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September 26, 2019

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

40-8943

Marty Link, Water Quality Division Administrator Nebraska Department of Environmental Quality P.O. Box 98922 Lincoln, Nebraska 68509-8922

2020 Surety Estimate

Class III Underground Injection Control Permit Number NE 0122611 Class I Underground Injection Control Permit Number NE 0211670 Class I Underground Injection Control Permit Number NE 0210825

### Dear Ms. Link:

Attached is the annual update to the surety estimate for the Crow Butte Uranium Mine. This estimate meets the requirements of Chapter 13 of Title 122, Rules and Regulations for Underground Injection and Mineral Production Wells and the annual update requirements included in the referenced permits issued by the Nebraska Department of Environmental Quality (NDEQ). Attached as required in the approved minor permit modification dated August 21, 2007, is an audit statement from Gardner, Loutzenhiser & Ryan; an independent professional auditing firm.

As stated in Criterion 9 of 10 CFR, Appendix A, this surety estimate supplies sufficient information for the U.S. Nuclear Regulatory Commission (NRC) to verify that the amount of coverage provided by the financial assurance will permit the completion of all decontamination, decommissioning, and reclamation of sites, structures, and equipment used in conjunction with facility operation.

Cost estimates have been calculated on the basis of completion of all activities by a third party who is not financially affiliated with Crow Butte. Costs quoted by independent contractors include profit and overhead costs and do not include any credit for salvage value. Crow Butte does not incur any annual costs due to licenses or permits from any State, County, or Local Governments.

The 2020 Surety Estimate is \$51,772,730, an increase of \$1,108,085 over the 2019 Surety Estimate of \$50,664,645, submitted on September 26, 2018. The chemical and electrical costs are based on

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current day invoiced costs. Project management costs have been incorporated into the various phases of decommissioning under the labor costs associated with engineering. There were no significant changes to the site infrastructure in 2019 or planned for 2020 that impacted the surety estimate.

The most significant factor contributing to the increased surety estimate is an 8.5% increase in electrical costs. This is partially offset by a slight decrease in realized fuel costs in 2019 compared to 2018. The increase closely reflects the 2019 escalation factor of 1.02.

By letter dated December 19, 2018, NRC staff requested additional information in four areas addressed in the 2019 surety submittal. CBO responded to each of these requests for additional information (RAI), and NRC approved the 2019 surety submittal by letter dated March 21, 2019. Each RAI and the CBO response is detailed below.

#### **RAI (1)**

As currently presented, the annual surety submission does not include sufficient information to justify the reduction in costs for Guideline 8 Analysis.

CBO Response: In 2018, CBO requested bids from contract laboratories for completion of Guideline 8 Analysis of groundwater samples. The successful bidder, Intermountain Laboratories (IML) in Sheridan, Wyoming, bid \$220 per sample, which compares to the price of \$372 that CBO was paying for Guideline 8 Analysis. This resulted in a reduction of \$870,048 in the overall surety cost. CBO has been using IML for Guideline 8 Analysis and the current charge for this analysis is in fact \$220 per sample.

### **RAI (2)**

As currently presented, the annual surety submission does not include sufficient information to identify how the costs related to "Other Laboratory Costs" were derived.

CBO Response: CBO believes this question refers to the Master Costs page of the surety spreadsheet, specifically to the subheading "Other (radon, biossays, etc.)" under the "Analytical Costs" section of this page. This subheading captures the monthly costs for monitoring employee exposures. The estimate included in this section is based on monthly billing from the contract laboratory for this analysis. The realized monthly cost for this analysis was reduced in the current surety estimate because the number of staff was reduced in 2018. The surety submitted in 2017 included 32 employees in this program, and the surety submitted in 2018 included only 19 employees (each sample set also includes three fictitious names that represent two spike samples and a blank sample for quality assurance). This resulted in a cost reduction from \$925 to \$600.

### **RAI (3)**

As currently presented, the annual surety submission does not include sufficient information to determine why costs were only identified for "Engineer support during final stabilization" and "HP [health physicist] Technician support during final stabilization" for mine units (MU) 9 through 11.



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CBO Response: CBO believes this request for additional information refers to the "Ground Water Restoration" page of the surety spreadsheet, specifically the rows labeled "3 Engineer support during final stabilization" and "4 HP Technician support during final stabilization" under the subheading "VI. Supervisory Labor Cost". These headings have been a standard section of the surety estimate for a number of years. They refer to a specific stage of restoration CBO has termed "final stabilization". In this phase, active restoration activities (i.e. groundwater transfer, groundwater sweep, or groundwater treatment) are complete in all mine units, but stability monitoring continues in the last mine units, MU 9 through 11. Before this phase begins, engineering and HP Technician costs are captured in the "1 Engineer support during active restoration" and the "2 HP Technician support during active restoration" rows located immediately above the rows in question. The rows in question capture the costs associated with engineering support and HP Technician support that will be realized when active restoration activities are complete, but stability monitoring continues in MU 9-11.

### **RAI (4)**

As currently presented, the annual surety submission does not include sufficient information to determine how cost decreases under "Cost reduction due to concurrent restoration of Mine Units" was derived.

CBO Response: CBO believes this request for additional information refers to the "Ground Water Restoration" page of the surety spreadsheet, specifically the row labeled "5 Cost reduction due to concurrent restoration of Mine Units" under the subheading "VI. Supervisory Labor Cost". As is the case with the rows referenced in RAI (3), this heading has been a standard section of the surety estimate for a number of years. The surety document captures costs for engineering support and HP technician support for the restoration of each mine unit, based on the number of months CBO estimates each mine unit will be in restoration. CBO multiplies the estimated monthly labor cost in both categories by the estimated active restoration period for each respective mine unit to derive this estimate. This methodology significantly overestimates the costs associated with this labor, because multiple mine units will be in active restoration at one time, and the monthly labor costs in question will apply to the entire site, not each individual mine unit. Said another way, the monthly labor of the engineer and HP technician will apply to all mine units as well as the rest of the site, not just one mine unit. The formula for reducing these costs is to divide the total estimated labor cost by 2. CBO believes that this methodology still results in a very conservative estimate, because it assumes that only two mine units will be in restoration at a given time. For most of 2018, mine units 3, 4, 5, and 6 were concurrently in active restoration. Obviously, this number will vary as mine units move into stability monitoring and other mine units are added to the active restoration roster, but CBO believes that 2 is a representative, conservative estimate of the number of mine units in active restoration at a given time, and application of this number to the formula results in a conservative estimate of the supervisory labor costs that will be associated with active restoration.

### Status of Mine Units in Restoration

Mine Unit #2

**History** 



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The restoration plan for this mine unit was submitted to NDEQ on December 5, 1995 and was approved by NDEQ in a letter dated December 15, 1995. Injection of lixiviant into this mine unit ceased on January 2, 1996. Since that time period, the mine unit has been in IX and RO treatment and stability monitoring with the following exception.

On August 9, 2007 the entire restoration circuit was shut down so that changes could be made to increase the flow through IX and RO treatment. During this time period the mine unit was in recirculation to maintain a hydrologic bleed until April 1, 2009, when IX treatment resumed in this mine unit. On May 26, 2009, the RO circuit was restarted and this mine unit was placed back into RO treatment.

In February 2009, Crow Butte contracted with a third party hydrogeologist to develop a restoration flow model for Mine Units 2 through 5. The groundwater flow at the facility was simulated using MODFLOW2000, a three-dimensional groundwater flow model developed by the United States Geological Survey. The groundwater flow model was calibrated to pre-mining conditions using water level data collected prior to the mining activities in January 1983. Initial estimates of aquifer properties and boundary water levels were adjusted slightly as part of the model calibration process in order to achieve the best possible match between observed and simulated water levels. The calibrated groundwater flow model is currently being used to optimize restoration in Mine Units 2 through 5 given certain practical limitations on treatment rates, disposal capacity, and existing well injection and extraction rates. The model is calibrated periodically to reflect current mine conditions. Based on this model, eight additional restoration wells were installed to remediate the excursion of lixiviant along the perimeter monitor wells PR-8, PR-15, and IJ13-P. On February 1, 2010 the Safety Environmental Review Panel approved the startup of these additional wells.

Based on these conditions, it was estimated that Mine Unit 2 would be placed into stability monitoring by July 1, 2012. By letter dated August 20, 2009 and Technical Evaluation Report dated August 5, 2009, the NRC approved CBO's request to complete groundwater restoration in Mine Unit 2 by July 1, 2012.

### 2019 Status

On May 23, 2013, CBO submitted to the Nebraska Department of Environmental Quality (NDEQ) data supporting the successful restoration of the groundwater in Mine Unit #2. By letter June 10, 2013, the NDEQ indicated that the data had been reviewed and determined that stabilization could begin. Stability monitoring and sampling was initiated in June 2013 and continued through September 2014. The data indicates that all the monitored constituents have stabilized and have been returned to the approved NDEQ restoration standards. However, a few of the monitored constituents do not meet the concentration limits under 10 CFR 40, Appendix A, Criterion 5B(5). As a result of this, CBO has collected coring data from this mine unit and anticipates submitting an application requesting an alternate concentration limit (ACL) for these constituents. Because of the small size, geographic proximity, and similar water quality between Mine Unit #2 and Mine



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Unit #3, CBO plans to prepare and submit the ACL application for these mine units together, which will defray significant cost in preparation of the submittal. CBO projects that this application will be submitted during the fourth quarter of 2020 and that regulatory review will be completed by the fourth quarter of 2022.

### Mine Unit #3

### History

The restoration plan for this mine unit was submitted to NDEQ on March 24, 1999 and was amended and approved by NDEQ in a letter dated February 13, 2008. Injection of lixiviant into this mine unit ceased on July 22, 1999. Since that time period, the mine unit has been in IX and RO treatment and stability monitoring with the following exception.

On August 9, 2007 the entire restoration circuit was shut down so that changes could be made to increase the flow through IX and RO treatment. During this time period the mine unit was in recirculation to maintain a hydrologic bleed until April 1, 2009, when IX treatment resumed in this mine unit. On May 26, 2009, the RO circuit was restarted and this mine unit was placed back into RO treatment.

In February 2009, Crow Butte contracted with a third party hydrogeologist to develop a restoration flow model for Mine Units 2 through 5. The groundwater flow at the facility was simulated using MODFLOW2000, a three-dimensional groundwater flow model developed by the United States Geological Survey. The groundwater flow model was calibrated to pre-mining conditions using water level data collected prior to the mining activities in January 1983. Initial estimates of aquifer properties and boundary water levels were adjusted slightly as part of the model calibration process in order to achieve the best possible match between observed and simulated water levels. The calibrated groundwater flow model is currently being used to optimize restoration in Mine Units 2 through 5 given certain practical limitations on treatment rates, disposal capacity, and existing well injection and extraction rates. The model is calibrated periodically to reflect current mine conditions. Based on this model, eight additional restoration wells were installed to remediate the excursion of lixiviant along the perimeter monitor wells PR-8, PR-15, and IJ13-P. On February 1, 2010 the Safety Environmental Review Panel approved the startup of these additional wells.

Based on these conditions, it was estimated that Mine Unit 3 would be placed into stability monitoring by July 1, 2013. By letter dated August 20, 2009 and Technical Evaluation Report dated August 5, 2009, the NRC approved CBO's request to complete groundwater restoration in Mine Unit 3 by July 1, 2013.

On May 23, 2013, CBO submitted to the Nebraska Department of Environmental Quality (NDEQ) data supporting the successful restoration of the groundwater in Mine Unit #3. By letter June 10, 2013, the NDEQ indicated that the data had been reviewed and determined that



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stabilization could begin. Stability monitoring and sampling was initiated in June 2013 and continued through September 2014. The data indicates that all the monitored constituents have stabilized and have been returned to the approved NDEQ restoration standards. However, a few of the monitored constituents do not meet the concentration limits under 10 CFR 40, Appendix A, Criterion 5B(5). As a result of this, CBO has collected coring data from this mine unit and anticipates submitting an application requesting an ACL for these constituents.

#### 2019 Status

On September 15, 2017, spot treatment of P246 in Mine Unit 3 was reinitiated after in-house samples indicated that the uranium levels in the well had increased significantly. Additional sampling indicated that the likely source of the elevated uranium levels in the well was an incursion of solutions from neighboring Mine Unit 7. In addition to spot treating the well, CBO initiated a conductivity monitoring program utilizing downhole trolls around the Mine Unit 2 and 3 perimeters that interface with active Mine Units 4, 5, and 7. CBO is currently collecting stability samples form Mine Unit 3 on a quarterly basis. An ACL application will be submitted during the fourth quarter of 2020 with regulatory review finished during the fourth quarter of 2022.

