STRATA ENERGY INC

A WHOLLY-OWNED SUBSIDIARY OF PENINSULA ENERGY LIMITED

November 20, 2017

Attention: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: Strata Energy, Inc., Ross In Situ Recovery Project
Source Materials License SUA-1601, Docket No. 040-09091
Annual Revised Bond Estimate

To Whom it May Concern:

As required by License Condition 9.5 Strata Energy Inc. (Strata) is submitting the proposed annual update to the financial assurance amount for the Ross ISR Project. Enclosed are the surety estimate and a revised Restoration Action Plan (RAP). This estimate covers the projected costs for decommissioning and reclamation of facilities planned for construction and operation through the end of 2018. In summary, the surety estimate includes the estimated costs for a third party to decommission and complete final reclamation of ten (10) wellfield headerhouses at Mine Units 1 and 2 (MU-1 and MU-2), the Central Processing Plant (CPP), lined storage pond 1 and all other related facilities anticipated to be constructed through the end of 2018.

The attached estimate determines a cost of groundwater restoration, decommissioning and reclamation at $10,648,905 over a seven-year period during which the site would be decommissioned and reclaimed to meet the standards of the WDEQ-LQD and the NRC. The estimate format implements the recommended format provided by the LQD.

Strata hereby requests that NRC approve the estimated bond amount and amend License SUA-1601.

Strata respectfully requests that NRC discontinue the review and approve of the estimate originally submitted on November 30, 2016 and revised by letter dated March 24, 2017. This estimate was for activities planned for 2017 and was approved by the WDEQ-Land Quality Division. The 2017 estimate is modified by the attached, resulting in a lower total bond amount. Strata requests that NRC review this latest estimate and take no licensing action to approve the 2017 estimate.

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If you have any questions regarding the provided information, please contact me at 307-467-5995 or by email at rpond@sytratawyo.com.

Sincerely,
STRATA ENERGY INC.

Royal Pond
Manager of Health, Safety, and Environment/Radiation Safety Officer

Cc: Don Lowman, NRC Project Manager **(via email)**

Attachment 1
Revised Restoration Action Plan

V. RECLAMATION PERFORMANCE BOND ESTIMATE

A. Purpose Statement

1. Introduction

The following summarizes the Restoration Action Plan (RAP) for the third and fourth years of development and operation of the Ross ISR Project (calendar year late 2017 and 2018). The accompanying surety estimate is based on this RAP and it covers the potential decommissioning and reclamation of facilities planned for construction and operation during the period. In summary, the surety estimate includes the estimated costs by a third party to conduct groundwater restoration, decommission and complete final reclamation of four (4) wellfield headerhouses at MU-1 and six (6) wellfield headerhouses at MU-2. The estimate also includes estimated costs to decommission and complete final reclamation at MU-1 and MU-2, planned wellfield development activities in MU-3, the Central Processing Plant (CPP), water storage ponds, roads and pipelines and all other related facilities. The estimate puts the costs of groundwater restoration, decommissioning and reclamation at $10,648,905 over a seven-year period during which the site would be decommissioned and reclaimed to a condition agreed upon by the Wyoming Department of Environmental Quality (WDEQ)-Land Quality Division (LQD) and the US Nuclear Regulatory Commission (NRC) that would return the site to unrestricted use. The RAP encompasses the full cycle of activities necessary for:

Aquifer restoration and well plugging;

Building and equipment decontamination, dismantling and disposal;

Pond and wellfield removal and reclamation of the entire site;

Radiological surveying and environmental monitoring;

Administrative, Overhead; and

Contingency of 25%.

Strata's surety estimate presented herein employs assumptions that are based on best professional judgment given the data currently available and WDEQ-LQD guidance contained in Guideline (GL) 12A (April 2017) and, where GL 12A does not provide specific guidance, GL 12 (February 2017). This estimate is presented in the Excel format specified by the WDEQ-LQD.

The surety estimate is considered conservative because it does not consider the potential reduction in cost through recovery of salvage value. Significant salvage value would exist for the CPP and Administration buildings (e.g., steel), motors and electrical switch gear, gravel road base, etc.

B. Consolidation of State and NRC Surety Instruments

In addition to being crafted to comply with NRC criteria in 10 CFR Part 40, Appendix A, Criterion 9 (Financial Criteria), Strata's proposed surety estimate is designed to address the Wyoming Environmental

Quality Act requirements for a reclamation performance bond. The surety estimate is provided in the format specified by the WDEQ-LQD and accepted by NRC staff.

C. Cost Details for Groundwater Restoration, Reclamation, and Decommissioning Activities

1. Introduction

The following tabulation summarizes the costs necessary to hire an independent contractor to assume all groundwater restoration, decommissioning and reclamation activities required for the CPP, the first ten (10) wellfield headerhouses, and associated facilities. Descriptions of the work are provided below, and detailed costs estimates for each major item of work are provided in the attached Excel spreadsheet entitled Ross 2018 Bond Estimate.

Total Restoration and Reclamation Cost Estimate

I.	Groundwater Restoration Cost		$6,581,858
II.	Equipment Removal & Disposal Cost		$67,978
III.	Building Demolition		$357,475
IV	Wellfield Buildings, Pipe & Equipment Removal & Disposal Cost		$333,273
V	Well Abandonment Cost		$945,816
VI	Wellfield Surface Reclamation Cost		$33,630
VII	Total Miscellaneous Reclamation Cost		$199,094
	Subtotal Reclamation and Restoration Cost Estimate		$8,519,124
	Administrative, Overhead, and Contingency Items (25%)		$2,129,781
		TOTAL	**$10,648,905**

2. Aquifer Restoration

The Groundwater Restoration worksheet (GW REST) and supporting unit cost worksheets (UC-GWS, UC-RO, UC-RECIRC, and UC-DDW) contain details concerning cost basis figures and assumptions, calculations and methodologies used in deriving cost estimates for the full cycle of groundwater restoration. It is estimated that active restoration will be completed in 48 months and that an additional 12 months will be necessary for final site decommissioning and reclamation following the stabilization monitoring period and regulatory approval of groundwater restoration. This estimate is designed to be descriptive enough for the NRC and WDEQ staff to determine the acceptability of Strata's proposed cost figures and is based on the estimated costs for an independent contractor to perform the decommissioning and reclamation work in accordance with 10 CFR Part 40, Appendix A, Criterion 9 and the Wyoming Environmental Quality Act and its accompanying rules and regulations and guidelines. Strata has developed its cost estimates to address all items in Appendix C of the NRC's "Standard Review Plan for In-Situ Leach Uranium Extraction License Applications" (NUREG-1569, dated June 2003).

Among other items, the groundwater restoration costs are broken down into separate phases of work:

Groundwater sweep;

Reverse osmosis (RO) with permeate injection;

Groundwater recirculation;

Monitoring; and

Vehicles and Labor.

For each phase of work, the estimated number of pore volume displacements (PVDs) required to complete that phase is provided (0.5 PVD for Groundwater Sweep, 7 PVD for Reverse Osmosis and 1 PVD for Recirculation). The worksheets also provide the assumptions and unit prices for all the work necessary to complete each phase of work for the first ten wellfield headerhouses.

Restoration progress is typically measured on the basis of the number of pore volumes (PVs) processed during each phase of groundwater restoration. A pore volume is a term used by the ISR industry to define an indirect measurement of a unit volume of aquifer affected by ISR recovery or restoration (NUREG-1910, NRC 2009). Following industry standards, Strata calculates a PV as follows:

PV = thickness x wellfield area x porosity x flare x conversion factor

Where:

The thickness is the average completion thickness for the recovery and injection wells. Based on actual well completions in MU-1 and MU-2, the ore zone thickness averages approximately 17.3 in MU-1 and 17.5 feet in MU-2 (revised from original of 15 feet).

The wellfield area is the surficial area of the injection and recovery well patterns for each wellfield headerhouse.

The porosity (or pore space) is defined as the collective open spaces of the formation or a measure of the amount of liquid or gas that may be absorbed or produced by a particular formation (NUREG-1910). The porosity of the ore zone within the Ross project area was determined by laboratory analysis of core samples collected during exploration drilling. The porosity is estimated to average 34% across the Ross Project area.

The flare is a proportionality factor that estimates the amount of aquifer water outside of the pore volume that has been affected by lixiviant flow during the recovery phase (NUREG-1910). Flare estimates usually include a horizontal and vertical flare factor. The horizontal flare is the volume of water affected by lixiviant outside the edge of the wellfield pattern. The vertical flare is the volume of water affected by lixiviant above and below the completion interval. Based on groundwater modeling of expected operational conditions and horizontal flare factors applied at other ISR facilities (e.g., Lost Creek, Nichols Ranch, and Christensen Ranch) it has been determined that the horizontal flare should be approximately 20% and the vertical flare would be approximately 20%. Therefore, the overall flare, which is dependent on the geometry of the affected area, is approximately 44%. This is consistent with other ISR operating facilities.

An estimate of the PV of the four (4) headerhouses in MU-1 is calculated as follows:

PV = 17.3 ft. x 1,440,019 ft^2 x 0.34 x 1.44 x 7.48 gal/ft^3 = 91.23 million gallons

An estimate of the PV of the six (6) headerhouses in MU-2 is calculated as follows:

PV = 17.5 ft. x 2,091,000 ft^2 x 0.34 x 1.44 x 7.48 gal/ft^3 = 134.01 million gallons

The aquifer restoration phase was based on the processing and circulation of 8.5 pore volumes of groundwater. Because the cost for restoration equipment such as wellfield pumps, lined retention ponds, the deep disposal well (DDW), one RO unit, restoration IX columns, laboratory equipment, trucks, and field equipment have been incurred for uranium production operations, they are considered operational capital and are not included as capital requirements in any of the RAP budget items. It should be noted that the estimated cost of purchasing and installing an additional high efficiency RO unit ($750,000) is included in the groundwater restoration cost estimate (worksheet GW REST, item VI). This additional RO would be used to augment the RO included with the construction and initial operation of the CPP. As with other operating ISR operations, the NRC and the WDEQ will be able to verify the availability of the restoration equipment during routine inspections.

