batteries will located and collected during the initial environmental sweep. Batteries will be sorted as lead acid, nickel cadmium, etc. and palletized and stockpiled for shipment to an approved recycler. All documentation relating to the handling and management of these materials will be forwarded to the owner's representative.
Regulated Waste	Other Regulated Materials (ORM) - Aerosols, Paint Containers, Solvents, Corrosives, Cleansers, Flammables, Miscellaneous Chemical Containers, etc.	Miscellaneous containers will managed per the identifying labels. Containers/bulk containers will be field tested for corrosively, flammability, reactivity and evaluated for toxicity. Materials will be managed per the evaluation.	Analysis will be performed when materials can not be identified by field analysis.	**Other Miscellaneous Regulated Materials**- Aerosols, Fuses, Paint Containers, etc. will be collected and sorted. The materials will be evaluated to determine the appropriate packaging and labeling, transportation and disposal/treatment. All documentation relating to the handling and management of these materials will be forwarded to the owner's representative.

Residual Waste

WASTE STREAM	WASTE DESCRITION	SAMPLING FREQUENCY	ANALYSIS	HANDLING
Residual Waste	Boiler Operation Residuals - Fly Ash, Bottom Ash, Precipitator/Baghouse Dust, etc.	Fly ash will be sampled will be sampled in accordance with the receiving landfill, e.g., 12 composite samples per 3000 cubic yards or less for smaller quantities.	Heavy Metals (RCRA) - EPA SW-846 Test Method 1311 - Toxicity Characteristic Leaching Procedure	**Fly Ash** - The residual fly ash will be removed from the boilers, duct work, miscellaneous bins and other process equipment as it is accessed during demolition. The material will be removed by hydraulic excavators, front end loaders and skid steers followed by a manual clean up. Water misting will be implemented as needed to control airborne particulate. The material will be loaded into trucks for transportation and disposal as residual waste unless analytical results indicate otherwise. The material will be managed as hazardous waste or clean fill as the analytical indicate. The fly ash will be appropriately manifested and shipped to an approved landfill for disposal. All manifests will be forwarded to the owner's representative.
Residual Waste	Unanticipated Boiler Process Residuals	As determined to adequately characterize the material for legal disposition.	Per Material Evaluation	**Other Residuals** - Other unanticipated residuals will be reported to the owner's representative. Contractor will evaluate the materials and report to the owner's representative for concurrence with proposed sampling and management protocols.

C

Attachment C

Limits of Demolition

Limits of Demolition Coal Strip Units 1 & 2	PROJECT MANAGER: C. DOWDELL
	DESIGNED BY:
Attachment - A Limits of Demolition, Ponds to be Backfilled	DRAWN BY:
& Graded and Common Structures to be Removed	CHECKED BY:
Drawing 00X-100	
*Note: Paste Plant & Paste Pump House not Shown	
ISSUE DATE DESCRIPTION	PROJECT NUMBER: 10040901

HDR Engineering, Inc.
1720 Spillman Drive, Suite 280
Bethlehem, PA 18015
610.807.5103