### Mine Unit #4

### History

The restoration plan for this mine unit was submitted to NDEQ on March 4, 2003 and was approved by NDEQ in a letter dated August 26, 2003. Injection of lixiviant into this mine unit ceased on October 31, 2003. Since that time period the mine unit has been in IX and RO treatment with the same exceptions as Mine Unit 2. On April 1, 2009, IX and RO treatment was resumed in this mine unit. Based on these conditions, it was estimated that Mine Unit 4 would be placed into stability monitoring by January 1, 2015. By letter dated August 20, 2009 and Technical Evaluation Report dated August 5, 2009, the NRC approved CBO's request to complete groundwater restoration in Mine Unit 4 by January 1, 2015.

### 2019 Status

Stability monitoring in Mine Unit 4 was initiated in September, 2018. CBO is currently collecting stability samples from the mine unit on a quarterly basis. If an ACL is required, CBO anticipates this submitting the application during the first quarter of 2021. It is estimated that the regulatory review will be completed during the first quarter of 2023.

### Mine Unit #5

### History

The restoration plan for this mine unit was submitted to NDEQ on July 9, 2007 and was approved by NDEQ in a letter dated August 6, 2007. Injection of lixiviant into this mine unit ceased on August 14, 2007. Since that time period the mine unit has been in IX and RO



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treatment with the same exceptions as Mine Unit 2. On April 1, 2009, IX and RO treatment was resumed in this mine unit. Based on these conditions, it was estimated that Mine Unit 5 would be placed into stability monitoring by July 1, 2016. By letter dated August 20, 2009 and Technical Evaluation Report dated August 5, 2009, the NRC approved CBO's request to complete groundwater restoration in Mine Unit 5 by July 1, 2016.

### 2019 Status

On August 20, 2018, CBO initiated stability monitoring in Mine Unit 5 by collecting guideline 8 samples from the baseline restoration wells in the mine unit and splitting these samples with NDEQ. Stability monitoring of the mine unit continues on a quarterly basis. If an ACL is required, CBO anticipates this submitting the application during the first quarter of 2021. It is estimated that the regulatory review will be completed during the first quarter of 2023.

### Mine Unit #6

### History

On October 28, 2010, CBO permanently ceased injection of lixiviant into the mine unit. By letter dated December 21, 2010, CBO provided notice of cessation of mining in Mine Unit #6. As specified in 10 CFR Part 40.42(h)(l), CBO must also complete mine unit restoration within 24 months after restoration is initiated. If the mine unit requires more than 24 months to complete, CBO must notify the NRC and request an alternate schedule for completion of decommissioning, along with adequate justification for the request. The following table was submitted displaying the schedule and timeline for the various phases of restoration for the mine unit.

IX Treatment November 1, 2010 through June 30, 2014 (3 pore volumes)	Flow 100 GPM
RO Treatment July 1, 2014 through June 30, 2016 (6 pore volumes)	400 GPM
Recirculation July 1, 2016 through December 31, 2014 (2 pore volumes)	200 GPM
Stability and Regulatory Approval January 1, 2018 through December 31, 2019	N/A

### 2019 Status

Mine Unit 6 is currently in IX and RO treatment. Based on the MODFLOW2000 model, stability of the mine unit should begin during the first quarter of 2021. If an ACL is required, CBO



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anticipates submitting the application during the first quarter of 2023. It is estimated that the regulatory review will be completed during the fourth quarter of 2024.

### Mine Unit #7

On June 25, 2018, CBO received a minor modification to NDEQ Class III UIC Permit NE0122611. The modification, in part, allows CBO to place more than five mine units into restoration status when the mine is no longer actively mining. CBO and NDEQ collected a split Guideline 8 sample from the Mine Unit 7 injection stream on September 5, 2018. CBO suspended injection in the mine unit on the next day. Mine Unit 7 is currently in the IX and RO treatment phase of restoration. CBO anticipates that Mine Unit will remain in treatment through the third quarter of 2021, and enter stability monitoring the following quarter.

Sufficient funds have been included in the 2020 Surety Estimate to cover the MU restoration periods and any associated work (e.g. development of an ACL application per Part 40, Appendix A, Criterion 5B(6)) by a third party.

Upon approval of the surety estimate update by the NDEQ, the Crow Butte Operation (CBO) will provide a secured letter of credit on the renewal date to the State of Nebraska in an amount equal to the updated surety estimate.

If you have any questions or require any further information, please do not hesitate to call me at (308) 665-2215 Ext 117.

Sincerely,
CAMECO RESOURCES
CROW BUTTE OPERATION

Walter D. Nelson SHEO Coordinator

Enclosure

cc:

ATIN Document Control Desk Director
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington D.C. 20555-0001

Deputy Director, Division of Decommissioning Uranium Recovery and Waste Programs Office of Nuclear Material Safety and Safeguards U.S. Nuclear Regulatory Commission



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CR - Electronic File ec:

Amanda Jones – NDEQ Program Coordinator Kory Winters – NDEQ Field Office

## Crow Butte Operation Crawford, Nebraska

## INDEPENDENT ACCOUNTANTS' REPORT ON APPLYING AGREED-UPON PROCEDURES

**Crow Butte Uranium Mine 2020 Surety Estimate** 



### INDEPENDENT ACCOUNTANTS' REPORT ON APPLYING AGREED-UPON PROCEDURES

Doug Pavlick, President Crow Butte Resources, Inc. P.O. Box 1201 Glenrock, WY 82637

At your request we have performed certain agreed-upon procedures, as enumerated below, with respect to evaluating the mathematical accuracy of the Crow Butte Uranium Project 2020 Surety Estimate, and to test the supporting assumptions in the master cost worksheet for the period 2020. These procedures, which were agreed to by Cameco Resources Crow Butte Operation were performed solely to assist Crow Butte Resources in complying with Chapter 13, Title 122, Rules and Regulations for Underground Injections and Mineral Production Wells in providing the Nebraska Department of Environmental Quality with surety bond estimate of costs. The sufficiency of these procedures is solely the responsibility of the specified parties. Consequently, we make no representation regarding the sufficiency of the procedures described below either for the purpose for which the report has been requested or for any other purpose.

Our procedures and findings are as follows:

- 1. Obtained the 2020 excel file for the Crow Butte Uranium Project 2020 Surety Estimate totaling \$51,772,730 from Walt Nelson on September 16, 2019.
  - Verified the mechanical accuracy of the spreadsheet by creating a separate recalculation excel spreadsheet (with all applicable tabs).
    - Manually re-entered cost amounts and formula values.
    - Beginning with the MasterCosts tab formula values were referenced forward through the entire spreadsheet.
    - Costs were verified as to properly flowing between the various tabs of the spreadsheet.
  - No notable differences were found between values in this excel spreadsheet and the 2020 Surety Estimate spreadsheet.
- 2. Verified accuracy of cost assumptions used in "MasterCosts" tab of 2020 Surety Estimate spreadsheet by tracing amounts reported to various supporting documentation including:
  - Labor rates for Operator Labor, Engineer Costs, and Radiation Technician Expenses were

agreed to the Nebraska Department of Labor website for labor statistics 2<sup>nd</sup> Quarter 2019.

- Chemical costs were agreed to actual invoices or other third party documentation.
- Per unit costs of chemicals were recalculated.
- Equipment rental costs were agreed to vendor quotes from Dominic Kleich at NMC Rental Services, Scottsbluff Compact Equipment Rental, and Chadron Ace Rental.
- Total hourly costs of equipment rental were recalculated.
- Diesel costs were agreed using monthly average diesel fuel costs at the Nebraska Energy Office website.
- Traced and agreed the diesel tax rates to the Nebraska Department of Revenue website to determine the cost of Ruby #1 diesel.
- Waste disposal costs were agreed to invoices from SWANN and Stumph Sanitation.
- Transportation and disposal costs were recalculated.
- Plant dismantling costs were agreed to a 2017 bid from Paul Reed Construction & Supply,
   Inc. in Genng, Nebraska.
- 3. Verified Consumer Price Index (CPI) assumptions used for accuracy, by tracing to the Historical Consumer Price Index for all Urban Consumers (CPI-U) at the Bureau of Labor Statistics website.
- 4. Recalculated the consumer price index ratios.

This agreed-upon procedures engagement was conducted in accordance with the attestation standards established by the American Institute of Certified Public Accountants. We were not engaged to and did not conduct an examination or review, the objective of which would be the expression of an opinion or conclusion, respectively, on the accompanying Surety Estimate. Accordingly, we do not express an opinion or conclusion on whether the Surety Estimate is presented in conformity with AICPA presentation guidelines or on whether the underlying assumptions provide a reasonable basis for the presentation assuming closure of the entire mine. Had we performed additional procedures, other matters might have come to our attention that would have been reported to you. Furthermore, even if closure of the entire mine should occur, there will usually be differences between the projected and actual results, because events and circumstances frequently do not occur as expected, and those differences may be material. We have no responsibility to update this report for events and circumstances occurring after the date of this report.

This information is intended solely for the use of Cameco Resources Crow Butte Operation and the Nebraska Department of Environmental Quality, and is not intended to be, and should not be, used by anyone other than these specified parties.

September 25, 2019 Chadron, Nebraska

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### **Total Restoration and Reclamation Cost Estimate**

بالمحاسب	***************************************	Contract Administration  Contingency	10% 15%	\$4,141,818 \$6,212,728
		Contract Administration	100/	ØA 1.41 010
	Subtotal Reclamation and Restoration Cost E	stimate	<u>:</u>	\$41,418,184
VIII.	I-196 Brule Aquifer Restoration (Sheets 16)		. ,	\$32,055
VII.	Deep Disposal Well Reclamation (Sheet 15)			\$242,727
VI.	Miscellaneous Site Reclamation (Sheets 14)	***************************************		\$670,764
V.	<b>Evaporation Pond Reclamation (Sheets 13)</b>	***************************************	, 	\$1,358,097
IV.	R.O. Building Reclamation/Decommissioning	(Sheets 10 to 12)		\$368,400
III.	Commercial Plant Reclamation/Decommission	ning (Sheets 10 to 12)		\$1,464,01
II.	Wellfield Reclamation (Sheets 7 to 9)			\$13,523,130
	Groundwater Restoration (Sheets 3 to 6)			\$23,758,990

### Comparison of Total Surety and Major Cost Elements to Previous Year Projected Costs for 2020 are Compared with Costs for 2019 and Changes are Calculated

Total Surety	<b>2020</b>	<b>2019</b>	<u>Change</u>
	\$51,772,730	\$50,664,645	\$1,108,085
Contract Administration	<b>2020</b>	<b>2019</b>	<u>Change</u>
	<b>\$4,</b> 141,818	\$4,053,172	\$88,646
Contingency	<b>2020</b>	<b>2019</b>	<u>Change</u>
	\$6,212,728	\$6,079,757	\$132,971
Groundwater Restoration Groundwater IX	<u>2020</u>	2019	Change
Total Gallons Processed (Kgal) Total Cost	2,893,512	2,893,512	0
	\$1,273,145	\$1,186,340	\$86,805
RO Treatment Total Gallons Processed (Kgal) Total Cost	5,787,024 \$7,754,612	5,787,024 \$7,407,391	0 \$347,221
Recirculation Total Gallons Processed (Kgal) Total Cost	1,929,008	1,929,008	0
	<b>\$</b> 636, <b>5</b> 73	\$597,992	\$38,580
Sampling and Monitoring Total 5 Parameter Samples Total 5 Parameter Analysis Costs	85,563 <b>\$</b> 5,133,780	<b>85,563 \$5,133,78</b> 0	0 <b>\$</b> 0
Total Guideline 8 Samples Total Guideline 8 Analysis Costs	5,724	5,724	0
	\$1,259,280	\$1,259,280	\$0
Wellfield Reclamation Pipeline Removal and Loading Well Abandonment Total Number of Wells	2020 \$1,685,776 4,953	2019 \$1,634,727 4,953	<u>Change</u> \$51,049
Total Abandonment Cost	\$3,183,056	\$3,213,434	-\$30,378
Site Reclamation Site Earthwork	<b>2020</b>	2019	<u>Change</u>
	\$1,560,824	\$1,532,028	\$28,796
Plant and Equipment Decontamination  Decontamination Costs  Demolition Costs  Piping Shredding Costs	2020 \$278,597 \$952,607 \$487,231	<b>2019</b> \$272,202 \$915,426 \$465,115	<b>Change</b> \$6,395 \$37,181 \$22,116
. Transportation and Disposal Byproduct Material	2020	2019	Change
Soil-Type Materials, Total Volume (Yd3) Soil-Type Materials, Total Cost Unpackaged Bulk Materials, Total Volume (Yd3) Unpackaged Bulk Materials, Total Cost	4,410	4,410	0
	\$1,471,026	\$1,419,377	\$51,648
	3,418	3,418	0
	\$756,195	\$727,417	\$28,778