The surety will be maintained at this calculated level until the number of pore volumes required to satisfactorily complete each phase has been demonstrated. Strata will adjust the surety estimate for aquifer restoration during each annual update review to reflect experience gained from actual work completed and the associated costs.

3. Description of Work

The first stage of aquifer restoration is groundwater sweep, in which groundwater is pumped from the wellfield headerhouse with no reinjection. This causes water from the formation surrounding the wellfield headerhouse to sweep through the wellfield toward the recovery wells and remove the high total dissolved solids (TDS) production fluids. Based on the anticipated aquifer restoration schedule, during most aquifer restoration operations, when some wellfield headerhouses are undergoing groundwater sweep while others are in RO treatment with permeate injection, the water removed from the groundwater sweep is taken to the RO units (see below) and the purified water (RO permeate) is reinjected into the wellfield headerhouse(s) undergoing RO treatment with permeate injection. The brine from the RO units can be taken to the lined retention ponds and/or to a deep disposal well.

For the first wellfield headerhouse undergoing groundwater sweep, it is assumed there are no wells concurrently in RO treatment with permeate injection. Thus, the groundwater from the groundwater sweep will be taken to the RO units, the high-quality permeate will be discharged or used for other purposes and the brine will be disposed via the deep disposal well. It is estimated that the groundwater sweep will remove about 0.5 PV from the wellfield at a rate of 200 gpm (20 gpm at 10 wells) per headerhouse. The duration of the groundwater sweep is estimated to take about two months per headerhouse. Groundwater sweep at one headerhouse may be done concurrently with RO at another headerhouse.

RO is a water treatment process whereby the majority of dissolved ions, which are too large to pass through a filter that passes pure water molecules, are concentrated into brine. The product water that passes through the filter (permeate) typically meets drinking water standards and during most restoration activities is reinjected back into the wellfield. This reinjection of relatively pure water (permeate) mixes with formation water and helps bring the quality of the underground solutions toward baseline quality. During restoration the RO brine can be pumped to a lined retention pond to level out flow rates or pumped to the disposal well.

Groundwater recovered from a depleted portion of the ore zone will be treated with an antiscalant and/or corrosion inhibitor to prevent fouling; these are the only pretreatment chemicals budgeted.

The water will also pass through a restoration IX system for removal of uranium and a pre-filtration system for particulate removal. To achieve RO purification, the pretreated solution is pressurized and directed to the first step of a two-stage RO process. Approximately 70 percent of the total feed volume will be converted to product water (permeate) in the first stage. The brine water of the first stage will then act as the feed for the second stage, which yields an overall permeate recovery rate of approximately 90 percent. It is estimated that the RO Phase for all 10 headerhouses will take 60 months.

The third phase of aquifer restoration is groundwater recirculation, which begins after completion of the RO treatment with permeate injection phase. In this phase, water from the production zone will be pumped from recovery wells and recirculated into injection wells in the same headerhouse. This recirculation will homogenize the groundwater and help reduce the risk of "hot spots," or areas of unusually high concentrations of dissolved constituents. The only treatment that will potentially occur during recirculation will be the filtration of particulates and/or uranium removal. It is expected that one PV will be circulated from, or within, the wellfield during this phase, at a rate of 500 to 800 gpm per headerhouse. This recirculation can be completed concurrently during the overall RO phase once RO is completed at a particular headerhouse.

The total duration of active aquifer restoration (groundwater sweep, RO treatment with permeate injection, and groundwater recirculation) is estimated to be 64 months for the first 10 wellfield headerhouses, which does not change from the current approved estimate.

The final step in aquifer restoration will be the stability monitoring phase, which will be used to ensure that chemical species of concern do not increase in concentration to unacceptable levels subsequent to restoration. The stability monitoring phase is described in Section 1.2.1.5 of the WDEQ Reclamation Plan (Section 6.1.2.5 of the NRC Technical Report) and includes well sampling, data analysis and reporting.

4. Labor Staffing Plan for Groundwater Restoration

The majority of labor costs for decommissioning the Ross Project would be associated with the 64-month period that active groundwater restoration occurs. This would include the operation of the wellfield production and injection wells and the CPP and ancillary facilities to complete the groundwater restoration commitments in accordance with the WDEQ permit and NRC license.

The stability period requires one year of sample collection and an indeterminate period for regulatory approval of groundwater restoration. During this period the manpower requirements lessen significantly as activities at the site are limited to groundwater monitoring and maintenance of the CPP.

Once the stability period is completed the actual facility decommissioning, demolition and disposal occurs. The associated labor costs are included in the surety estimate details for the particular activity. The labor estimate also included 7 years of Environmental Manager/RSO and Environmental/Radiation Safety Technician for this period.

Given the above, Strata has included the labor costs associated with groundwater restoration in section

IX of the groundwater restoration worksheet (GW REST):

Position	***Years***
Environmental Manager/RSO	*7*
Restoration Manager	*6*
Environmental/Radiation Safety Technician	*7*
Operators/Laborers (4)	*6*
Maintenance Technician	*6.5*

5. Facilities Area Decommissioning and Reclamation

Following wellfield restoration and stability monitoring, when the water treatment equipment is no longer needed, reclamation can begin on the surface facilities. Detailed cost estimates for the facilities area decommissioning and reclamation are provided in the following worksheets and supporting unit costs worksheets:

CPP Equipment - EQUIP

Main Facility Buildings- BLDGS

Wellfield Buildings and Pipelines- WF BLDGS PIPE

Well Abandonment- WELL ABAN

Wellfield Reclamation- WF REC

Miscellaneous Reclamation Items- MISC REC

6. Equipment and Buildings

Unlike the original RAP and surety estimate that included the decommissioning, demolition and disposal of a full scale CPP including yellowcake precipitation and drying equipment, the revised Operations Plan results in the CPP that will only be used as a "Satellite" IX facility. Therefore, uranium elution, precipitation and drying equipment will not be installed. This results in considerably less equipment that will require decontamination and disposal as 11e.(2) waste or solid waste. Additionally, the lack of yellowcake processing will make it easier to decontaminate limited portions of the CPP walls and floor.

Buildings to be removed include the CPP, Administration building, the deep disposal well building, the Potable Water building and the wellfield headerhouse buildings. The latest surety estimate includes the actual sizes of the buildings that were constructed in 2015. Decontamination of salvageable building materials, equipment, pipe, and other materials to be released for unrestricted use will be accomplished by completing a preliminary radiological survey to determine the location and extent of the contamination and to identify any hazards.

Processing and water treatment equipment, including tanks, filters, IX columns, pipes, and pumps, will be decontaminated as necessary and disposed of in accordance with applicable regulations.

Decontaminated and non-contaminated equipment and materials will be disposed at the Gillette Landfill. Previous estimates were based on disposal at the Moorcroft Landfill, but the Town of Moorcroft has taken action to preclude disposal of any waste from outside their town limits. Disposal costs at the Gillette Landfill are estimated based on actual costs since the Ross project has shipped all solid waste to Gillette since the project received the Permit to Mine in 2012. A salvage percentage of 60 percent for clean building material (steel) is assumed. This salvage is assumed at no value with the remaining 40 percent disposed at the Gillette Landfill. Contaminated equipment and materials will be disposed at a licensed 11e.(2) byproduct disposal facility. The estimate for disposal of 11e.(2) byproduct material has been revised this year to reflect new transportation and disposal contracts that Strata has negotiated. These contracts have allowed Strata to reduce the estimated cost of transportation and disposal by a significant margin over previous estimates.

The disposal of concrete on site as "clean fill" is desired by both the State of Wyoming (WDEQ), Crook County, and local municipalities due to the limited space for such material in municipal landfills. This is appropriate due to the benign character of concrete and safety concerns with transporting this material via large trucks on rural and single lane roadways. Additionally, Strata owns the land at the CPP site and adequate areas exist to bury the materials on-site. Also, it is likely that due to the relatively large quantity of concrete, it would be recycled rather than buried. However, NRC has identified additional dose modelling that would be necessary to support disposal on site. Disposal on site may be appropriate but must be approved by NRC or an Agreement State after preparation and submittal of modelling that predicts the dose to the public from residual radioactive materials. Strata determined that it is not appropriate to perform such modelling at this time and therefore it is assumed the clean concrete will be sent to the Gillette landfill. To satisfy this NRC concern, the surety estimate was revised (increased) in 2016/2017 to include the estimated cost to dispose of uncontaminated concrete instead of on site.

7. Ponds

Work required to reclaim Pond 1 will include brine disposal in the deep disposal well, removal of the liner and brine residue to a licensed 11e.(2) disposal site, disposal of all non-11e.(2) solid waste to an approved landfill or on-site solid waste facility, backfilling and regrading to restore an acceptable topography, topsoil replacement and revegetation. These reclamation costs are based on the actual as-built details of Pond 1 and are provided in the worksheet MISC REC.

8. Earthwork

After the buildings and ponds are demolished and removed, the entire site will be regraded to restore the original topography, topsoil will be replaced to approximate its original depth, and the area will be seeded with the approved seed mix. Earthwork costs to complete the regrading of the CPP, parking areas, and access roads are provided in the worksheet MISC REC.