PUGET SOUND ENERGY

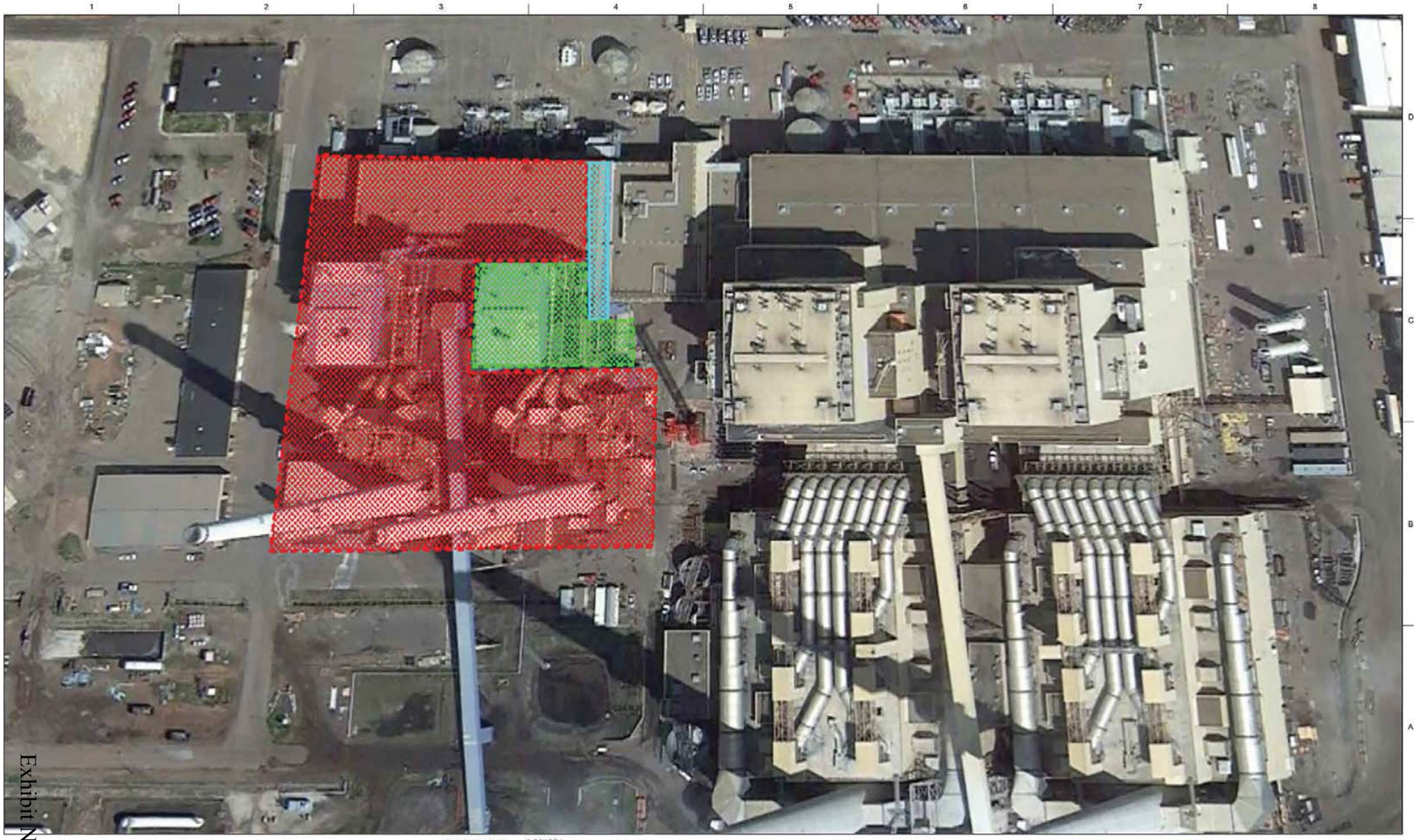
PSE
Colstrip, MT

Coal Strip Units 1 & 2 Limits of Demolition

Ponds to be Backfilled & Graded

Common Structures to be Demolished

Exhibit No. (RJR-21)
Page 27 of 29



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Coal Strip Units 1 & 2

Option B Demolition Plan

Drawing 00X-101

*Note: Paste Plant & Paste Pump House not Shown

ISSUE DATE DESCRIPTION

PROJECT MANAGER C. DOWDELL
DESIGNED BY
DRAWN BY
CHECKED BY
PROJECT NUMBER 10040901

PSE
PUGET SOUND ENERGY

PSE
Colstrip, MT

Structures to be Demolished Conventionally

Physical Separation

Structure to be Deconstructed

N

Exhibit No. (RJR-21)
Page 28 of 29

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