			Mine Unit 2	Mine Unit 3	Mine Unit 4	Mine Unit 5	Mine Unit 6	Mine Unit 7	Mine Unit 8	Mine Unit 9	Mine Unit 10	Mine Unit 11	Total
I. IX Treatment Costs	•	*										· ·	-
PV's Required			3	· 3	3	3	3	. 3	. 3	3	` 3	3	•
Total Kgals for Treatment			64866	57219	314268	643926	181311	213447	348732	273090	487269	309384	2893512
IX Treatment Unit Cost (\$/Kgal)	(8heet 25)		<b>\$</b> 0.44	\$0.44	\$0.44	\$0.44	\$0.44	\$0.44	\$0.44	\$0.44	\$0.44	\$0.44	
Subtotal IX Treatment Costs per Wellfield			\$28,541.04	\$25,176.36	\$138,277.92	\$283,327.44	\$79,776.84	\$93,916.68	\$153,442.08	\$120,159.60	\$214,398.36	\$136,128.96	\$1,273,145.28
Total IX Treatment Costs			\$1,273,145.28										
II. Reverse Osmesis Costs										•		ŀ	
PV's Required			6	6	6	6	6′	6 '	6	6	. 6	6	•
Total Kgals for Treatment			129732	114438	628536	1287852	362622	426894	697464	546180	974538	618768	5787024
Reverse Osmosis Unit Cost (\$/Kgal)	(Bheet 26)	•	\$1.34	\$1.34	\$1.34	\$1.34	\$1.34	\$1.34	\$1.34	\$1.34	\$1,34	\$1.34	\$1.34
Subtotal Reverse Osmosis Costs per Wellfield			\$173,840.88	\$153,346.92	\$842,238.24	\$1,725,721.68	\$485,913.48	\$572,037.96	\$934,601.76	\$731,881.20	\$1,305,880.92	\$829,149.12	\$7,754,612.16
Total Reverse Osmosis Costs			\$7,754,612.16						•				
III. Recirculation Costs							,						•
PV's Required			. 2	2	2	2	2	2	2	2	2	. 2	
Total Kgals for Treatment			43244	38146	209512	429284	120874	142298	232488	182060	324846	206256	1929008
Recirculation Unit Cost (\$/Kgal)	(Sheet 27)		\$0.33	\$0.33	\$0,33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33	\$0.33
Subtetal Recirculation Costs per Wellfield			\$14,270.52	\$12,588.18	\$69,138.96	\$141,663.72	\$39,888.42	\$46,958.34	\$76,721.04	\$60,679.80	\$107,199.18	\$68,064.48	\$636,572.64
Total Recirculation Costs			\$636,572.64									ł	
IV. Consumables										•		ŀ	
Spare parts, filters and consumables =	\$56,596.84	year											,
Active restoration period (months)			9.55	8.43	46.28	94.81	26.70	31.44	51.35	40.20	71.74	45.55	426,05
Consumable usage (months restoration x ann	ual rate estimate)		\$45,041.65	\$39,759.28	\$218,275.15	\$447,162.20	\$125,927.97	\$148,283.72	\$242,187.31	\$189,599.41	\$338,354.78	\$214,832.17	\$2,009,423.64
Subtotal Consumables per Mine Unit Total Consumables Costs	-	•	\$45,041.65 \$2,609,423.64	\$39,759.28	\$218,275.15	\$447,162.20	\$125,927.97	\$148,283.72	\$242,187.31	S189,599.41	\$338,354.78	S214,832.17	\$2,009,423.64

		Mine Unit 2	Mine Unit 3	Mine Unit 4	Mine Unit 5	Mine Unit 6	Mine Unit 7	Mine Unit 8	Mine Unit 9	Mine Unit 10	Mine Unit 11	Total
V. Monitoring and Sampling Costs				,						-	,	
Guideline 8 analysis =	\$220.00 analysis											
5 parameter analysis =	\$60 00 analysis		•								•	,
Total restoration wells		12	18	43	59	55	25	34	` 21	36	25	32
Total monitor wells		13	10	20	50	54	33	50	33	64	43	31
IX Treatment duration (months)	•	1.29	1.14	6.24	12 78	3 60	4.24	6 92	5 42	9.67	6.14	57.4
Reverse Osmosis duration (months)		7.40	6.53	35 88	73.51	20.70	24.37	39.81	31.17	55.62	35,32	330.
Recirculation duration (months)		0.86	0.76	4 16	8.52	2.40	2.83	4.62	3.61	6.45	4 09	38.
Stabilization duration (months)		24	24	24	24	24	24	24	24	24	24	
Regulatory Review (months)		60	60	60	. 60	, 60	60	60	60	60	· 60	
A. Restoration Well Sampling												
<ol> <li>Well Sampling prior to restoration start</li> </ol>			•		7							
# of Wells	_	0	0	0	. 0	0	25	34	. 21	` 36	<b>2</b> 5	1
\$/sample		\$220 00	\$220 00	\$220,00	\$220 00	\$220,00	\$220 00	\$220 00	\$220.00	\$220 00	\$220 00	
2. IX Treatment Sampling											i	
# of Wells		12	18	43	59	55	` 25	34	21	36	25	
Total # samples		24	36	301	767	220	125	238	126	360	175	. 23
\$/sample		\$60 00	\$60 00	\$60.00	\$60.00	\$60 00	\$60.00	\$60,00	\$60 00	\$60,00	\$60 00	
3 RO Sampling											- 1	
# of Wells		12	18	43	59.	55	25	34	21	36	25	
Total # samples		- 84	126	1548	4366	1155	600	1360	651	2016	· 875	127
\$/sample		\$60.00	\$60,00	\$60.00	\$60.00	\$60.00	\$60.00	\$60,00	\$60 00	\$60.00	\$60.00	•

		Mine Unit 2	Mine Unit 3	Mine Unit 4	Mine Unit 5	Mine Unit 6	Mine Unit 7	Mine Unit 8	Mine Unit 9 ·	Mine Unit 10	Mine Unit 11	Total
4. Recirculation Sampling				•							,	
# of Wells	•	12	18	43	59	55	25	34	21	36	25	-
Total # samples		12	18	215	531	165	75	170	` 84	252	125	1647
\$/sample		\$220.00	\$220.00	\$220.00	\$220 00	\$220 00	\$220.00	\$220.00	\$220 00	\$220.00	\$220.00	
<ol><li>Stabilization Sampling (Guideline 8)</li></ol>							•			• .	•	
# of Wells		12	18	. 43	59	55	25	34	21	` 36	25	-
Total # samples	•	144	216	516	708	660	300	408	252	432	300	3936
\$/sample		\$220 00	. \$220.00	\$220.00	\$220 00	\$220 00	\$220.00	\$220.00	\$220 00	\$220.00	\$220.00	
6 Stabilization Sampling (5 parameter)							-					•
# of Wells		12	18	43	59	55	25	34	21	36	. 25	_
Total # samples		288	432	1032	1416	1320	600	816	504	864	600	7872
\$/sample		\$60.00	\$60.00	\$60.00	\$60 00	\$60 00	\$60.00	\$60.00	\$60.00	\$60,00	\$60.00	
7. Monttor Well Sampling											1	· ·
# of Wells		13	10	20	50	54	33	50	33	64	43	
\$/sample	·	\$60.00	\$60.00	\$60.00	\$60,00	\$60.00	· \$60 00	\$60.00	\$60 00	\$60.00	\$60.00	
Total # samples (2 2/mo for entire period)		960	713	3092	13069	6023	4025	8289	4661	13480	6579	60891
8. Alternate Concentration Limit Sampling												
Average Cost per Mine Unit		\$41,633 00	\$41,633.00	\$41,633.00	<b>\$</b> 41,633,00	\$41,633 00	\$41,633.00	\$41,633.00	\$41,633.00	\$41,633.00	<b>\$4</b> 1,633.00	
9 Other Laboratory Costs						,						
Radon, bioessays, etc. =	\$600 00 month											
Total Laboratory Costs.		\$5,730.00	\$5,058.00	\$27,768.00	\$56,886.00	\$16,020 00	\$18,864.00	\$30,810 00	\$24,120 00	\$43,044 00	\$27,330.00	\$255,630 00
Subtotal Monitoring and Sampling Costs per Mine	U∎it	\$163,043,00	\$176,591.00	\$588,601,00	\$1,548,179.00	\$762,233.00	\$469,497.00	\$849,263.00	· \$500,813.00 \	\$1,246,277.00	,\$661,703.00	\$6,966,200.00
Total Monitoring and Sampling Costs		\$6,966,200,00										,
VL MIT Costs							-		•			
MIT Costs per Well		\$92.98	\$92.98	\$92 98	\$92 98	\$92.98	\$92.98	\$92.98	\$92 98	\$92.98	\$92 98	
Restoration period, plus stabilization		33,55	32.43	70,28	118.81	50,70	55.44	75.35	. 64,20	95.74	69.55	
Remaining MIT's per 5 year cycle		1	1	1	2	2	2	2	3	3	, 3	
Number of Wells MIT'd for Life of Mine Unit		144	163	292	496	550	618	731	552	865	, 528	
Subtotal MIT Mine Unit	•	\$13,389.12	\$15,155.74	\$27,150.16	\$92,236.16	\$102,278.00	\$114,923.28	\$135,936.76	\$153,974,88	\$241,283.10	\$147,280.32	
2-year MIT Costs for Disposal Wells	<b>\$6,7</b> 93							•			H	
Number of DDWs	2										ı	
Number of MITs per DDW	' 8										H	
Subtotal MIT DDW Cests	\$108, <del>692</del>										Ĭ	
Tetal MIT Costs	\$1,152,300				,						· #	

		Mine Unit 2	Mine Unit 3	Mine Unit 4	Mine Unit 5	Mine Unit 6	Mine Unit 7	Mine Unit 8	Mine Unit 9	Mine Unit 10	Mine Unit 11	Total
VI. Supervisory Labor Cost												
Engineer Support = HP Technician support =	\$8,868 33 month \$6,505.75 month					•						,
Active restoration period (months) Stabilization period (months)		9 55 24	8.43 24	46.28 24	94.81 24	26 70 24	31.44 24	51.35 24	40.20 24	71.7 <b>4</b> 24	45.55 24	
1 Engmeer support during active restoration 2 HP Technician support during active restoration 3 Engineer support during final stabilization 4 HP Technician support during final stabilization 5 Cost reduction due to concurrent restorations.	oration n nzation	\$84,692 55 \$62,129 91	\$74,760 02 \$54,843.47	\$410,426.31 \$301,086.11 -355,756.21	\$840,806 37 \$616,810.16 -728,808.27	\$236,784.41 \$173,703 53 -205,243 97	\$278,820.30 \$204,540.78 -241,680.54	\$455,388 75 \$334,070 26	\$356,506.87 \$261,531.15 \$212,839.92 \$156,138.00 -493,507.97	\$636,213.99 \$466,722.51 \$212,839.92 \$156,138.00 -735,957.21	\$403,952.43 \$296,336.91 \$212,839.92 \$156,138.00 -534,633.63	\$3,778,352 00 \$2,771,774.79 \$638,519 76 \$468,414 00 -\$3,690,317 30
Subtotal Supervisory Labor per Mine Unit Total Supervisory Labor Costs		\$146,822.46 \$3,966,743.25	\$129,603.49	\$355,756.21	\$728,808 <i>,27</i>	\$205,243,97	\$241,680.54	\$394,729.51	\$493,507.97	\$735,957.21	\$534,633.63	\$3,966,743.25
TOTAL RESTORATION COST PER WELLFIE	ELD	\$571,559.55	\$537,065,23	\$2,212,287.48	\$4,874,862.31	\$1,698,983.68	\$1,572,374.24	\$2,650,944.70	\$2,096,040.98	\$3,948,067.45	\$2,444,511,36	\$22,606,696.97