9. Containment Barrier Wall

The containment barrier wall (CBW) at the CPP will be reclaimed to the extent necessary to restore the flow pattern of shallow groundwater. Reclamation of this wall will be accomplished by creating a series of breaches, also known as finger drains, along the CBW. Each finger drain will consist of a 1.5 ft. wide by 25 ft. long trench that is cut through the CBW at a right angle and to a depth that is 2 ft. below the

lowest historical groundwater level. Gravel will be placed in the trench from the bottom to a point 2 ft. above the highest recorded groundwater level such that a highly permeable flow path is created through the CBW. The remaining trench will be backfilled with topsoil and seeded.

This method of CBW reclamation was selected as a means of effectively restoring the groundwater flow system in the CPP area, while minimizing surface and environmental disturbance. The cost estimate for this phase of work is included in the worksheet MISC REC.

10. Wellfield Equipment Removal and Disposal

Decommissioning and reclamation of the wellfields will include removal of any staging or laydown areas, the headerhouse buildings and all pipes and utilities connecting the wells to the headerhouse buildings and the CPP, shredding or chipping the solid materials to reduce the volume, and disposing of these materials in a permitted landfill or licensed 11e.(2) waste site as appropriate, and reclaiming the surface as described for the other surface facilities. All pumps and tubing will be removed from production, injection and monitoring wells to permit well plugging.

The estimated costs for each item of work in this task are included in the worksheet WF BLDGS PIPE.

11. Well Abandonment

All injection, recovery and monitor wells will be abandoned (plugged) with high solids bentonite in accordance with WDEQ-LQD Rules and Regulations Chapter 8. After the well casing is cut off below grade a cement hole plug will be installed prior to backfill above the plug with soil. This work includes abandonment and reclamation of monitor wells and production and injection wells currently used, or planned for use during the next report period, for uranium recovery at MU-1 and MU-2. It also includes an estimated 300 delineation holes. It also includes existing five-inch baseline monitor wells. The costs are based on actual contract, material, and labor rates from the Ross project. The estimated costs to abandon and reclaim all wells are included in worksheet WELL ABAN. The costs for plugging and abandoning one deep disposal well are included and have been increased by 3%.

12. Reclamation of Wellfields, Roads, CPP Area

Once all wells are plugged at the wellfield and pipelines, headerhouse buildings and utilities have been removed, a radiological survey (Section K) will be completed prior to any topsoil application and final seeding with the approved seed mix. If deemed necessary, high traffic areas and/or compacted areas will be ripped or chisel plowed prior to seeding. Gravel from main roads, the CPP area, wellfield roads and areas will be salvaged with scrapers and either used as clean fill material or more likely recycled for use on adjacent private or county roads. If necessary, compacted areas will be ripped or chisel plowed prior to the application of topsoil and final seeding. Procedures are fully described in Sections 6.2 and 6.3 of the NRC Technical Report and the applicable sections of the Reclamation Plan.

Cost estimates are included for the removal of 14,428 feet of 6-inch trunk line, 7,290 feet of 8-inch trunk line, 5,480 feet of 10-inch trunk line, 3,350 feet of 12-inch trunk line, and 7,290 feet of 16-inch trunk line in MU-1 and MU-2 and between the CPP and the mine units. Cost estimates are also included to remove and reclaim approximately 12,600 feet of existing and planned wellfield roads associated with MU-1 and MU-2, and the connecting road from MU-1 to the CPP area.

13. Radiological Surveys

During equipment decontamination, contamination surveys of building and equipment surfaces will be performed and analyzed. The results of these surveys will drive decontamination efforts. Following removal of all structures and regrading of the site to approximate original contours, and before topsoil is spread on the regraded area, a gamma survey and soil sampling will be conducted as described in Section 2 of the WDEQ Reclamation Plan (Section 6.4 of the NRC Technical Report).

Soils will be cleaned up in accordance with the requirements of 10 CFR Part 40, Appendix A, including consideration of ALARA goals. The proposed limits and ALARA goals for cleanup of soils are summarized in the approved WDEQ Reclamation Plan and NRC Technical Report. Any areas that do not meet these limits will be remediated by removing contaminated soils and disposing at a licensed site. The site will then be regraded. This process will be repeated until all sites meet the ALARA goals for cleanup.

The costs and areas subject to these surveys are provided in worksheets EQUIP, BLDGS, WF BLDGS PIPE and MISC REC.

14. Revegetation

At the completion of the previous tasks, and after topsoil has been spread across all regraded areas, all of the disturbed lands will be seeded with vegetation species that will return the lands to their pre-project conditions. The reclaimed land will be capable of supporting livestock grazing, dry land farming and wildlife habitat. Baseline soils, vegetation, and radiological data will be used to guide the reclamation activities.

The costs and the areas to be revegetated are provided in worksheets WF REC and MISC REC and are based on actual costs for revegetation at the Ross site.

15. Miscellaneous Reclamation Activities

Costs for miscellaneous reclamation activities, some of which were discussed in the preceding sections, are provided in MISC REC. This includes:

Item

- CPP/Office area reclamation
- Access road reclamation
- Wastewater pipeline reclamation
- Pond reclamation
- Diversion berm earthwork and reclamation
- Containment barrier wall reclamation
- Main trunk line reclamation
- Culvert removal and disposal
- Fence removal and disposal

- Monitoring site removal and disposal; this estimate has been updated this year to reflect the removal of a number of monitoring sites.
- Radiologic surveys
- Surface reclamation for delineation, exploration, and historic hole abandonment

The complete bond estimate is contained in Appendix C. The bond estimate was prepared using the approved and current LQD Guidelines 12A and 12 and the Noncoal ISL Bond Spreadsheet.

Attachment 2
Revised Annual Bond Estimate

Total Restoration and Reclamation Cost Estimate

I.	GROUNDWATER RESTORATION COST	$6,581,858
II.	EQUIPMENT REMOVAL & DISPOSAL COST	$67,978
III.	BUILDING DEMOLITION AND DISPOSAL COST	$357,475
IV.	WELLFIELD BUILDINGS, PIPE & EQUIPMENT REMOVAL & DISPOSAL COST	$333,273
V.	WELL ABANDONMENT COST	$945,816
VI.	WELLFIELD SURFACE RECLAMATION COST	$33,630
VII.	TOTAL MISCELLANEOUS RECLAMATION COST	$199,094
	SUBTOTAL RECLAMATION AND RESTORATION COST ESTIMATE	$8,519,124
	ADMINISTRATIVE, OVERHEAD, AND CONTINGENCY ITEMS (25%)	$2,129,781
	TOTAL	**$10,648,905**

TOTALS

Groundwater Restoration	MU-1	MU-2
PV Assumptions		
Wellfield Area (ft2) (10 Mods injected (4 in MU-1 and 6 in MU-2))	1440019	2091000
Wellfield Area (acres)	33.06	48.00
Affected Ore Zone Area (ft^2)	1440019	2091000
Avg. Completed Thickness	17.3	17.5
Porosity	0.34	0.34
Flare Factor (H=1.2, V=1.20, Overall= 1.44)	1.44	1.44
Affected Volume (ft^3)	12197076	17915688
Kgallons per Pore Volume	91234	134009
Number of Wells in Unit(s)		
Production Wells (P)		
Current	107	160
Estimated next report period	0	0
Total Estimated	107	160
Injection Wells (I)		
Current	190	294
Estimated next report period	1	1
Total Estimated	191	295
Monitor Wells		
Current	49	76
Estimated next report period	0	0
Total Estimated	49	76
Restoration Wells (not included with P and I wells)		
Current	1	1
Estimated next report period	0	0
Total Estimated	1	1
Number of Wells per Wellfield	348	532
Total Number of Wells	**880**	
Average Well Depth (ft)	500	620
I. Groundwater Sweep Costs (includes brine disposal)		
PV's Required	0.5	0.5
Total Kgals for Treatment	45617	67005
Groundwater Sweep Unit Cost ($/Kgal)	$0.58	$0.58
Subtotal Groundwater Sweep Costs per Wellfield	$26,641	$39,132
Total Groundwater Sweep Costs	**$65,773**	
II. Reverse Osmosis Costs (includes brine disposal)		
PV's Required	7	7
Total Kgals for Treatment	638639	938065
Reverse Osmosis Unit Cost ($/Kgal)	$0.82	$0.82
Subtotal Reverse Osmosis Costs per Wellfield	$523,386	$768,776
Total Reverse Osmosis Costs	**$1,292,162**	

Groundwater Restoration	MU-1	MU-2
III. Recirculation		
PV's Required	1	1
Total Kgals for Treatment	91234	134009
Recirculation Unit Cost ($/Kgal)	$0.47	$0.47
Subtotal Recirculation Unit Costs per Wellfield	$43,061	$63,250
Total Recirculation Costs	**$106,311**	
IV. Monitoring and Sampling Costs		
A. Restoration Well Sampling		
Estimated Restoration Period (Years)	4	4
1. Well Sampling prior to restoration start		
# of OZ BL Wells	12	22
$/sample	$330	$330
2. Restoration Progress Sampling		
# of OZ BL Wells	12	22
$/sample	$30	$30
Samples/Year	6	6
3. UCL Sampling		
# of UCL Wells	47	76
$/sample	$20	$20
Samples/Year	6	6
Sub-total Restoration Analyses	$35,160	$59,580
B. Short-term Stability		
Estimated Stabilization Period (Months)	12	12
# of OZ BL Wells	12	22
Samples/Year	48	88
$/sample	$330	$330
# of UCL Wells	47	76
Samples/Year	6	6
$/sample	$30	$30
Sub-total Short-term Stability Analyses	$24,300	$42,720
Subtotal Monitoring and Sampling Costs per Wellfield	$59,460	$102,300
Total Monitoring and Sampling Costs	**$161,760**	
V. Mechanical Integrity Test (MIT) Costs		
Five Year Injector MIT Unit Cost ($/well)	$146	$146
Five Year Producer/Monitor Well MIT Unit Cost ($/well)	$191	$191
Number of Injection Wells (at end of 2018)	191	295
Number of Production/Monitor Wells (at end of 2018)	156	236
Subtotal Injector MIT costs	$27,886	$43,070
Subtotal Producer/Monitor MIT costs	$29,796	$45,076
Subtotal Mechanical Integrity Testing Costs per Wellfield	$57,682	$88,146
Total Mechanical Integrity Testing Cost	**$145,828**	
TOTAL RESTORATION COSTS PER WELLFIELD	$710,230	$1,061,604
TOTAL WELLFIELD RESTORATION COST	**$1,771,834**	