TATAT	CDOIND WATER RECTORATION COSTS	\$22.759.00£.40
IUIAL	GROUND WATER RESTORATION COSTS	\$23,758,996.49

#### Wellfield Reclamation

				Wellfield Rec	lamation							
	Mme Unit 1	Mine Unit 2	Mine Unit 3	Mine Unit 4	Mine Unit 5	Mine Unit 6	Mine Unit 7	Mine Unit 8	Mine Unit 9	Mine Unit 10	Mine Unit 11	Totals
Wellfield Piping					,						ľ	-
Assumptions								-				
Number of Wellhouses	0	3	3	5	7	7	6	` 9	7	10	6	63
Total Mine Unit surfacé area (acres)	9 27	11 70	13 46	71 62	129 66	34 61	51.01	62 51	48 95	76 19	42 11	551.09
Total length of small diameter production and atjection lines (laterals) (ft)	0	34000	39520	68900	106080	130700	172900	211200	163150	262600	92000	1281050
Total length of 3/8-such hose (ft)					66300				•		i	- 66300
Total length 1-1/4-anch storger pape (ft)	0	0	٥	0	0	٥	72000	14600	129600	110000	100000	426200
Total length of 2-anch downhole production pape (ft)	1200	20000	30000	22000	50000	45000	104000	72500	95000	72000	97500 .	609200
Total Length of Trunkline (6-inch) (ft)	1000	2100	4000	600	***************************************	4500		900	,,,,,,	5600		18700
Total Length of Trunkline (8-meh) (ft)	4400	1300	1450	7800	3700	2000	1000	2200	2225	3600	1400	31075
	1	1500	1430	7000	5700	2000	1000	400		3004		400
Total Length of Trunkime (10-mch) (ft)			10800	6500	31900	12000	500Ò	19100	11525	14500	5000	116325
Total Length of Trunkine (12-mch) (ft)	5400	3400	16250	14900	35600	18500	6000	22600	13750	23700	6400	166500
Total Length of All Trunkline (fl)	3400	52	57	103	210	187	205	269	195	298	201	1780
Total number of production wells	0	79	96	169	236	309	380	412	324	503	284	2792
Total number of mection wells	•	3	3		25	28	25	30	20	32	24	201
Total number of shallow monitor wells	.0	_	7	11 9	25	26	یں *	20	13	32	10	180
Total number of permeter mountor wells	11	10	,	y	B	26	0	20	15	32	19	100
I. Production and Injection Piping											.	
A. Removal and Loading	\$0.76	\$0.76	\$0.76	\$0.76	\$0.76	\$0.76	<b>\$</b> 0.76	\$0.76	- \$0.76	( \$0.76	\$0.76	i
Production and Insection Promg Removal Unit Cost (\$7ft of pipe)			\$30,035.20	\$52,364 00	\$80,620 80	\$99,332.00	\$131,404 00	\$160,512.00	\$123,994 00	\$199,576 00	\$69,920 00	\$973,598 00
Subsotal Production and Injection Piping Rumoval and Loading Costs	\$0.00	\$25,840 00	\$30,033.20	\$32,364 UU	200,020 00	235,332 00	\$131,404 00	\$100,312.00	3123,554 00	\$199,570 00	\$05,520 00	\$373,37000
B. Pape Shredding		***	***	\$0.09	\$0.09	\$0.09	\$0,09	. \$0.09	\$0.09	\$0.09	\$0.09	
Production and Injection Prong Shredding Unit Cost (\$/ft of pupe)	\$0.09	\$0.09	\$0.09					\$19,008.00	\$14,683.30	\$23,634,00	\$8,280,00	\$115,294 50
Subtotal Production and Injection Piping Removal and Loading Costs	\$0.00	\$3,060 00	\$3,556 80	\$6,201 00	\$9,547 20	\$11,763 00	\$15,561 00	319,000 00	\$14,083.30	\$23,034.00	\$0,200,00	#113,254.50
C Equipment Costs		ATAN #44 AN	A1 40 (770 14	*****	0101 746 10	6404 OP7 04	PCC4 00C 00	* 6700.056.64	ec17 0e1 c0	2004 612 70	\$348,422 40	
Cat 924G Loader Unit Costs for removal (450/day)	\$0.00	\$128,764 80	\$149,670 14	\$260,938.08	\$401,746 18	\$494,987 04	\$654,806 88	\$799,856 64	\$617,881.68	\$994,518 72		
Shredder Unit Costs for shredding (450/day)	\$0.00	\$7,628 09	\$8,866,53	\$15,458 10	\$23,799 64	\$29,323 27	\$38,791.08	\$47,383 89	\$36,603 61	\$58,915 77	\$20,640.71	\$5,159,003 25
Subtotal Equipment Costs	, <b>\$</b> 0 00	\$136,392 89	\$158,536 67	\$276,396 18	\$425,545.82	\$524,310 31	\$693,597 96	\$847,240 53	<b>\$</b> 654,485 <b>2</b> 9	\$1,053,434 49	\$369,063 11	\$3,139,003 <i>23</i>
D Transport and Dusposal Costs (NRC-Licensed Faculty)											0.0000	
Chipped Volume Reduction (ft <sup>1</sup> /ft)	0 0069	0 0069	0 0069	0 0069	0 0069	0 0069	0 0069	0 0069	0 0069	0 0069	0 0069	
Chipped Volume per Wellfield (yd')	00	8 7	10,1	17 6	27 1	33 4	44.2	54 0	41 7	67 1	23 5	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Volume for Desposal Assuming 25% Void Space (yd*)	00	109	126	22 0	33 9	41 8	55 3	67.5	52 1	83 9	29 4	409 4
Transportation and Disposal Unit Cost (\$/yd²) Unpackaged Bulk	\$220 99	\$220 99	\$220,99	\$220 99	\$220 99	\$220 99	\$220 99	\$220 99	\$220.99	\$220 99	\$220 99	***
Subtotal Production and Injection Piping Transport and Disposal Costs	\$0.00	\$2,408 79	\$2,784.47	\$4,861 78	\$7,491.56	\$9,237 38	\$12,220 75	\$14,916.83	\$11,513 58	\$18,541.06	\$6,497.11	\$90,473.31
Tetal Production and Injection Piping Costs	. \$9.00	\$167,701.68	\$194,913.14	5339,822.96	\$523,295.38	\$644,642.69	\$852,783.71	\$1,841,677,36	\$804,676,37	\$1,295,185.55	\$453,760.22	\$6,318,369.06
II. Tranklines												
A. Removal and Loading												
Trunkine Removal Unit Cost (\$/ft of pape)	\$1 72	\$1.72	\$1 72	\$1 72	\$1 72	<b>\$</b> 1 72	, \$1.72	\$1.72	\$1.72	\$1,72	\$1 72	
Subsocal Trunkline Removed and Loading Costs	\$9,288 00	\$5,848 00	\$27,950 00	\$25,628 00	\$61,232 00	\$31,820 00	\$10,320 00	\$38,872 00	\$23,650 00	\$40,764 00	\$11,008 00	\$286,380 00
B Pipe Shredding												
Trunkine Shredding Unit Cost (\$/ft of pipe)	\$1.72	\$1.72	\$1.72	\$1 72	\$1.72	\$1 72	\$1.72	\$1 72	\$1,72	\$1.72	\$1 72	
Subsocial Trumblime Shrudding Costs	\$9,288 00	\$5,848 00	\$27,950.00	\$25,628 00	\$61,232 00	\$31,820 00	\$10,320 00	\$38,872 00	\$23,650 00	· \$40,764 00	, \$11,008 00	\$286,380 00
C Baumment Costs												
Cat 924G Loader Unit Costs for removal (200 /day)	\$46,014.48	\$28,972.08	\$138,469 50	\$126,965 88	\$303,354 72	\$157,642 20	\$51,127 20	\$192,579.12	\$117,166 50	\$201,952 44	\$\$4,535 68	
Shredder Unit Costs for shredding (200/day)	\$2,725 92	\$1,71632	\$8,203,00	\$7,521 52	\$17,970 88	\$9,338 80	\$3,028 80	\$11,408.48	\$6,941.00	\$11,963.76	\$3,230 72	
Subtotal Equipment Costs	\$48,740 40	\$30,688 40	\$146,672 50	\$134,487.40	\$321,325 60	\$166,981 00	\$54,156 00	\$203,987.60	\$124,107 50	\$213,916 20	\$57,766.40	\$1,502,829 00
D. Transport and Disposal Costs (NRC-Licensed Facility)		- *		•	·	•	•	•	,			
Chapped Volume Reduction (6-inch) (ft /ft)	0 0651	0 0651	0 0651	0 0651	0 0651	0 0651	0 0651	0 0651	0 0651	0 0651	0 0651	
Chipped Volume Reduction (8-inch) (ft <sup>3</sup> /ft)	0.1103	0 1103	0 1 1 0 3	0 1103	0 1103	0.1103	0 1103	0.1103	0 1103	0 1103	0 1103	
Chapped Volume Reduction (10-inch) (ft <sup>2</sup> /ft)	0 1712	0 1712	0 1712	0 1712	0 1712	0 1712	0 1712	0.1712	0,1712	0 1712	. 0 1712	
Chapped Volume Reduction (12-mch) (1/15)	0 2408	0 2408	0 2408	0,2408	0 2408	0 2408	0 2408	0.2408	0 2408	0 2408	0 2408	
Chapped Volume per Welffield (yd')	204	104	1119	91 3	299 6	1260	48.7	184 0	111.9	157 5	50 3	
Volume for Disposal Assuming 25% Void Space (ft <sup>2</sup> )	25.5	13.0	139 9	1141	374 5	157.5	60,9	230,0	139.9	1969	62.9	1515.1
Transportation and Desposal Unit Cost (\$\hat{M}^2)	\$220.99	\$220 99	\$220 99	\$220 99	\$220 99	\$220 99	\$220 99	\$220 99	\$220.99	\$220 99	\$220 99	
Subscial Transport and Disposal Costs	\$5,635.25	\$2,872.87	\$30,916.50	\$25,214.96	\$82,760,76	\$34,805 93	\$13,458 29	\$50,827 70	\$30,916 50	\$43,512.93	\$13,900 27	\$334,821.96
Total Trankline Certs	\$72,951.65	\$45,257.27	\$233,489.00	\$210,958,36	\$526,550.36	\$265,426.93	\$88,254,29	\$332,559,30	\$202,324,00	\$338,957,13	\$93,682,67	\$2,410,410.96
Total Transmit Color	والبدو دوم ر س											