Groundwater Restoration	MU-1	MU-2
VI. Purchase/Install Additional High Eff. RO Unit (550 gpm)		
Cost for Additional High Eff RO Unit (includes installation)	$750,000	
Total Cost for Additional High Eff RO Unit	**$750,000**	
VII. Building Utility Costs	**CPP**	**Office**
Electricity ($/Month) estimate	$2,500	$300
Propane ($/Month)		
Natural Gas ($/Month) estimate	$2,000	$500
Number of Months	84	84
Subtotal Utility Costs per Building	$378,000	$67,200
Total Building Utility Costs	**$445,200**	
VIII. Vehicle Operation Costs		
Number of Pickup Trucks/Pulling Units (Gas)	6	
Unit Cost in $/hr (WDEQ Guideline No.12, Table D-1, Feb 17)	$14.86	
Average Operating Time (Hrs/Year)	200	
Total Number of Years (Average)	7	
Total Vehicle Operation Costs	**$124,824**	
IX. Labor Costs		
Number of Environmental Managers/RSOs	1	
$/Year	$125,000	
Number of Years	7	
Number of Restoration Managers (during active restoration)	1	
$/Year	$75,000	
Number of Years	6	
Number of Environmental Technicians	1	
$/Year	$65,000	
Number of Years	7	
Number of Operators/Laborers (reduced during stabilization)	4	
$/Year	$55,000	
Number of Years	6	
Number of Maintenance Technicians (reduced during stabilization)	1	
$/Year	$60,000	
Number of Years	6.5	
Total Labor Costs	**$3,490,000**	
TOTAL GROUNDWATER RESTORATION COSTS	**$6,581,858**	

Equipment Removal Onsite Disposal and Loading	CPP	DDW Building
I. Removal and Loading Costs		
A. Tankage		
Number of Uncontaminated FG Tanks to be Cut Up	2	
Volume of Uncontaminated Tank Construction Material (ft^3)	246	
Weight of Uncontaminated Tank Construction Material @ 1000 lb/yd^3 (tons)	5	
1. Labor for Dismantling		
Number of Persons	3	
Ft^3/Day	50	
Number of Days	5	
$/Day/Person	$200	
Subtotal Labor Costs	$3,000	
2. Equipment		
Number of Days	5	
$/Day	$500	
Subtotal Equipment Costs	$2,500	
3. Off site tranport and disposal at Gillette Landfill Unit Cost ($/ton)	$72.31	
Off site transport and disposal cost	$329	
Subtotal Uncontaminated tankage Removal, Loading, Disposal Costs	$5,829	
Number of Contaminated FG Tanks to be Cut Up	4	
Volume of Contaminated Tank Construction Material (ft^3)	283	
1. Labor for Dismantling		
Number of Persons	3	
Ft^3/Day	50	
Number of Days	6	
$/Day/Person	$200	
Subtotal Labor Costs	$3,600	
2. Equipment		
Number of Days	6	
$/Day	$500	
Subtotal Equipment Costs	$3,000	
Subtotal Tankage Removal and Loading Costs	$6,600	

Equipment Removal Onsite Disposal and Loading	CPP	DDW Building
B. Number of IX Columns to be Decontaminated, Cut Up and Salvaged (no value)		
Number of 11,000 gal IX Columns	9	
Number of 5,500 gal Guard IX Columns	1	
Weight of 11,000 gal IX Column (lbs)	24,000	
Weight of 5,500 gal Guard IX Column (lbs)	5500	
Assume 10% steel to landfill		
Weight of 11,000 gal IX column for disposal (tons)	1.2	
Weight of 5,500 gal IX column for disposal (tons)	0.275	
1. Labor for Decontamination and Dismantling		
Number of Persons	3	
Number of Days	18	
$/Day/Person	$200	
Subtotal Labor Costs	$10,800	
2. Equipment		
Number of Days	18	
$/Day	$500	
Subtotal Equipment Costs	$9,000	
3. Off site tranport and disposal at Gillette Landfill Unit Cost ($/ton)	$72.31	
Off site transport and disposal cost	$801	
Subtotal Decontaminated IX Columns Removal and Offsite Disposal Costs	$20,601	
C. Contaminated Pipe		
PVC Pipe Footage/DDW SS Pipe footage (no Shredding)	7700	9
Average PVC Pipe Diameter (inches)	4	2
Shredded PVC Pipe Volume Reduction (ft^3/ft)	0.2	1
Volume of Shredded PVC Pipe (ft^3)	1540	9
1. Labor for Shredding		
Number of Persons	2	0
Ft/Day	350	350
Number of Days	22	0
$/Day/Person	$200	$200
Subtotal Labor Costs	$8,800	$0
Subtotal Pipe Removal and Loading Costs	$8,800	

Equipment Removal Onsite Disposal and Loading		CPP	DDW Building
D. Contaminated Pumps			
Number of Contaminated Pumps		16	1
Average Volume (ft^3/pump)		4	4
Volume of Pumps (ft^3)		64	4
1. Labor			
Number of Persons		3	2
Pumps/Day		10	1
Number of Days		2	1
$/Day/Person		$200	$200
Subtotal Labor Costs		$1,200	$400
Subtotal Pump Removal and Loading Costs		$1,200	$400
E. Contaminated Dryer			
Dryer Volume (ft^3)	NA		
1. Labor			
Number of Persons	NA		
Ft^3/Day	NA		
Number of Days	NA		
$/Day/Person	NA		
Total Labor Cost	NA		
Total Dryer Dismantling and Loading Cost		$0	
F. Contaminated RO Units			
Number of RO Units			
Current		1	
Planned (One RO installed with CPP, one installed later for restoration)		1	
Average Volume (ft^3/RO Unit)		1000	
1. Labor			
Number of Persons		3	
Number of Days		1	
$/Day/Person		$200	
Subtotal Labor Costs		$1,200	
Subtotal RO Unit Removal and Loading Costs		$1,200	
Subtotal Equipment Removal and Loading Costs per Facility		$44,230	$400
Total Equipment Removal and Loading Costs		**$44,630**	

Equipment Removal Onsite Disposal and Loading		CPP	DDW Building
II. Transportation and Disposal Costs (NRC-Licensed Facility)			
A. Tankage			
Volume of Tank Construction Material (ft^3)		283	
Volume for Disposal Assuming 10% Void Space (ft^3)		311	
Transportation and Disposal Unit Cost ($/$ft^3$)		$4.90	
Subtotal Tankage Transportation and Disposal Costs		$1,525	
B. PVC Pipe			
Volume of Shredded PVC/HDPE Pipe (ft^3)		1540	9
Volume for Disposal Assuming 10% Void Space (ft^3)		1694	10
Transportation and Disposal Unit Cost ($/$ft^3$)		$4.90	$4.90
Subtotal PVC Pipe Transportation and Disposal Costs		$8,307	$49
C. Pumps			
Volume of Pumps (ft^3)		64	4
Volume for Disposal Assuming 10% Void Space (ft^3)		70	4
Transportation and Disposal Unit Cost ($/$ft^3$)		$4.90	$4.90
Subtotal Pump Transportation and Disposal Costs		$343	$20
D. Dryer			
Dryer Volume (ft^3)	NA		
Volume for Disposal Assuming Dryer Remains Intact (ft^3)	NA		
Transportation and Disposal Unit Cost ($/$ft^3$)		$4.90	
Total Dryer Transportation and Disposal Costs	NA		
E. RO Units			
Volume of RO Units (ft^3)		1000	
Volume for Disposal Assuming 50% Volume Reduction (ft^3)		1000	
Transportation and Disposal Unit Cost ($/$ft^3$)		$4.90	
Subtotal RO Unit Transportation and Disposal Costs		$4,904	
Subtotal Equipment Transportation and Disposal Costs per Facility		$15,079	$69
Total Equipment Transportation and Disposal Costs		**$15,148**	
III. Health and Safety Costs			
Radiation Safety Equipment		$8,000	200
Total Health and Safety Costs		**$8,200**	
SUBTOTAL EQUIPMENT REMOVAL AND DISPOSAL COSTS PER FACILITY		$67,309	$669
TOTAL EQUIPMENT REMOVAL AND DISPOSAL COSTS		**$67,978**	

Building Demolition and Disposal	CPP 140'x102'x30'	CPP Truck Bay 20'x102'x22'	Office 115'x100'x16'	DDW Building 12'x12'x10'	Pot Water Building 30x30x12'
I. Decontamination Costs					
A. Wall Decontamination					
Assumption: Approx 25% of CPP walls require decontamination					
Area to be Decontaminated (ft^2)	3500	1122	0	120	0
Application Rate (Gallons/ft^2)	1	1		1	
HCl Acid Wash, including labor ($/Gallon)	$0.50	$0.50		$0.50	
Subtotal Wall Decontamination Costs	$1,750	$561	$0	$60	$0
B. Concrete Floor Decontamination					
Assumption: Approx 50% of CPP and DDW floor requires decontamination					
Area to be Decontaminated (ft^2)	7200	1020	0	72	0
Application Rate (Gallons/ft^2)	2	2		2	
HCl Acid Wash, including labor ($/Gallon)	$0.50	$0.50		$0.50	
Subtotal Concrete Floor Decontamination Costs	$7,200	$1,020	$0	$72	$0
C. Deep Well Injection Costs					
Total Kgals for Injection	17.9	3.162	0	0.264	0
Deep Well Injection Unit Cost ($/Kgals)	$1.12	$1.12	$1.12	$1.12	$1.12
Subtotal Deep Well Injection Costs	$20	$4	$0	$0	$0
Subtotal Decontamination Costs per Building	$8,970	$1,585	$0	$132	$0
Total Decontamination Costs	**$10,687**				
II. Demolition Costs					
A. Building					
Assumptions:					
Limited contamination of CPP as there is no Precip/Dryer					
Volume of Building (ft^3)	428400	44880	184000	1440	10800
Demolition Unit Cost per WDEQ Guideline No.12,App.K, 2/17 ($/$ft^3$)	$0.298	$0.298	$0.298	$0.298	$0.298
Subtotal Building Demolition Costs	$127,663	$13,374	$54,832	$429	$3,218
B. Concrete Floor					
Area of Concrete Floor (ft^2)	14280	2040	11500	144	900
Demolition Unit Cost per WDEQ Guideline No.12, App.K, 2/17 ($/$ft^2$)	$0.779	$0.779	$0.779	$0.779	$0.779
Subtotal Concrete Floor Demolition Costs	$11,124	$1,589	$8,959	$112	$701
C. Concrete Footing					
Length of Concrete Footing (ft)	484	142	430	48	120
Demolition Unit Cost per WDEQ Guide. No.12, App.K, 2/17 ($/lin. ft)	$15.97	$15.97	$15.97	$15.97	$15.97
Subtotal Concrete Footing Demolition Costs	$7,729	$2,268	$6,867	$767	$1,916
Subtotal Demolition Costs per Building	$146,516	$17,231	$70,658	$1,308	$5,835
Total Demolition Costs	**$241,548**				

Building Demolition and Disposal		CPP 140'x102'x30'	CPP Truck Bay 20'x102'x22'	Office 115'x100'x16'	DDW Building 12'x12'x10'	Pot Water Building 30x30x12'
III. Disposal Costs						
A. Building						
Volume of Building Materials-no concrete, 10% of building full volume (yd^3)		1587	166	681	53	400
Weight of Building Materials @ 405 lb/yd^3 (ton)		321	34	138	11	81
1. Gillette Landfill						
Assumptions:						
Percentage salvage -no value (40%)		0.4	0.4	0.4	0.4	0.4
Weight for Disposal (tons)		129	13	55	4	32
Disposal Unit Cost ($/ton)		$72.31	$72.31	$72.31	$72.31	$72.31
Subtotal Landfill Disposal Costs		$9,294	$974	$3,992	$312	$2,343
2 Building Steel Recycle transportation						
Assumptions:						
Percentage salvage -recycle value (60%)		0.6	0.6	0.6	0.6	0.6
Weight for Disposal (tons)		193	20	83	6	49
Transport and Disposal Unit Cost ($/ton)		$72.31	$72.31	$72.31	$72.31	$72.31
Subtotal Building Steel Recycling Costs		$13,941	$1,460	$5,988	$469	$3,514
Subtotal Building Disposal Costs		$23,235	$2,434	$9,980	$781	$5,857
B. Concrete Floor						
Area of Concrete Floor (ft^2)		14280	2040	11500	144	900
Average Thickness of Concrete Floor (ft)		0.5	0.5	0.5	0.5	0.5
Volume of Concrete Floor (ft^3)		7140	1020	5750	72	450
Volume of Concrete Floor (yd^3)		264	38	213	3	17
1. Gillette Landfill						
Percentage (%)		80.00%	80.00%	0.00%	100.00%	0.00%
Weight for Disposal (tons) @ concrete density (lbs/yd^3):	4050	428	61	0	5	0
Disposal at Gillette Landfill						
Disposal Unit Cost ($/ton)		$72.31	$72.31	$72.31	$72.31	$72.31
Subtotal Landfill Disposal Costs		$30,979	$4,426	$0	$390	$0
2. NRC-Licensed Facility						
Assumptions:						
Percentage (%)		20	20	0	0	0
Volume for Disposal (ft^3)		1428	204	0	0	0
Segregation and Loading Unit Cost ($/$ft^3$)		$0.00	$0.00	$0.00	$0.00	$0.00
Transportation and Disposal Unit Cost ($/$ft^3$)		$4.90	$4.90	$4.90	$4.90	$4.90
Subtotal NRC-Licensed Facility Disposal Costs		$7,003	$1,000	$0	$0	$0
Subtotal Concrete Floor Disposal Costs		$37,982	$5,426	$0	$390	$0
C. Concrete Footing						
Length of Concrete Footing (ft)		484	142	430	48	120
Average Depth of Concrete Footing (ft)		2	2	2	0.5	2
Average Width of Concrete Footing (ft)		3	3	3	0.5	3
Volume of Concrete Footing (yd^3)		108	32	96	0	27
Weight for Disposal (tons)		218	7	3	0	0
Gillete Landfill Transport and Disposal Unit Cost ($/ton)		$72.31	$72.31	$72.31	$72.31	$72.31
Transportation and Disposal of Footings		$15,750	$489	$211	$0	$5
Subtotal Disposal Costs per Building		$76,967	$8,349	$10,191	$1,171	$5,862
Total Disposal Costs		**$102,540**				
IV. Health and Safety Costs						
Radiation Safety Equipment		$2,000	$500		$200	
Total Health and Safety Costs		**$2,700**				

Building Demolition and Disposal	CPP 140'x102'x30'	CPP Truck Bay 20'x102'x22'	Office 115'x100'x16'	DDW Building 12'x12'x10'	Pot Water Building 30x30x12'
SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS	$234,453	$27,665	$80,849	$2,811	$ 11,697
TOTAL BUILDING DEMOLITION AND DISPOSAL COSTS	**$357,475**				

Wellfield Buildings and Equipment Removal and Disposal	MU-1	MU-2
I. Wellfield Piping		
Assumptions:		
Number of Headerhouses per Wellfield	4	6
Length of Piping per Headerhouse (ft) (updated to reflect actual 2017)	22700	22700
Total Length of Piping (ft)	90800	136200
A. Removal and Loading		
Wellfield Piping Removal Unit Cost ($/ft of pipe)	$0.41	$0.41
Subtotal Wellfield Piping Removal and Loading Costs	$37,228	$55,842
B. Transport and Disposal Costs (NRC-Licensed Facility)		
Average Diameter of Piping (inches)	1.5	1.5
Chipped Volume Reduction (ft^3/ft)	0.0069	0.0069
Chipped Volume per Wellfield (ft^3)	626.52	939.78
Volume for Disposal Assuming 10% Void Space (ft^3)	689	1034
Transportation and Disposal Unit Cost ($/$ft^3$)	$4.90	$4.90
Subtotal Wellfield Piping Transport and Disposal Costs	$3,379	$5,071
Wellfield Piping Costs per Wellfield	$40,607	$60,913
Total Wellfield Piping Costs	**$101,520**	
II. Well Pumps and Tubing		
Assumptions:		
Pump and tubing removal costs included under groundwater restoration labor costs		
100% of production/injection wells contain pumps and/or tubing		
A. Pump and Tubing Transportation and Disposal		
Number of Production Wells (operating wells only)	107	160
Number of Injection Wells (operating wells only)	191	295
1. Pump Volume		
Number of Production Wells with Pumps	107	160
Average Pump Volume (ft^3)	2	2
Pump Volume per Wellfield (ft^3)	214	320
2. Tubing Volume		
Assumptions:		
Average tubing length/wellfield based on average well depth minus 25 ft		
Number of Production Wells with Tubing	107	160
Number of Injection Wells with Tubing	191	295
Average Tubing Length per Well (ft)	475	595
Tubing Length per Wellfield (ft)	141550	121000
Diameter of Production Well HDPE Tubing (inches)	2	2
Diameter of Injection Well HDPE Tubing (inches)	1	1
Chipped Volume Reduction (ft^3/ft)	0.0069	0.0069
Chipped Volume per Wellfield (ft^3)	977	835
Volume of Pump and Tubing (ft^3)	1191	1155
Volume for Disposal Assuming 10% Void Space (ft^3)	1310	1271
Transportation and Disposal Unit Cost ($/$ft^3$)	$4.90	$4.90
Pump and Tubing Transport and Disposal Costs per Wellfield	$6,425	$6,231
Total Pump and Tubing Costs	**$12,655**	

Wellfield Buildings and Equipment Removal and Disposal	MU-1	MU-2
III. Well Head Covers		
Total Quantity (operating wells)	298	455
Average Well Head Cover Volume (ft^3)	12	14.5
A. Removal		
Total Volume (ft^3)	3576	6597.5
Demolition Unit Cost per WDEQ Guideline No.12, App.K, 2/17 ($/ft^3$)	$0.298	$0.298
Subtotal Well Head Cover Demolition Costs	$1,066	$1,966
B. Survey and Decontamination		
Assumptions:		
Cost per Well Head Cover		
Subtotal Survey and Decontamination Costs		
C. Disposal		
Total Volume (ft^3)	3576	6598
Volume for Disposal Assuming 10% Void Space (ft^3)	3934	7257
Disposal Unit Cost 11E2 ($/ft^3$)	$4.90	$4.90
Subtotal 11E2 Disposal Costs	$19,292	$35,588
Well Head Cover Removal and Disposal Costs per Wellfield	$20,358	$37,554
Total Well Head Cover Removal and Disposal Costs	**$57,912**	
IV. Header Houses		
Total Quantity (operating)	4	6
Average Header House Volume (ft^3) (12'x30'x8')	2880	2880
A. Removal		
Total Volume (ft^3)	11520	17280
Demolition Unit Cost per WDEQ Guideline No.12, App.K, 2/17 ($/ft^3$)	$0.298	$0.298
Subtotal Building Demolition Costs	$3,433	$5,149
B. Survey and Decontamination		
Assumptions:		
Cost per Header House	$1,000	$1,000
Subtotal Survey and Decontamination Costs	$4,000	$6,000
C. Volume of Building Materials-no concrete,40% of full building volume (yd^3)	171	256
1. Gillette Landfill		
Assumptions:		
Weight for Disposal @484 lb/yd3 (tons)	41	62
Disposal Unit Cost ($/ton)	$72.31	$72.31
Subtotal Landfill Disposal Costs	$2,987	$4,480
Total Header House Removal and Disposal Costs per Wellfield	$10,420	$15,629
Total Header House Removal and Disposal Costs	**$26,049**	