#### Wellfield Reclamation

III. Downshote Pipe A. Removal and Loading Downshole Piping Removal Unst Cost (\$78 of pipe) Downshole Hosing Removal Unst Cost (\$78 of pipe) Removal of 1-1/4-inch stinger pipe Removal of downshole production pipe Removal of downshole production pipe Removal of downshole bose	Mine Unit 1 \$0 090 \$0 170 \$0 00 \$108.00 \$0 00	\$0 090 \$0 170 \$0 00	Mine Unit 3 \$0,090 \$0 170	Mine Unit 4	Mine Unit 5	Mine Unit 6	Mine Unit 7	Mine Unit 8	Mine Unit 9	Mine Unit 10	Mine Unit 11	Totals
A. Removal and Loading Downhole Piping Removal Unit Cost (\$7h of pape) Downhole Hosing Removal Unit Cost (\$7h of pape) Removal of 1-1/4-mch stinger pape Removal of downhole production pape	\$0 170 \$0 00 \$108,00 \$0 00	\$0 170 \$0 00		\$0,090	<b>\$0.00</b> 0							
Downhole Piping Removal Unit Cost (\$7\text{ft of pape}) Downhole Hosmg Removal Unit Cost (\$7\text{ft of pape}) Removal of 1-1/4-inch stringer pape Removal of downhole production pape	\$0 170 \$0 00 \$108,00 \$0 00	\$0 170 \$0 00		\$0,090	\$0.000						1	
Downhole Hosing Removal Unit Cost (\$7h of pape) Removal of 1-1/4-inch stinger pape Removal of downhole production pape	\$0 170 \$0 00 \$108,00 \$0 00	\$0 170 \$0 00		\$0,090	<b>90 000</b>							
Downhole Hosing Removal Unit Cost (\$7h of pape) Removal of 1-1/4-inch stinger pape Removal of downhole production pape	\$0.00 \$108,00 \$0.00	\$0.00	\$0 170		<b>30</b> 020	\$0 090	\$0.090	\$0 090	\$0 090	\$0 090	\$0.090	
Removal of 1-1/4-inch stinger pape Removal of downhole production pape	\$0.00 \$108,00 \$0.00	\$0.00		\$0 170	\$0 170	\$0 170	\$0 170	\$0 170	\$0 170	\$0 170	\$0 170	
Removal of downhole production pape	\$108,00 \$0.00		\$0.00	\$0.00	\$0.00	\$0.00	\$6,480 00	\$1,314,00	\$11,664 00	\$9,900 00	\$9,000 00	
	\$0.00	\$1,800 00	\$2,700 00	\$1,980 00	\$4,500 00	\$4,050 00	\$9,360 00	\$6,525 00	\$8,550 00	\$6,480 00	\$8,775 00	
		\$0.00	\$0.00	\$0.00	\$11,271 00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
Subtotal Downhole Paying Removal and Loading Costs		\$1,800.00	\$2,700 00	\$1,980 00	\$15,771.00	\$4,650 00	\$15,840 00	\$7,839 00	\$20,214 00	\$16,380 00	\$17,775 00	\$104,457.00
	\$108 00	\$1,000.00	a2,700 00	\$1,700 00	#13,771 QU	₽7,000 BD	<b>3</b> 13,040 00	, 97,033 00	220,227	314,500 <sub>0</sub> 00	<b>21</b> 7,77,700	<b>410 9,107 00</b>
B Pupe Shredding	** ***	** ***	** **	** ***	\$0.080	\$0.080	\$0.080	´ \$0.080	\$0.060	\$0.080	\$0.080	
Downhole Paping Shredding Unit Cost (\$1/th of pape)	\$0 080	\$0.080	\$0.060	\$0,080				• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •			\$82,832 00
Subsotal Downhole Piping Shredding Costs	<b>\$96.00</b>	\$1,600 00	\$2,400 00	\$1,760 00	\$4,000 00	\$3,600 00	\$14,080 00	\$6,968 00	\$17,968 00	\$14,560 00	\$15,800 00	302,832 (1)
C Equipment Costs	*		•									
Smeel Unit Costs for removal	\$99 07	\$1,484 53	\$2,226 80	\$1,632 99	\$3,711.33	\$3,340 20	\$13,063,89	<b>\$6,4</b> 65 14	\$16,671.31	\$13,509 25	\$14,659,77	
Shredder Unit Costs for shredding	\$26 92	<b>\$448</b> 71	\$673 07	\$493 5B	\$1,121 78	\$1,009 60	\$3,948 66	\$1,954 14	\$5,039 03	\$4,083 27	\$4,431.02	
Subtotal Equipment Costs	<b>\$</b> 115 99	\$1,933 24	\$2,899 87	\$2,126 57	\$4,833 11	\$4,349 80	\$17,012 55	\$8,419 28	\$21,710 34	<b>\$</b> 17,592 52	\$19,090 79	\$100,084 06
D Transport and Disposal Costs (NRC-Lacensed Facility)	•		*									
Chipped Volume Reduction - 1-1/4-mch stinger (ft /ft)	0 0044	0 0044	0 0044	0 0044	0 0044	0 0044	0 0044	0 0044	0,0044	0 0044	0 0044	
Chapped Volume Reduction - 2-Inch downhole production (ft*/ft)	0 0074	0 0074	0 0074	0 0074	0 0074	0 0074	0 0074	0 0074	. 0 0074	0 0074	0 0074	•
Volume Reduction - 3/8-inch hose (ft3/ft)	0 0313	0 0313	0 0313	0.0313	0 0313	0 0313	0 0313	0 03 13	0 0313	0 0313	0 0313	
Chipped Volume - 1-1/4-mch stinger (fr')	0 0013	0 0313	0 0 5 1 5	0.0313	0 0 0	0	317	64	570	484	. 440	
Chipped Volume - 2-inch downhole production (R <sup>1</sup> )	ů,	148	222	163	370	333	770	537	703	533	722	
	0	140	0	103	2075	333	,,0	0	/ω	0	<b>77</b>	
Volume 3/8-inch bose (ff3)	•	69	103	7.5	113 2	154	. 503	27 8	58.9	47,1	53,8	391 6
Volume for Desposal Assuming 25% Void Space (yd')	0.4											391 0
Transportation and Disposal Unit Cost (\$/yd') (Unpackaged Bulk)	\$220 99	\$220 99	\$220 99	\$220 99	\$220 99	\$220 99	\$220.99	\$220 99	\$220 99	\$220.99	\$220 99	PR ( FRO 20)
Subtotal Downhole Piping Transport and Disposal Coets	\$88 40	\$1,524 83	\$2,276 20	\$1,657.43	\$25,016 07	\$3,403.25	\$11,115 80	. \$6,143.52	\$13,016 31	\$10,408 63	\$11,889 26	\$86,539.70
Tetal Downkele Piping Costs	\$408.39	\$6,258.07	\$10,276,07	\$7,524.90	\$49,620.18	\$15,403.05	\$58,048,35	\$29,369.80	\$72,908.65	\$58,941.15	\$64,555,85	\$373,912.76
IV. Surface Reclamation										,		
A. Removal and disposal of contaminated soil around wells and wellhouses										·		
Volume of contaminated soil (0.37 yd3 per spection and production well)	I 11	48 47	56 61	100 64	165.02	183 52	216 45	251.97	192.03	296 37	179.45	1691,64
Volume of contaminated soil (5 yd3 per wellhouse)	. 0	15	15	25	135	35	30	45	35	50	30	
Estimated volume of contaminated soil from spills in the Mine Unit (vd3)	0	116	57	40	170	253	64	70	\$1	13	1	
Duposal of contammated soil \$263 17 per yd3	\$292.12	\$47,231 12	\$33,846 29	\$43,591,48	\$97,378 16	\$124,089 92	\$81,701 13	\$96,575 49	\$81,064 26	\$94,575 40	\$55,384.13	\$755,729 50
Equipment (Cat 924G loader at 2 yd3/hr)	\$118 23	\$5,162.78	\$6,029 81	\$10,719 67	\$17,577 11	\$19,547 63	\$23,055 17	\$26,838.58	\$20,454.08	\$31,567 85	\$19,114 12	
	\$11.90	\$519 60	\$606 86	\$1,078 86	\$1,769 01	\$1,967 33	\$2,320 34	\$2,701 12 .	\$2,058 56	\$3,177 09	\$1,923 70	
Labor (1 man-hour per 2 Yd3)	\$422.25	\$52,913 50	\$40,482.96	\$35,390 01	\$116,724.28	\$145,604 88	\$107,076 64	\$126,115 19	\$103,576.90	\$129,320 34	\$76,421 95	\$954,048 90
Subtotal removal and disposal of contaminated soil	\$422.23	\$32,913.30	\$40,402.50	233,370 01	\$110,724.20	\$140,004.00	\$107,070.04	<b>3124,11319</b>	2100,57070	#127,520 S4	5,0,721,75	\$334,04030
B Recontour and seeding												
Recordour and seeding (est. \$300/acre)	\$2,781 00	<b>\$3,</b> 510 00	\$4,038 00	\$21,486.00	\$38,898 00	\$10,383 00	\$15,303 00	\$18,753 00	\$14,685 00	\$22,857.00	\$12,633 00	
Subsoral Recontour and Sending	\$2,781 00	<b>\$3</b> ,510.00	\$4,038 00	<b>\$</b> 21,486 00	\$38,898 00	\$10,383 00	\$15,303 00	\$18,753 00	\$14,685 00	\$22,857.00	\$12,633,00	\$165,327 00
Total Surface Reclamation	\$3,203,25	\$56,423.50	844,529.96	\$76,876,01	\$155,622.28	\$155,967.88	\$122,379,64	\$144,868.19	\$118,261.90	\$152,177.34	\$89,054.95	\$1,119,375,90
IV. Well Houses			•								-	
Total Quantity	0	3	3	5	7	7	6	9	7	,10	الم	
Average Well House Weight (Lbs.) (Includes wellhead covers for each well)	9200	9200	9200	9200	, 9200	9200	9200	9200	9200	9200	9200	
A. Romoval											· · ]	
Dismantiement at 2-men-days per wellhouse (min-days)	0	6	6	10	14	14	12	18	14	20	12	
Dismandement Labor Costs	\$0.00	\$1,029 12	\$1,029 12	\$1,715 20	\$2,401.28	\$2,401 28	\$2,058 24	\$3,087 36	\$2,401.28	\$3,430.40	\$2,058.24	\$21,611 52
Equipment (Cat 924G at 2 hours per wellhouse) (lins)	0	. 6	6	10	14	14	12	18	14	20	12	
Boyapment Costs	20 00	\$1,278.18	\$1,278 1\$	\$2,130 30	\$2,982,42	\$2,982.42	\$2,556.36	\$3,834.54	\$2,982 42	\$4,260 60	\$2,556 36	\$26,841,78
Subtotal Well House Dismonthement Costs	\$0.00	\$2,307,30	\$2,307 30	\$3,845.50	\$5,383,70	\$5,383 70	\$4,614 60	\$6,921 90	\$5,383,70	\$7,691.00	84,614.60	\$48,455.30
	3000	94,507,50	<b>44,507, 50</b>	20,000		22,222 70	2.,22.00	**** *** ***	,/0	J., 1.00	2,322,300	
B Duponi	0	27600	27600	46000	64400	64400	55200	82200	64400	92000	55200	
Total Desposal Weight (9200 lbs per wellhouse) (Lbs)	•										\$6,624.00	\$69,552 00
Subtotal Disposal Costs Total WH. Harry Review I and Disposal Costs	\$0.00 \$0.00	\$3,312 00 \$5,619.30	\$3,3 <i>12 00</i> \$5,619,30	\$5,520 00 \$9,365.50	<i>\$7,728 00</i> <b>\$13,111.79</b>	\$7,728 00 \$13,111.70	\$6,624 00 \$11,238,69	\$9,936 00 \$16,857.90	\$7,728 00 \$13,111,70	\$11,040 00 \$18,731.00	\$11,238,60	\$118,995,30
Total Well Heme Removal and Disposal Cents	\$0.00	\$2,017,39	42/012/20	95,000,00	*1111/4	313411./0	311,430,000	÷10,637,5¶	4171114/U	319,731,00		- Variopecado
TOTAL REMOVAL AND DISPOSAL COSTS PER WELLFIELD	\$76,563,29	\$281,859.82	\$488,818,47	8644,546,83	\$1,263,109.90	\$1,094,572,25	\$1,132,784.59	\$1,565,332,55	\$1,211,282.62	\$1,863,992,17	\$712,291.49	\$10,349,073,98

TOTAL WELLFIELD BUILDINGS AND EQUIPMENT REMOVAL AND DISPOSAL COSTS \$18,340,073.98

### Well Abandonment

	Mine Unit 1	Mine Unit 2	Mine Unit 3	Mine Unit 4	Mine Unit 5	Mine Unit 6	Mine Unit 7	Mine Unit 8	Mine Unit 9	Mine Unit 10	Mine Unit 11	Total
L Well Abandonment (Wellfields)												
# of Production Wells	3	52	57	103	210	187	205	269	195	298	201	
# of Injection Wells	0	79	96	169	236	309	380	412	324	503	284	,
# of Perimeter Monitoring Wells	11	10	7	9	25	26	8	20	13	32	19	
# of Shallow Monitoring Wells	0	3	3	11	25	28	25	30	20	32	24	
Total Number of Deep Wells	14	141	160	281	471	522	593	· 701	532	833	504	4752
Total Number of Shallow Wells	0	3	3	11	25	28	25	30	20	32	24	201
Average Diameter of Casing (inches)	5	5	5	5	5	5	·5	5	5	5	5	
Production, Injection and Perimeter Well Average Depth (ft)	665	631	774	698	. 675	515	762	500	770	480	<i>7</i> 90	660
Shallow Well Average Depth (ft)	200	200	200	200	, 200	200	200	200	200	150	300	205
Total Mine Unit Well Depth (ff)	9810	89571	124440	198338	322925	274430	456866	356500	413640	404640	405360	3056020
Well Abandonment Unit Cost (\$/ft, of well)	\$1.04	\$1.04	\$1.04	\$1.04	\$1.04	\$1.04	\$1.04	\$1.04	\$1.04	\$1.04	\$1.04	
Substatul Abundanment Cost per Wellfield	\$9,682.40	\$93,153.84	\$129,417.60	\$206,271.52	\$335,842.00	\$285,407.20	\$475,140.64	\$370,760.00	\$430,185.60	\$420,825.60	\$421,574.40	\$3,178,260.80
II. Downhole Pump Disposal								•	`			
Number of Downhole Pumps 1174												•
Pump Disposal Volume(ff3) 0.5												
Total Pump Disposal Volume(yd3) 21.7											.0	2L7
Downhole Pump Disposal Rate (\$/yd3) \$220.99					•						Ī	220.99
Subtetal Downhole Pump Dispesal	\$4,795.48											\$4,795.48
Total Wellfield Abandonment Costs	\$3,183,056.28					,					ц	