Wellfield Buildings and Equipment Removal and Disposal	MU-1	MU-2	
V. Buried Trunk Line	**MU1**	**MU2**	**From CPP to MU-1**
Number of Lines per trench	2	2	2
Length of 16 inch lines	1280	3005	3645
Length of 12 inch lines		1675	
Length of 10 inch lines		2040	
Length of 8 inch lines			3645
Length of 6 inch lines	1749	5465	
A. Removal and Loading			
Total Trench Length (ft.)	3029	15885	7290
Main Pipeline Removal Unit Cost ($/ft of trench)	$3.47	$3.47	$3.47
Subtotal Trunk line Removal and Loading Costs	$10,511	$55,121	$25,296
B. Transport and Disposal Costs (NRC-Licensed Facility)			
1. 6" HDPE Trunk line			
Piping Length (ft)	3498	10930	
Chipped Volume Reduction (ft^3/ft)	0.078	0.078	
Chipped Volume (ft^3)	273	853	
2. 8" HDPE Trunk line			
Piping Length (ft)			7290
Chipped Volume Reduction (ft^3/ft)			0.141
Chipped Volume (ft^3)			1028
3. 10" HDPE Trunk line			
Piping Length (ft)		5480	
Chipped Volume Reduction (ft^3/ft)		0.277	
Chipped Volume (ft^3)		1518	
4. 12" HDPE Trunk line			
Piping Length (ft)		3350	
Chipped Volume Reduction (ft^3/ft)		0.293	0.293
Chipped Volume (ft^3)		982	
6. 16" HDPE Trunk line			
Piping Length (ft)			7290
Chipped Volume Reduction (ft^3/ft)			0.486
Chipped Volume (ft^3)			3543
Total Trunk line Chipped Volume (ft^3)	273	3352	4571
Volume for Disposal Assuming 10% Void Space (ft^3)	300	3687	5028
Transportation and Disposal Unit Cost 11E2 ($/$ft^3$)	$4.90	$4.90	$4.90
Subtotal Trunk line Transport and Disposal Costs	$1,471	$18,081	$24,657
Trunk line Decommissioning Costs per Wellfield	$11,982	$73,202	$49,953
Total Trunk Line Decommissioning Costs	**$135,137**		
TOTAL WELLFIELD BUILDINGS,PIPE AND EQUIPMENT REMOVAL AND DISPOSAL COSTS	**$333,273**		

Well Abandonment	MU-1	MU-2	Five Inch MU1 and Regional Baseline Wells
I. Well Abandonment (Wellfields)			
# of Production Wells (operating and/or installed)	107	160	0
# of Injection Wells (operating and/or installed)	191	295	28
# of Monitoring Wells (operating and/or installed)	49	76	26
#of Restoration Wells (operating and/or installed)	1	1	0
Total Number of Wells	348	532	54
Average Diameter of Casing (inches)	4.5	4.5	5
Average Depth (ft)	500	620	420
Well Abandonment Unit Cost ($/ft)	$1.56	$1.56	$1.61
Subtotal Abandonment Cost per Wellfield	$270,614	$512,984	$36,555
Total Wellfield Abandonment Costs	**$820,152**		
II. Waste Disposal Well Abandonment	**DDW- 2**		
Estimated Well Abandonment Cost per Well	$125,664		
Subtotal Waste Disposal Well Abandonment Costs per Well	$125,664		
Total Waste Disposal Well Abandonment Costs	**$125,664**		
TOTAL WELL ABANDONMENT COSTS	**$945,816**		

Wellfield Surface Reclamation	Connecting Road from CPP	MU-1	MU-2
I. Wellfield Pattern Area Reclamation			
Pattern Area (acres)		33.06	48.00
Disking/Seeding Unit Cost ($/acre) GL 12A		$300	$300
Subtotal Pattern Area Reclamation Costs per Wellfield		$9,918	$14,401
Total Wellfield Pattern Area Reclamation Costs		**$24,319**	
II. Wellfield Road Reclamation			
A. Road Reclamation			
Length of Wellfield Roads (1000 ft)	2.5	6.6	3.5
Wellfield Road Reclamation Unit Cost ($/1000 ft)	$739	$739	$739
Subtotal Road Reclamation Costs per Wellfield	$1,848	$4,877	$2,587
Total Wellfield Road Reclamation Costs	**$9,311**		
SUBTOTAL SURFACE RECLAMATION COSTS PER WELLFIELD	$1,848	$14,795	$16,988
TOTAL WELLFIELD SURFACE RECLAMATION COSTS	**$33,630**		

Miscellaneous Reclamation

I. CPP/Office Area Reclamation

Assumptions

Concrete used to backfill low areas as Clean Fill

A. Scarification of Gravel

Assumptions	
Average haul distance (ft)	NA
Surface grade (%)	0%
Average Thickness of Gravel (ft)	0.33
Surface Area (acres) (minus building floor area)	4.1
Scarification Unit Cost per WDEQ Guideline No.12A ($/acre)	$47.27
Total Gravel Scarification Cost	$194

B. Topsoil Application

1. Topsoil Replacement

Assumptions	
Average haul distance (ft)	1000
Surface area (acres)	4.82
18 inches of topsoil removed and replaced at borrow area	
Volume of topsoil (cy)	35,550.00
Topsoil Removal/Replacement Unit Cost per WDEQ GL No. 12A($/cy)	$0.67
Total Topsoil Removal/Replacement Cost	$23,819

C. Disking/Seeding

Assumptions	
Surface Area (acres)	44.1
Disking/Seeding Unit Cost ($/acre) GL 12A	$300
Total Disking/Seeding Costs	$13,230
Total CPP/Office Area Reclamation	**$37,242**

Miscellaneous Reclamation

II. Access Road Reclamation	Main Access Road	Water Supply Well Road	DDW Road
A. Assumptions			
Surface grade			
Length of road (miles)	0.45	0.09	0.25
Average road width (ft)	30	12	24
B. Gravel Percentage salvage -no value (60%)			
Assumptions			
Average haul distance (ft)	500	500	500
Gravel Road Base Width (ft)	30	12	24
Gravel Road Base Area (acres)	1.6	0.1	0.7
Average Road Base Depth (ft)	0.33	0.33	0.33
Volume of Road Base (cy)	871	66	381
Removal Unit Cost per WDEQ Guideline No.12 Appendix C ($/cy)	$0.774	$0.774	$0.774
Subtotal Gravel Road Base Removal Costs	$674	$51	$295
C. Move Road Fill Material			
Assumptions			
Estimated volume to move (cy)	30,500		
Average haul distance (ft)	500		
Removal Unit Cost per WDEQ Guideline No.12A ($/cy)	$0.774		
Subtotal Gravel Road Fill Removal Costs	$23,607		
D. Scarification with Dozer			
Road Surface Area (acres)	1.6	0.1	0.7
Scarification Unit Cost per WDEQ Guideline No.12A Grader ($/acre)	$47.27	$47.27	$47.27
Scarification Costs	$77	$6	$34
E. Topsoil Application			
Assumptions	Included in CPP reclamation		
F. Disking/Seeding	Included in CPP reclamation		
Subtotal Reclamation Costs per Road	$24,358	$57	$329
Total Access Road Reclamation Costs	**$24,744**		

Miscellaneous Reclamation

III. **Wastewater Pipeline Reclamation**	**DDW-2 Pipeline**	**CPP-Pond 1**
A. Pipeline Removal and Loading		
Length of HDPE Pipe Trench (ft)	1600	900
Main Pipeline Removal Unit Cost ($/ft of trench)	$3.47	$3.47
Subtotal Pipeline Removal Costs	$5,552	$3,123
B. Pipeline Transportation and Disposal (NRC-Licensed Facility)		
Pipe Diameter (inches)	4	4
Chipped Volume Reduction (ft^3/ft)	0.028	0.028
Subtotal Volume of Shredded PVC Pipe (ft^3)	49.28	27.72
11e2 Byproduct Transportation and Disposal Unit Cost ($/$ft^3$)	$4.90	$4.90
Subtotal Pipeline Disposal Costs	$242	$136
C. Disking/Seeding		
Assumptions:		
Width of Pipeline Trench (ft)	2	Included in CPP reclamation
Area of Pipeline Trench (acres)	0.1	
Disking/Seeding Unit Cost ($/acre) GL 12A	$300	
Subtotal Disking/Seeding Costs	$22	
Subtotal Reclamation Costs per Pipeline	$5,816	$3,259
Total Wastewater Pipeline Reclamation Costs	**$9,075**	