Plant Equipment Decommissioning

Plant &	Juipment Decommissioning	Commercial Plant	R.O. Building
I. Removal and Loading Costs	ı		
Tankago			N .
Number of Contaminated Tanks		141	1
Volume of Contaminated Tank Construction Material (ft <sup>1</sup> )	' /	2721	X
Number of Chemical Tanks		21	-
Disposal Void Factor		1.25	li .
A. Labor to Remove and Load Tankage			U
Number of Persons		2	1
Tanks/Day		1	
Number of Days		162	
\$/Day/Person		\$171.52	
Subtotal Removal Labor Costs		\$55,572.48	1
B. Labor to Clean Chemical Tankage	,	200,072.40	
Number of Persons	,	1	
Tanka/Day	•		
Number of Days	•	1	
		21	<b>L</b> .
S/Day/Person		\$171.52	
Subtotal Cleaning Labor Costs		\$3,601.92	
C. Equipment			
Saws, scaffolding, etc.		\$6,000	1
Subtotal Equipment Costs		<b>\$</b> 6,000	
Total Equipment Removal and Loading Costs		\$65,174.40	
I. Transportation and Disposal Costs (NRC-Licensed Facility)	,		-
A. Tenkage			1
Volume of Tank Construction Material (ft <sup>3</sup> )		A404	i '
		2721	
Volume for Disposal Assuming Void Space (yd³)		126.0	į.
Transportation and Disposal Unit Cost (\$/yd²) (Unpackaged Bulk)		\$220.99	H
Subtotal Tankage Transportation and Disposal Costs		\$27,844.74	i
B. Contaminated PVC Pipe			
Volume of Shredded PVC Pipe (ft <sup>2</sup> )		422.4	
Volume for Disposal Assuming Vold Space (yd <sup>3</sup> )		19.6	
Transportation and Disposal Unit Cost (\$/yd²) (Unpackaged Bulk)		\$220.99	
Subtotal Contaminated PPC Pipe Transportation and Disposal Costs		\$4,331.40	
C. Pumps		.,,	<u>l</u>
Volume of Process Pumps (yd3) (no void factor used)		34.8	
Transportation and Disposal Unit Cost (\$/yd5) (Unpackaged Bulk)		\$220.99	
Subtotal Pump Transportation and Disposal Costs		\$7,690.45	i
		37,090.45	A
D. Filters (injection, backwash and yellowcake filters)	,	400.0	Ħ
Volume of Filters (yd) (no vold factor med)		463.0 .	1
Transportation and Disposal Unit Cost (\$/yd³) (Unpackaged Bulk)		\$220.99	1
Subtotal Filter Transportation and Disposal Costs		, <b>\$</b> 102,318.37	N .
B. Dryer			1
Dryer Volume (yd³) (no void factor used)		29.6	
Transportation and Disposal Unit Cost (\$/yd²) (Unpackaged Bulk)		\$220.99	1
Total Dryer Transportation and Disposal Costs		\$6.541.30	
Total Contaminated Equipment Transportation and Disposal Costs		\$148,726.26	
		***************************************	
III. Transportation and Disposal (Solid Waste for Landfill Disposal)  A. Cleaned Tankage			
Volume of Tank Construction Material (ft <sup>3</sup> )		405	
Number of Landfill Trips		1	1
Transportation and Disposal Unit Cost (\$/Load)		\$1,000.00	
			1
Subtotal Tankage Transportation and Disposal Costs		\$1,000.00	1
B. Uncontaminated PVC Pipe			
Volume of Shredded PVC Pipe (ft <sup>2</sup> )		184.3	1
Number of Landfill Trips		1	]
Transportation and Disposal Unit Cost (\$/Load)	•	\$1,000.00	k
Subtotal PVC Pipe Transportation and Disposal Costs		\$1,000.00	
Total Uncontaminated Equipment Transportation and Disposal Costs		<b>\$2,000.00</b>	
IV. Supervisory Labor Costs During Plant Decommissioning .			
Estimated Duration (months)		6	I
Engineer		\$53,209.98	
Radiation Technician		\$39,034.50	8
Total Supervisory Labor Costs		\$92,244.48	
UBTOTAL EQUIPMENT REMOVAL AND DISPOSAL COSTS PER FA	CILITY	\$308,145.14	
Building Area (Ft2)		39,738	10,000
Building Equipment Removal and Disposel Cost per Square Foot		\$7.75	~ \$7.75
TOTAL EQUIPMENT REMOVAL AND DISPOSAL COSTS		9209 14E 14	\$77.500.00
TOTAL EQUIPMENT REMOVAL AND DISCOSAL COSTS		\$308,145.14	\$77,500.00