Miscellaneous Reclamation

			WW Storage Pond 1 (3 cells)	Sediment Pond
IV.	**Pond Reclamation**			
	A. HDPE Liner Removal and Disposal			
	Assumptions:			
	HDPE Primary liner for Pond 1 constitutes 11E2 waste			
	Thickness of HDPE Primary liner (mil)		60	
	HDPE Secondary liner for Pond 1 and Sediment pond not contaminated			
	Thickness of HDPE Secondary liner (mil)		40	
	Liner swell factor (50%)		1.5	
	Width of Pond (ft)		240	130
	Length of Pond (ft)		545	130
	Depth of Pond (ft)		15	15
	Surface area of pond (ft^2)		130800	16900
	Surface area of liner (ft2)		143616	
	Volume of HDPE Liner (cy)	0	40	0
	1. Removal and Loading			
	Removal and Loading Unit Cost based on engineer's estimate		$30,000.00	
	Sub Total Liner Removal and Loading Costs		**$30,000**	
	2. Transportation and Disposal 11E2			
	Volume of HDPE Primary Liner (ft^3)		1077	
	Transportation and Disposal Unit Cost 11E2 ($/$ft^3$)		$4.90	
	Sub Total Liner Transportation and Disposal Costs 11E2		**$5,282**	
	3. Transportation and Disposal Non Contaminated			
	Volume of HDPE Secondary Liner (ft^3)		718	0
	Assume loose liner weighs 1500 lbs/yd3			
	Offsite Transport and Disposal Unit Cost ($/ton)		$72.31	
	Subtotal Liner Transportation and Disposal Costs		$1,442	$0
	Total Liner Transportation and Disposal Costs		**$1,442**	
	B. Removal and disposal pond leak detection system			
	Labor/equipment estimate		$5,000	
	Volume of material estimate (ft3)		500	
	Transportation and Disposal Unit Cost 11E2 ($/$ft^3$)		$4.90	
	Sub Total Leak Detection Removal and Disposal Costs		**$7,452**	
	C. Backfill Pond			
	Assumptions per cell (3):			
	Estimated volume to approx natural grade (yd3)		10080	13600
	Average push distance with dozer (ft)		50	
	Approx haul for scraper from road fill (ft)			500
	Surface grade (%)		0%	0%
	Volume of WW Pond backfill for 3 cells (cy)		30,240	
	Backfill Unit Cost per WDEQ Guideline No.12., ($/cy)		$0.22	$0.774
	Subtotal Backfill Costs		$6,653	$10,526
	Subtotal Backfill Costs		**$17,179**	
	D. Topsoil Application			
	Assumptions		Included in CPP reclamation	
	E. Soil Sampling and Analysis Costs			
	Number of samples		12	
	Cost per sample ($)		$150	
	Subtotal Soil Sampling Costs ($)		**$1,800**	
	Total Pond Reclamation Costs		**$63,156**	

Miscellaneous Reclamation

V.	**Diversion Berm Earthwork and Reclamation**	
	Assumptions	
	Estimated volume to move (cy)	10800
	Average haul distance (ft)	1000
	Removal Unit Cost per WDEQ Guideline No.12A ($/cy)	$0.67
	Subtotal Berm Fill Removal Costs	$7,236
	Topsoil Application	
	Assumptions	Included in CPP reclamation
	TOTAL DIVERSION BERM EARTHWORK AND RECLAMATION	**$7,236**
VI.	**Containment Barrier Wall (CBW) Reclamation**	
	Assumptions	
	Labor/equip to excavate/install finger drains (estimate)	$7,650
	Gravel for finger drains (estimate)	$3,000
	Total Containment Barrier Wall (CBW) Reclamation Costs	**$10,650**
VII.	**Main Trunk Line Reclamation**	
	Assumptions	
	4000 feet requires seeding (located outside wellfield area) (ft)	4000
	Assume 20 feet wide (ft)	20
	Disking/Seeding Unit Cost ($/acre) GL12A	$300
	Total Trunk Line Reclamation	**$551**

Miscellaneous Reclamation

	MU1	MU2
VIII. Culvert Removal and Disposal		
Assumptions		
Total Feet	120	60
Removal Unit Cost per WDEQ Guideline No.12A (13.20 per ft.)	$1,584	$792
Total Culvert Removal and Disposal	**$2,376**	
IX. Fence Removal and Disposal		
Assumptions		
Length 4-Strand Barbwire Fence (MU-1)	6340	
Length 4-Strand Barbwire Fence (MU-2)	6270	
Length CPP Fence	8500	
Unit Cost per WDEQ Guideline No.12, App H ($/ft)	$0.31	
	$6,544	
Total Fence Removal and Disposal Costs		
X. Monitoring Site Removal and Disposal		
3 Surface Water Sites (removed 2017)	$0	
6 Air Mon Sites (reduced from 7 in 2017; estimated at $500 each)	$3,000	
1 Met Station (removed 2017)	$0	
	$3,000	
Total Monitoring Site Removal and Disposal Costs		
XI. Radiologic Surveys		
Ass Misc meter/smear surveys buildings/equipment (100 at $55 each)	$5,500	
Decomm area gamma surveys (est based on baseline survey costs	$15,000	
Misc soil samples (Ra-226/U)	$13,000	
	$33,500	
Total Radiologic Surveys Costs		
XII. MISC Ecological Surveys		
Assumptions (Wildlife survey no longer required by NSR to PTM)	**$0**	
Total Survey Costs	**$0**	
XIII. Surface reclamation for Delineation, DN and Historic Hole Abandonment		
Historic holes associated with Mine Unit 2	0	
Exploration (DN) Holes within permit area	70	
Delineation Holes outside MU1 and MU3	300	
Total acres disturbed (400 ft2 per hole)	3.4	
Disking/Seeding Unit Cost ($/acre) GL12A	$300	
Total Surface Reclamation for Delination, DN, and Historic Holes	**$1,019**	
TOTAL MISCELLANEOUS RECLAMATION COSTS	**$199,094**	

GROUNDWATER SWEEP (GWS)

Assumptions:

1. All pumps are 5 hp pumping at 20 gpm
2. Cost of electricity = $0.07/kwh (updated 2017 to reflect actual PRECORP rates)
3. All wastewater brine pumped to DDW for injection at $1.37/1000 gallons. with 90% permeate/10% brine split
4. Repair and maintenance costs estimated at $0.10/1000 gallons
5. Process sampling and analysis costs estimated at $0.1/1000 gallons
6. Labor costs are covered in GW REST

Wellfield Pumping Costs per 1000 Gallons

$$\frac{1000\ gal}{} \times \frac{5\ hp}{20\ gpm} \times \frac{1\ hr}{60\ min} \times \frac{0.746\ kwh}{hp} \times \frac{\$\ 0.070}{kwh} \times \frac{1}{0.8} = \$\ 0.271979167$$

Repair and Maintenance Costs per 1000 Gallons	= $ $0.10
Process Sampling and Analysis Costs per 1000 Gallons	= $ $0.10
RO Wastewater Brine to DDW per 1000 Gallons **Note: only 10% of RO Volume Requires DDW Disposal**	= $ $0.11
TOTAL GWS COSTS PER 1000 GALLONS	**= $ 0.58**

REVERSE OSMOSIS (RO)

Assumptions:

1 Cost of electricity = $0.07/kwh (updated 2017 to reflect actual PRECORP rates)
2 90% permeate/10% brine split
3 Membrane life of 4 years.
4 Includes cost of pumping from wellfield to RO Unit
5 The 10% reject is disposed at the DDW at a cost of $1.12/1000 gal
6 Process sampling and analysis costs estimated at $0.17/1000 gallons at 700 GPM flow rate
7 Labor costs are covered in GW REST

Reverse Osmosis Costs per 1000 Gallons

Electricity	= $ 0.15
Chemicals	= $ 0.10
Membrane Replacement	= $ 0.00
Repair and Maintenance	= $ 0.10
Pumping from Wellfield	= $ 0.19
Process Sampling and Analysis	= $ 0.17

RO Wastewater Brine to DDW per 1000 Gallons = $ 0.112
Note: only 10% of RO Volume Requires DDW Disposal

TOTAL RO COSTS PER 1000 GALLONS **= $ 0.82**

RECIRCULATION (REC)

Assumptions:

1. All pumps are 5 hp pumping at 20 gpm
2. Cost of electricity = $0.07/kwh (updated 2017 to reflect actual 2017 PRECORP rates)
4 Repair and maintenance costs estimated at $0.10/1000 gallons
5 Process sampling and analysis costs estimated at $0.10/1000 gallons
6 Labor costs are covered in GW REST

Wellfield Pumping Costs per 1000 Gallons

$$\frac{1000\ gal}{} \times \frac{5\ hp}{20\ gpm} \times \frac{1\ hr}{60\ min} \times \frac{0.746\ kwh}{hp} \times \frac{\$\ 0.070}{kwh} \times \frac{1}{0.8} = \$\ 0.27198$$

Repair and Maintenance Costs per 1000 Gallons = $ 0.10

Process Sampling and Analysis Costs per 1000 Gallons = $ 0.10

TOTAL GWS COSTS PER 1000 GALLONS **= $ 0.47**

DEEP WELL INJECTION

Assumptions:

1. Pump 50 hp pumping at 50 gpm
2. Cost of electricity = $0.07/kwh (updated 2017 to reflect actual 2017 PRECORP rates)
3 Repair and maintenance costs estimated at $0.10/1000 gallons
4 Labor costs are covered in GW REST

Waste Disposal Pumping Costs per 1000 Gallons

$$\frac{1000\ gal}{} \times \frac{50\ hp}{50\ gpm} \times \frac{1\ hr}{60\ min} \times \frac{0.746\ kwh}{hp} \times \frac{\$\ 0.070}{} = \$\ 0.87$$

Repair and Maintenance Costs per 1000 Gallons = $ 0.10

Chemical Costs per 1000 Gallons = $ 0.15

Scale Inhibitor	= $ 0.10
Corrosion Inhibitor	= $ 0.05

TOTAL DEEP WELL INJECTION COSTS PER 1000 GALLONS = $ 1.12

FIVE YEAR MECHANICAL INTEGRITY TESTS (MIT)

Assumptions:

1. Based on actual operating costs
2. Use Pulling Unit for pulling producer pumps, 1 hr/well at cost of $28.50/hr.
3. Use ATV for pulling injection stinger 1 hr/well at cost of $10.00/hr.
3. Use MIT Unit for 2 hr/well at cost of $28.50/hr.
4. Labor for operation of pulling unit will require 2 workers at $26.44/hr
4. Labor for operation of ATV to pull injector stingers will require 1 worker at $26.44/hr
5. Labor for operation of MIT Unit will require 1 worker at $26.44/hr

Producer MIT Costs per Well

Equipment:						
Pulling Unit						
	1 hours	X	$ 28.50	per hour		=$ 28.50
MIT Unit						
	2 hours	X	$ 28.50	per hour		=$ 57.00
Labor:						
Pulling Unit						
	1 hours	X	$ 26.44	per hour X	2 workers	=$ $52.88
MIT Unit						
	2 hours	X	$ 26.44	per hour		=$ 52.88

Producer MIT COST PER WELL =$ 191

Injector MIT Costs per Well

Equipment:						
ATV						
	1 hours	X	$ 10.00	per hour		=$ 10.00
MIT Unit						
	2 hours	X	$ 28.50	per hour		=$ 57.00
Labor:						
ATV						
	1 hours	X	$ 26.44	per hour X	1 workers	=$ $26.44
MIT Unit						
	2 hours	X	$ 26.44	per hour		=$ 52.88

Injector MIT COST PER WELL =$ 146

MAIN PIPELINE REMOVAL

Assumptions:

1. Trenching with track hoe at 400 ft/day
2. Pipeline extraction and backfilling with track hoe at 300 ft/day
3. Trackhoe rental: $1725/week (updated 2017)
4. Fuel cost: $12.00/operating hour (updated from Caterpillar tables 2017)
5. Trackhoe operation requires 1 worker at $25/hour
6. Pipeline extraction requires 2 workers at $25/hour (in addition to trackhoe operator)
7. Pipelines removed simutaneously
8. Includes removal of manholes
9. Operating schedule: 8 hrs/day, 5 days/week

Main Pipeline Removal Costs per ft of Trench

Equipment

Trackhoe

$$\frac{\$\ 1725}{\text{week}} \times \frac{1\ \text{week}}{5\ \text{days}} \times \frac{1\ \text{days}}{300\ \text{ft}} = \$\ 1.15$$

Fuel

$$\frac{\$\ 12}{\text{hour}} \times \frac{8\ \text{hrs}}{1\ \text{day}} \times \frac{1\ \text{days}}{300\ \text{ft}} = \$\ 0.32$$

Labor

Track hoe Operation

$$\frac{\$\ 25}{\text{man hr}} \times \frac{8\ \text{man hrs}}{1\ \text{day}} \times \frac{1\ \text{days}}{300\ \text{ft}} = \$\ 0.67$$

Pipeline Extraction

$$\frac{\$\ 25}{\text{man hr}} \times \frac{16\ \text{man hrs}}{1\ \text{day}} \times \frac{1\ \text{day}}{300\ \text{ft}} = \$\ 1.33$$

MAIN PIPELINE REMOVAL COST PER FT OF TRENCH =$ 3.47

WELLFIELD PIPING REMOVAL

Assumptions:

1. Trenching with backhoe at 2000 ft/day
2. Pipeline extraction and backfilling with backhoe at 2000 ft/day
3. Backhoe rental: $855/week ($3,700/mo. updated 2017)
4. Fuel cost: $7.25/operating hour (updated from Caterpillar tables 2017)
5. Backhoe operation requires 1 worker at $25/hour
6. Pipeline extraction requires 1 workers at $25/hour (in addition to backhoe operator)
7. Operating schedule: 8 hrs/day, 5 days/week

Wellfield Pipe Removal Costs per ft of Pipe

Equipment

Backhoe

$$\frac{\$\ 855}{\text{week}} \times \frac{1\ \text{week}}{5\ \text{days}} \times \frac{1\ \text{days}}{1500\ \text{ft}} = \$\ 0.11$$

Fuel

$$\frac{\$\ 7.25}{\text{hour}} \times \frac{8\ \text{hrs}}{1\ \text{day}} \times \frac{1\ \text{days}}{1500\ \text{ft}} = \$\ 0.04$$

Labor

Backhoe Operation

$$\frac{\$\ 25}{\text{man hr}} \times \frac{8\ \text{man hrs}}{1\ \text{day}} \times \frac{1\ \text{days}}{1500\ \text{ft}} = \$\ 0.13$$

Pipeline Extraction

$$\frac{\$\ 25}{\text{man hr}} \times \frac{8\ \text{man hrs}}{1\ \text{day}} \times \frac{1\ \text{day}}{1500\ \text{ft}} = \$\ 0.13$$

WELLFIELD PIPE REMOVAL COST PER FT OF PIPE =$ 0.41

WELLFIELD ROAD RECLAMATION

Assumptions

1. Gravel road base removed at cost of $103/1000 ft. (WDEQ Guideline No. 12, App. C, Level Ground, 500 ft. haul)
2. Gravel road base: average depth = 0.3 ft., average width =12 ft.
3. Roads scarified prior to topsoil application at cost of $47.27/acre (WDEQ Guideline No. 12A)
4. Grading of scarified roads prior to topsoil application at cost of $53.90/acre (WDEQ Guideline No. 12A)
5. Topsoil applied at cost of $0.55/cy (WDEQ Guideline No. 12A Level Ground, 500 ft. haul)
6. Stripped topsoil: average depth = 1.5 ft., average width = 16 ft.
7. Disking/seeding cost of $300 acre is based on LQD recommendation and LQD Guideline 12A.

Gravel Road Base Removal Costs per 1000 ft. of Road

$$\frac{1000\ ft.}{} \times \frac{0.30\ ft.}{} \times \frac{12\ ft.}{} \times \frac{1\ cy}{27\ ft^3} \times \frac{\$0.774}{cy} = \$\ 103$$

Scarification Costs per 1000 ft. of Road

$$\frac{1000\ ft.}{} \times \frac{16\ ft.}{} \times \frac{1\ acre}{4.356E{+}04\ ft^2} \times \frac{\$47.27}{acre} = \$\ 17$$

Grading Costs per 1000 ft. of Road

$$\frac{1000\ ft.}{} \times \frac{16\ ft.}{} \times \frac{1\ acre}{4.356E{+}04\ ft^2} \times \frac{\$53.90}{acre} = \$\ 20$$

Topsoil Application Costs per 1000 ft. of Road

$$\frac{1000\ ft.}{} \times \frac{1.50\ ft.}{} \times \frac{16\ ft.}{} \times \frac{1\ cy}{27\ ft^3} \times \frac{\$0.55}{cy} = \$\ 489$$

Disking/Seeding Costs per 1000 ft. of Road

$$\frac{1000\ ft.}{} \times \frac{16\ ft.}{} \times \frac{1\ acre}{4.356E{+}04\ ft^2} \times \frac{\$300}{acre} = \$\ 110$$

TOTAL WELLFIELD ROAD RECLAMATION COSTS PER 1000 FT OF ROAD = $ 739

NON CONTAMINATED WASTE TRANSPORT AND DISPOSAL AT GILLETTE LANDFILL

Assumptions:

1. 30 yd^3 per load
2. 484 pounds per cubic yard based on EPA conversion for bulk construction and demolition solid waste
3. Transportation and disposal cost at Gillette landfill of $525 per 30 yd^3 container based on current actual cost

Non Contaminated Waste Transportation and Disposal Cost

$$\frac{\$525.00}{\text{shipment}} \times \frac{1\ \text{Shipment}}{30\ yd^3} \times \frac{1\ yd^3}{484\ \text{lb}} \times \frac{2000\ \text{lb}}{1\ \text{ton}}$$

Total NON CONTAMINATED WASTE TRANSPORT AND DISPOSAL **$72.31 per ton**

11E2 BYPRODUCT CONTAMINATED WASTE TRANSPORT AND DISPOSAL

Assumptions:

1. 40 yd^3 per load (two 20 yd^3 containers per shipment)
2. Shipment to White Mesa mill per current transportation contract
3. Disposal fee per current disposal contract with Energy Fuels
4. Waste Density based on current average of 14.5 lbs/ft^3

Transportation:	$2.84	Ft^3
Unloading:	$0.69	Ft^3
Disposal:	$1.27	Ft^3
Utah Tax:	$0.10	Ft^3

Total 11E2 BYPRODUCT CONTAMINATED WASTE TRANSPORT AND DISPOSAL **$4.90 per ft^3**

Abbreviations/Acronyms

$	Dollars
$/Kgal	Dollars per 1000 gallons
avg	average
CBW	Containment Barrier Wall
cy	cubic yard
DDW	Deep Disposal Well
FG	Fiberglass
ft	feet
ft^2	square feet
ft^3	cubic feet
gal	gallon
gpm	gallons per minute
H&S	Health and Safety
H2S	Hydrogen Sulfide
H2SO4	Sulfuric Acid
HCl	Hydrochloric Acid
Hp	Horsepower
Kgal	1000 gallons
Kwh	Kilowatt-hours
NaOH	Caustic Soda
OD	Outside Diameter
PPE	personal protective equipment
PV	Pore Volume
PVD	Pore Volume Displacement
reqm't	requirement
RO	Reverse Osmosis
yd^3	cubic yards
yr	year