### **Building Demolition**

Decontamination Costs         A. Wall Decontamination Area to be Decontaminated (R³) HCl Application Rate (Gallons/R³) 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Dunuing Demontion	Commercial Plant
Area to be Decontaminated (ft²) HCl Apilication Rate (Gallons/ft²) 1 HCl Acid Cost Subtotal Wall Decontamination Materials Costs Soc,728.40 B. Concrete Floor Decontamination Area to be Decontamination for HCl Apilication Rate (Gallons/ft²) HCl Acid Cost Subtotal Picor Decontamination Materials Costs C. Decontamination Labor Labor (man-days) Subtotal Decontamination Labor Cost Labor (man-days) Subtotal Decontamination Labor Cost D. Decontamination Equipment Costs Sprayer pump Subtotal Decontamination Equipment Costs Sprayer young Recycle pump Subtotal Decontamination Equipment Costs Sprayer with hose Subtotal Decontamination Equipment Costs Subtotal Decontamination Equipment Costs Subtotal Decontamination Costs Total gallons HCl waste Pumping costs (5 HF/30 gpm) Subtotal Decontamination Costs Total Decontamination Costs Total Decontamination Costs  11,704.48 Subtotal Decontamination Costs  Labor (manufact) Dismantling plant building A. Building Dismantling Plant contents and building dismantling (2017 \$'s escalated by CPI) Subtotal Building and Contents Dismantling Plant contents and building dismantling (2017 \$'s escalated by CPI) Subtotal Building and Contents Dismantling Plant contents and building dismantling (2017 \$'s escalated by CPI) Subtotal Building and Contents Dismantling Removal Rate (\$\frac{1}{2}\$) \$11,100 Removal Rate (\$\frac{1}{2}\$) \$17,80 Subtotal Demolition Costs  10. Disposal Costs  Volume of Concrete Floor Removal Area of Direct-Dispose Concrete Floor (\$\frac{1}{2}\$) \$11,100 Average Thickness of Concrete Floor (\$\frac{1}{2}\$) \$206 Decontaminated Soil Volume of Concrete Floor (\$\frac{1}{2}\$) \$206 Decontaminated Soil Volume of Concrete Floor (\$\frac{1}{2}\$) \$206 Decontaminated Soil Volume of Concrete Floor (\$\frac{1}{2}\$) \$205 Destruction Cost Subtotal Demolition Cost (\$\frac{1}{2}\$) \$205 Destruction Cost Subto	Decontamination Costs	
HCl Application Rate (Gallons/R*)		
HCI Acid Cost   \$1.72		36,470
Subtotal Wall Decontamination Materials Costs  B. Concrete Floor Decontamination Area to be Decontamination Area to be Decontamination Area to be Decontamination Area to be Decontamination HCl Application Rate (Gallone/H²) 12 131-72 141-73 141-74 141-74 141-75	== ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	1
B. Concrete Floor Decontamination Arose to be Decontaminated (ft²) HCl Application Rate (Gallons/ft²) 2 HCl Acid Cost Subtotal Floor Decontamination Materials Costs Subtotal Floor Decontamination Labor Labor (man-days) Subtotal Decontamination Labor Labor (man-days) Subtotal Decontamination Lebor Cost D. Decontamination Equipment Costs Sprayer pump SS00 Recycle pump SS00 Subtotal Decontamination Equipment Costs Sprayer with hose Subtotal Decontamination Equipment Costs Total gallons HCl waste Pumping costs (5 HP/90 gm) Sl,704.48 Subtotal Decontamination Costs Total Decontamination Costs Total Decontamination Costs  I. Demoltiton Costs Assumptions (based on 2017 costs): Dismantling plant building Plant contents and building dismantling (2017 S's escalated by CPI) Subtotal Building and Contents Dismantling Plant contents and building dismantling Area of direct-dispose concrete floors (ft²) Subtotal Building and Contents Dismantling Floor Removal Area of direct-dispose concrete floors (ft²) Subtotal Building and Contents Dismantling Total Demoltition Costs  A. Concrete Floor Removal Total Demoltition Costs  A. Concrete Floor Removal Total Demoltition Costs  A. Concrete Floor Area of Direct-Dispose Concrete Floor (ft²) Average Thickness of Concrete Floor (ft²) Volume of Concrete Floor (ft³) Volume of Concrete Floor and Soil Disposal Costs Total Demoltion Costs  Total Demolting Receptation A. Plant Site Earthwork Material to be Moved (Yd3) PRI Building Revegetation Area requiring Revegetation Area requiring Revegetation (Ac) Revegetation Intro Cost (S/Ac) Subtotal Plant Site Earthwork  Building Demolition Cost per Square Foot  SUBTOTAL Building Area (Ft²) Subtotal Plant Site Earthwork SUBTOTAL Building Area (Ft²) Subtotal Plant Site Earthwork Subtotal Plant Site Revegetation S1,800,000 Subtotal Plant Site Revegetation S1,800,000 Subtotal Plant Site Reveg	HCl Acid Cost	\$1.72
Area to be Decontaminated (ft <sup>2</sup> ) HCI Apilication Rate (Gallons/ft <sup>2</sup> ) HCI Acid Cost St.72 Subtotal Floor Decontamination Materials Costs St.72 Subtotal Floor Decontamination Materials Costs Subtotal Decontamination Labor Cost Labor (man-days) Subtotal Decontamination Labor Cost Subtotal Decontamination Labor Cost Sprayer pump St.00 Recycle pump St.00 Recycle pump St.00 Subtotal Decontamination Equipment Costs Sprayer with hose Subtotal Decontamination Equipment Costs Subtotal Decontamination Equipment Costs Subtotal Decontamination Subterial St.	Subtotal Wall Decontamination Materials Costs	\$62,728.40
HCl Application Rate (Gallons/ft*)   2	B. Concrete Floor Decontamination	
HCl Application Rate (Gallons/R*)   2	Area to be Decontaminated (ft <sup>2</sup> )	39738
HCl Acid Cost   \$1.72		
Subtotal Floor Decontamination Materials Costs C. Decontamination Labor Labor (man-days) Subtotal Decontamination Labor Cost D. Decontamination Engineent Costs Sprayer pump Recycle pump Recycle pump Sprayer with hose Subtotal Decontamination Equipment Costs Sprayer pump Recycle pump Sprayer with hose Subtotal Decontamination Equipment Costs Total gallons HCl waste Pumping costs (S HP30 gpm) Subtotal Decontamination Costs Total gallons HCl waste Pumping costs (S HP30 gpm) Subtotal Decontamination Costs Total Decontamination Costs Total Decontamination Costs Total Decontamination Costs Total Decontamination Costs  I. Demolition Costs Assumptions (based on 2017 costs): Dismantling plant building Plant contents and building dismantling Plant contents and building dismantling Plant contents and building dismantling Removal Rate (S/R) Removal Rate (S/R) Subtotal Building and Contents Dismantling Removal Rate (S/R) Subtotal Concrete Floor Removal Area of direct-dispose concrete floors (ft2) Subtotal Demolition Costs  II. Disposal Costs A. Concrete Floor Removal Total Demolition Costs  Sadota Concrete Floor (ft²) Average Thickness of Concrete Floor (ft²) Volume of Concrete Floor (ft²) Subtotal Floor Subtotal Concrete Floor (ft²) Subtotal Floor Subtotal Concrete Floor (ft²) Subtotal Floor Subtotal F		<del>-</del>
C. Decontamination Labor		
Labor (man-days)   60		\$130,098.72
Subtotal Decontamination Labor Cost  D. Decontamination Equipment Costs  Sprayer pump Recycle pump S500 Subtotal Decontamination Equipment Costs Sprayer with hose Subtotal Decontamination Equipment Costs Subtotal Decontamination Equipment Costs Subtotal Decontamination Equipment Costs Subtotal Decontamination Equipment Costs Total gallons HCl waste Pumping costs (5 HP/30 gpm) S1,704.48 Subtotal Decontamination Costs Total Decontamination Costs Total Decontamination Costs S213,422.80  I. Demolition Costs Assumptions (based on 2017 costs): Dismanding plant building Behavioral Building and Contents Dismanding Plent contents and building dismandling (2017 \$'s escalated by CPI) S637,021.64 Subtotal Building and Contents Dismanding Behavioral Building and Contents Dismanding Area of direct-dispose concrete floors (ft2) Removal Rate (\$/ft2) Subtotal Concrete Floor Removal Total Demolition Costs  II. Disposal Costs A. Concrete Floor Area of Direct-Dispose Concrete Floor (ft²) Average Thickness of Concrete Floor (ft²) Volume of Concrete Floor (ft²) Volume of Concrete Floor (ft²) Subtotal Concrete Floor (ft²) Volume of Concrete Floor (ft²) Subtotal Concrete Floor (ft²) Subtotal Concrete Floor (ft²) Volume of Concrete Floor (ft²) Subtotal Flam Site Earthwork Subtotal Flam Site Earthwork Material to be Moved (Yd3) Den Buildoget Earthwork Rate (Yd3/hr) Den Den Hourly Rate Subtotal Flam Site Earthwork Revegetation Unit Cost (\$/Ac) Subtotal Flam Site Revegetation Area requiring Revegetation (Ac) Area requiring Revegetation (Ac) Ferengetation Site Revegetation Site Reclamation Cost Subtotal Flam Site Revegetation Total Plant Site Reclamation Cost Subtotal Flam Site Flam Site Flam Site Reclamation Cost Subtotal Flam Site Flam Site Flam Site Flam Site Reclamation Cost Subtotal Flam Site Flam S		60
D. Decontamination Equipment Costs   Sprayer pump   S500   Recycle pump   S500   Sprayer with hose   \$1,000   Sprayer with hose		
Sprayer pump   S500   S500   S500   S500   S500   S500   Sprayer with hose   S1,000   Subtotal Decontamination Equipment Costs   S2,000   E. Decontamination Waste Disposal (to Ponds)   Total gallons HCl waste   115,946   Pumping costs (5 HP/30 gpm)   S1,704.48   Subtotal Decontamination Costs   S213,422.80   Subtotal Decontamination Costs   S213,422.80   Subtotal Decontamination Costs   S213,422.80   Demolition Costs   S213,422.80   Subtotal Decontamination Costs   S213,422.80   Demolition Costs   Sasumptions (based on 2017 costs): Dismanding plant building   S625,758.00   A Building Dismanding Plant contents and building dismantling   S637,021.64   Subtotal Building and Contents Dismantling   S637,021.64   Subtotal Concrete Floor Removal   S197,380.00   S197,390.00   S197,380.00   S197,380.		\$10,291.20
Recycle pump   Sprayer with hose   \$1,000		
Sprayer with hose   \$1,000	- · · · · · · · · · · · · · · · · · · ·	
Subtotal Decontamination Equipment Costs   E. Decontamination Waste Disposal (to Ponds)		
E. Decontamination Waste Disposal (to Ponds)  Total gallons HCl waste Pumping costs (5 HP/30 gpm) S1,704.48 Subtotal Decontamination Costs Total Decontamination Costs Total Decontamination Costs  I. Demolition Costs Assumptions (based on 2017 costs): Dismantling plant building A. Building Dismantling Plant contents and building dismantling (2017 \$'s escalated by CPI) S637,021.64 Subtotal Building and Contents Dismantling Plant contents and building dismantling Plant contents and building dismantling Plant contents Plantling Plantlin	Sprayer with hose	\$1,000
Total gallons HCl waste   11.5,946   S1,704.48   Subtotal Decontamination Costs   S1P3 gpm   S1,704.48   Subtotal Decontamination Costs   S213,422.80   S2	Subtotal Decontamination Equipment Costs	<b>\$2,000</b> .
Total gallons HCl waste	E. Decontamination Waste Disposal (to Ponds)	
Pumping costs (5 HP/30 gpm)   \$1,704.48	<u> </u>	115.946
Subtotal Decontamination Costs   \$213,422.80	· ·	
Total Demolition Costs	· · · - · · · · · · · · · · · · · ·	-
Demolition Costs		
Assumptions (based on 2017 costs):	I otal Decontamination Costs	\$213,422.80
Assumptions (based on 2017 costs):	Demolition Costs	•
Dismantling plant building   \$625,758.00		
A. Building Dismantling Plant contents and building dismantling (2017 \$'s escalated by CPI)  \$637,021.64  B. Concrete Floor Removal Area of direct-dispose concrete floors (ft2) Removal Rate (\$'ft2) \$11,100 Removal Rate (\$'ft2) \$11,100 Subtotal Concrete Floor Removal  Area of Direct-Dispose Concrete Floor (ft2) Average Thickness of Concrete Floor (ft2) Volume of Concrete Floor (ft3)  Volume of Contaminated Soil (Yd3) Transportation and Disposal Unit Cost (\$'Yd3') (Unpackaged Bulk) \$220.99 Subtotal Concrete Floor and Soil Disposal Costs  Total Disposal Costs  V Plant Site Reclamation A. Plant Site Earthwork Material to be Moved (Yd3) D8N Bulldozer Earthwork Rate (Yd3/hr) D8N Hourly Rate Subtotal Plant Site Earthwork B. Revegetation Area requiring Revegetation (Ac) Revegetation Unit Cost (\$'Ac) Subtotal Plant Site Reclamation Costs  SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS Building Area (Ft2) Building Area (Ft2) Building Demolition Cost per Square Foot	- · · · · · · · · · · · · · · · · · · ·	0.05 750 00
Plant contents and building dismantling (2017 \$'s escalated by CPI)   \$637,021.64   Subtotal Building and Contents Dismantling   \$637,021.64	- <del>"</del>	\$625,758.00
Subtotal Building and Contents Dismantling B. Concrete Floor Removal Area of direct-dispose concrete floors (ft2) Removal Rate (\$/ft2) Subtotal Concrete Floor Removal Total Demolition Costs  S3834,601.64  II. Disposal Costs A. Concrete Floor Area of Direct-Dispose Concrete Floor (ft²) Average Thickness of Concrete Floor (ft²) Volume of Concrete Floor (ft²) Volume of Concrete Floor (ft²) Subtotal Concrete Floor (ft²) Volume of Concrete Floor (ft²) Subtotal Concrete Floor (ft²) Volume of Concrete Floor (ft²) Subtotal Concrete Floor (ft²) Volume of Contaminated Soil (Yd3) Transportation and Disposal Unit Cost (\$/Yd³) (Unpackaged Bulk) Subtotal Concrete Floor and Soil Disposal Costs Subtotal Plant Site Earthwork Material to be Moved (Yd3) DBN Bulldozer Earthwork Rate (Yd3/hr) DBN Hourly Rate Subtotal Plant Site Earthwork Subtotal Plant Site Earthwork Subtotal Plant Site Earthwork Subtotal Plant Site Earthwork Subtotal Plant Site Revegetation Total Plant Site Receptation Total Plant Site Receptation Costs Subtotal Plant Site Receptation Total Plant Site Receptation Costs Subtotal Plant Site Receptation Subtota		
B. Concrete Floor Removal   Area of direct-dispose concrete floors (ft2)   \$17.80   \$17.80   \$197.580.00   \$197.		-
Area of direct-dispose concrete floors (ft2) Removal Rate (\$/ft2) Subtotal Concrete Floor Removal  Total Demolition Costs  8. 197,580.00  Total Demolition Costs  A. Concrete Floor Area of Direct-Dispose Concrete Floor (ft²) Average Thickness of Concrete Floor (ft²) Volume of Concrete Floor (ft²) Volume of Concrete Floor (ft²) S,550 Volume of Contaminated Soil Volume of Contaminated Soil (Yd3) Transportation and Disposal Unit Cost (\$/Yd³) (Unpackaged Bulk) S220.99 Subtotal Concrete Floor and Soil Disposal Costs S91,047.88  V Plant Site Reclamation A. Plant Site Earthwork Material to be Moved (Yd3) D8N Bulldozer Earthwork Rate (Yd3/hr) D8N Hourly Rate Subtotal Plant Site Earthwork B. Revegetation Unit Cost (\$/Ac) Subtotal Plant Site Revegetation Total Plant Site Revegetation Costs S11,890.00  Total Plant Site Reclamation Costs Subtotal Plant Site Revegetation Total Plant Site Reclamation Costs Subtotal Plant Site Revegetation Total Plant Site Revegetation Costs Subtotal Plant Site Revegetation Subtotal Plant Site Revegetation Total Plant Site Revegetation Costs Subtotal Plant Site Revegetation S1,800.00  Total Plant Site Reclamation Costs Subtotal Plant Site Revegetation S2,9.09	Subtotal Building and Contents Dismantling	\$637,021.64
Removal Rate (\$\frac{1}{2}\)	B. Concrete Floor Removal	
Removal Rate (\$\frac{3}{12})	Area of direct-dispose concrete floors (ft2)	11,100
Subtotal Concrete Floor Removal   \$197,580.00   Total Demolition Costs   \$834,601.64		
Total Demolition Costs   \$834,601.64     II. Disposal Costs   A. Concrete Floor     Area of Direct-Dispose Concrete Floor (ft²)   11,100     Average Thickness of Concrete Floor (ft²)   0.50     Volume of Concrete Floor (ft²)   5,550     Volume of Concrete Floor (Yd3)   206     B. Contaminated Soil     Volume of Contaminated Soil (Yd3)   206     Transportation and Disposal Unit Cost (\$/Yd³) (Unpackaged Bulk)   \$220.99     Subtotal Concrete Floor and Soil Disposal Costs   \$91,047.88     Total Disposal Costs   \$91,047.88    V Plant Site Reclamation     A. Plant Site Earthwork   \$000     A. Plant Site Earthwork   \$000     D8N Bulldozer Earthwork   \$14,997.80     B. Revegetation   \$14,997.80     B. Revegetation Unit Cost (\$/Ac)   \$300     Subtotal Plant Site Revegetation (Ac)   6     Revegetation Unit Cost (\$/Ac)   \$300     Subtotal Plant Site Revegetation Costs   \$1,800.00     Total Plant Site Reclamation Costs   \$16,797.80    SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS   \$1,155,870.12     Building Demolition Cost per Square Foot   \$29.09	· ·	
A. Concrete Floor  Area of Direct-Dispose Concrete Floor (ft²)  Average Thickness of Concrete Floor (ft²)  Volume of Concrete Floor (ft³)  Volume of Concrete Floor (yd3)  B. Contaminated Soil  Volume of Contaminated Soil (yd3)  Transportation and Disposal Unit Cost (\$/Yd³) (Unpackaged Bulk)  Subtotal Concrete Floor and Soil Disposal Costs  Total Disposal Costs  VPlant Site Reclamation  A. Plant Site Earthwork  Material to be Moved (yd3)  D8N Bulldozer Earthwork Rate (yd3/hr)  D8N Hourly Rate  Subtotal Plant Site Earthwork  B. Revegetation  Area requiring Revegetation (Ac)  Revegetation Unit Cost (\$/Ac)  Subtotal Plant Site Reclamation Costs  SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS  Building Demolition Cost per Square Foot  11,100  11,100  11,100  11,100  11,100  11,100  11,100  11,100  10,50  10,500  10,500  10,500  20,500  20,500  20,500  20,500  6  6  Revegetation  31,4997.80  SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS  \$1,155,870.12  Building Demolition Cost per Square Foot		•
A. Concrete Floor  Area of Direct-Dispose Concrete Floor (ft²)  Average Thickness of Concrete Floor (ft)  Volume of Concrete Floor (ft²)  Volume of Concrete Floor (Yd3)  B. Contaminated Soil  Volume of Contaminated Soil (Yd3)  Transportation and Disposal Unit Cost (\$\forall Yd3\$) (Unpackaged Bulk)  \$206  Transportation and Disposal Unit Cost (\$\forall Yd3\$) (Unpackaged Bulk)  \$220.99  Subtotal Concrete Floor and Soil Disposal Costs  \$91,047.88  Total Disposal Costs  \$91,047.88  V Plant Site Reclamation  A. Plant Site Earthwork  Material to be Moved (Yd3)  D8N Bulldozer Earthwork Rate (Yd3/hr)  D8N Hourly Rate  \$14,997.80  B. Revegetation  Area requiring Revegetation (Ac)  Revegetation Unit Cost (\$\forall Ac)  Revegetation Unit Cost (\$\forall Ac)  Subtotal Plant Site Revegetation  Total Plant Site Reclamation Costs  \$1,800.00  Total Plant Site Reclamation Costs  \$11,155,870.12  Building Area (Ft2)  Building Demolition Cost per Square Foot		4004,001.04
Area of Direct-Dispose Concrete Floor (ft²)  Average Thickness of Concrete Floor (ft)  O.50  Volume of Concrete Floor (ft²)  Volume of Concrete Floor (yd3)  B. Contaminated Soil  Volume of Contaminated Soil (Yd3)  Transportation and Disposal Unit Cost (\$\frac{9}{4}\) (Unpackaged Bulk)  Subtotal Concrete Floor and Soil Disposal Costs  Total Disposal Costs  V Plant Site Reclamation  A. Plant Site Earthwork  Material to be Moved (Yd3)  D8N Bulldozer Earthwork Rate (Yd3/hr)  D8N Bulldozer Earthwork  B. Revegetation  Area requiring Revegetation (Ac)  Revegetation Unit Cost (\$\frac{9}{4}\)colon  Total Plant Site Reclamation Costs  SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS  Building Demolition Cost per Square Foot  11,100  0.50		
Average Thickness of Concrete Floor (ft)  Volume of Concrete Floor (ft <sup>3</sup> )  Volume of Concrete Floor (Yd3)  B. Contaminated Soil  Volume of Contaminated Soil (Yd3)  Transportation and Disposal Unit Cost (\$\forall Yd3') (Unpackaged Bulk)  \$220.99  Subtotal Concrete Floor and Soil Disposal Costs  Total Disposal Costs  V Plant Site Reclamation  A. Plant Site Earthwork  Material to be Moved (Yd3)  D8N Bulldozer Earthwork Rate (Yd3/hr)  D8N Hourly Rate  \$512.12  Subtotal Plant Site Earthwork  B. Revegetation  Area requiring Revegetation (Ac)  Revegetation Unit Cost (\$\forall Ac)  Subtotal Plant Site Revegetation  Total Plant Site Revegetation Costs  \$11,800.00  Total Plant Site Reclamation Costs  \$11,155,870.12  Building Area (Ft2)  39,738  Building Demolition Cost per Square Foot	<u>-</u>	11 100
Volume of Concrete Floor (ft³)   5,550   Volume of Concrete Floor (Yd3)   206     B. Contaminated Soil   Volume of Contaminated Soil (Yd3)   206   Transportation and Disposal Unit Cost (\$\forall Yd3\) (Unpackaged Bulk)   \$220.99   Subtotal Concrete Floor and Soil Disposal Costs   \$91,047.88     Total Disposal Costs   \$91,047.88    V Plant Site Reclamation   20,500     D8N Bulldozer Earthwork   20,500     D8N Bulldozer Earthwork Rate (Yd3/hr)   700     D8N Hourly Rate   \$512.12     Subtotal Plant Site Earthwork   \$14,997.80     B. Revegetation   6   8     Revegetation Unit Cost (\$\forall Ac)   6     Revegetation Unit Cost (\$\forall Ac)   \$300     Subtotal Plant Site Revegetation   \$1,800.00     Total Plant Site Reclamation Costs   \$16,797.80    SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS   \$1,155,870.12     Building Demolition Cost per Square Foot   \$29.09	• , ,	•
Volume of Concrete Floor (Yd3)   206     B. Contaminated Soil     Volume of Contaminated Soil (Yd3)   206     Transportation and Disposal Unit Cost (\$/Yd³) (Unpackaged Bulk)   \$220.99     Subtotal Concrete Floor and Soil Disposal Costs   \$91,047.88     Total Disposal Costs   \$91,047.88    V Plant Site Reclamation     A. Plant Site Earthwork   20,500     D8N Bulldozer Earthwork Rate (Yd3/hr)   700     D8N Hourly Rate   \$512.12     Subtotal Plant Site Earthwork   \$14,997.80     B. Revegetation   6     Area requiring Revegetation (Ac)   6     Revegetation Unit Cost (\$/Ac)   \$300     Subtotal Plant Site Revegetation   \$1,800.00     Total Plant Site Reclamation Costs   \$16,797.80     SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS   \$1,155,870.12     Building Demolition Cost per Square Foot   \$29.09	_ , , ,	
B. Contaminated Soil  Volume of Contaminated Soil (Yd3)  Transportation and Disposal Unit Cost (\$/Yd³) (Unpackaged Bulk)  \$220.99  Subtotal Concrete Floor and Soil Disposal Costs  Total Disposal Costs  \$91,047.88  Total Disposal Costs  \$91,047.88  V Plant Site Reclamation  A. Plant Site Earthwork  Material to be Moved (Yd3)  D8N Bulldozer Earthwork Rate (Yd3/hr)  D8N Hourly Rate  \$512.12  Subtotal Plant Site Earthwork  B. Revegetation  Area requiring Revegetation (Ac)  Revegetation Unit Cost (\$/Ac)  Subtotal Plant Site Reclamation Costs  \$1,800.00  Total Plant Site Reclamation Costs  \$1,155,870.12  Building Area (Ft2)  Building Demolition Cost per Square Foot  \$29.09	Volume of Concrete Floor (ft²)	5,550
Volume of Contaminated Soil (Yd3)   206     Transportation and Disposal Unit Cost (\$/Yd³) (Unpackaged Bulk)   \$220.99     Subtotal Concrete Floor and Soil Disposal Costs   \$91,047.88     Total Disposal Costs   \$91,047.88     Total Disposal Costs   \$91,047.88     V Plant Site Reclamation   20,500     A. Plant Site Earthwork   20,500     D8N Bulldozer Earthwork Rate (Yd3/hr)   700     D8N Hourly Rate   \$512.12     Subtotal Plant Site Earthwork   \$14,997.80     B. Revegetation   6   8     Revegetation Unit Cost (\$/Ac)   \$300     Subtotal Plant Site Revegetation   \$1,800.00     Total Plant Site Reclamation Costs   \$16,797.80     SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS   \$1,155,870.12     Building Area (Ft2)   39,738     Building Demolition Cost per Square Foot   \$29.09	Volume of Concrete Floor (Yd3)	206
Transportation and Disposal Unit Cost (\$/Yd³) (Unpackaged Bulk)         \$220.99           Subtotal Concrete Floor and Soil Disposal Costs         \$91,047.88           Total Disposal Costs         \$91,047.88           V Plant Site Reclamation         20,500           A. Plant Site Earthwork         20,500           D8N Bulldozer Earthwork Rate (Yd3/hr)         700           D8N Hourly Rate         \$512.12           Subtotal Plant Site Earthwork         \$14,997.80           B. Revegetation         6           Area requiring Revegetation (Ac)         6           Revegetation Unit Cost (\$/Ac)         \$300           Subtotal Plant Site Revegetation         \$1,800.00           Total Plant Site Reclamation Costs         \$16,797.80           SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS         \$1,155,870.12           Building Area (Ft2)         39,738           Building Demolition Cost per Square Foot         \$29.09	B. Contaminated Soil	
Transportation and Disposal Unit Cost (\$/Yd³) (Unpackaged Bulk)   \$220.99     Subtotal Concrete Floor and Soil Disposal Costs   \$91,047.88     Total Disposal Costs   \$91,047.88     Total Disposal Costs   \$91,047.88     V Plant Site Reclamation   20,500     A. Plant Site Earthwork   20,500     D8N Bulldozer Earthwork Rate (Yd3/hr)   700     D8N Hourly Rate   \$512.12     Subtotal Plant Site Earthwork   \$14,997.80     B. Revegetation   6     Revegetation Unit Cost (\$/Ac)   \$300     Subtotal Plant Site Revegetation   \$1,800.00     Total Plant Site Reclamation Costs   \$16,797.80     Subtotal Plant Site Reclamation Costs   \$1,155,870.12     Building Area (Ft2)   39,738     Building Demolition Cost per Square Foot   \$29.09	Volume of Contaminated Soil (Yd3)	206
Subtotal Concrete Floor and Soil Disposal Costs         \$91,047.88           Total Disposal Costs         \$91,047.88           V Plant Site Reclamation         20,500           A. Plant Site Earthwork         20,500           D8N Bulldozer Earthwork Rate (Yd3/hr)         700           D8N Hourly Rate         \$512.12           Subtotal Plant Site Earthwork         \$14,997.80           B. Revegetation         6           Area requiring Revegetation (Ac)         6           Revegetation Unit Cost (\$/Ac)         \$300           Subtotal Plant Site Revegetation         \$1,800.00           Total Plant Site Reclamation Costs         \$16,797.80           SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS         \$1,155,870.12           Building Area (Ft2)         39,738           Building Demolition Cost per Square Foot         \$29.09		\$220.99
Total Disposal Costs   \$91,047.88		
V Plant Site Reclamation       A. Plant Site Earthwork         Material to be Moved (Yd3)       20,500         D8N Bulldozer Earthwork Rate (Yd3/hr)       700         D8N Hourly Rate       \$512.12         Subtotal Plant Site Earthwork       \$14,997.80         B. Revegetation       6         Revegetation Unit Cost (\$/Ac)       \$300         Subtotal Plant Site Revegetation       \$1,800.00         Total Plant Site Reclamation Costs       \$16,797.80         UBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS       \$1,155,870.12         Building Area (Ft2)       39,738         Building Demolition Cost per Square Foot       \$29.09		<u>-</u>
A. Plant Site Earthwork  Material to be Moved (Yd3)  D8N Bulldozer Earthwork Rate (Yd3/hr)  D8N Hourly Rate  S512.12  Subtotal Plant Site Earthwork  8. Revegetation  Area requiring Revegetation (Ac)  Revegetation Unit Cost (\$/Ac)  Subtotal Plant Site Revegetation  Total Plant Site Revegetation Costs  S14,997.80  \$300  \$300  \$1,800.00  Total Plant Site Reclamation Costs  \$1,55,870.12  Building Area (Ft2)  Building Demolition Cost per Square Foot  \$29.09	Total Disposal Costs	\$71,0 <del>4</del> 7.00
Material to be Moved (Yd3)       20,500         D8N Bulldozer Earthwork Rate (Yd3/hr)       700         D8N Hourly Rate       \$512.12         Subtotal Plant Site Earthwork       \$14,997.80         B. Revegetation       6         Area requiring Revegetation (Ac)       \$300         Subtotal Plant Site Revegetation       \$1,800.00         Total Plant Site Reclamation Costs       \$16,797.80         SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS       \$1,155,870.12         Building Area (Ft2)       39,738         Building Demolition Cost per Square Foot       \$29.09	V Plant Site Reclamation	
D8N Bulldozer Earthwork Rate (Yd3/hr)       700         D8N Hourly Rate       \$512.12         Subtotal Plant Site Earthwork       \$14,997.80         B. Revegetation       6         Revegetation Unit Cost (\$/Ac)       \$300         Subtotal Plant Site Revegetation       \$1,800.00         Total Plant Site Reclamation Costs       \$16,797.80         SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS       \$1,155,870.12         Building Area (Ft2)       39,738         Building Demolition Cost per Square Foot       \$29.09	A. Plant Site Earthwork	
D8N Bulldozer Earthwork Rate (Yd3/hr)       700         D8N Hourly Rate       \$512.12         Subtotal Plant Site Earthwork       \$14,997.80         B. Revegetation       6         Revegetation Unit Cost (\$/Ac)       \$300         Subtotal Plant Site Revegetation       \$1,800.00         Total Plant Site Reclamation Costs       \$16,797.80         SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS       \$1,155,870.12         Building Area (Ft2)       39,738         Building Demolition Cost per Square Foot       \$29.09		20.500
D8N Hourly Rate   \$512.12     Subtotal Plant Site Earthwork   \$14,997.80     B. Revegetation   6   6     Revegetation Unit Cost (\$/Ac)   \$300     Subtotal Plant Site Revegetation   \$1,800.00     Total Plant Site Reclamation Costs   \$16,797.80     SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS   \$1,155,870.12     Building Area (Ft2)   39,738     Building Demolition Cost per Square Foot   \$29.09	· · · · · · · · · · · · · · · · · · ·	
Subtotal Plant Site Earthwork  B. Revegetation Area requiring Revegetation (Ac) Revegetation Unit Cost (\$/Ac) Subtotal Plant Site Revegetation Total Plant Site Reclamation Costs  SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS Building Area (Ft2) Building Demolition Cost per Square Foot  \$14,997.80  \$300 \$300 \$1,800.00 \$1,800.00 \$16,797.80  \$11,155,870.12 \$39,738 \$29.09	· · · · · · · · · · · · · · · · · · ·	
B. Revegetation Area requiring Revegetation (Ac) Revegetation Unit Cost (\$\frac{5}{Ac}\) Subtotal Plant Site Revegetation  Total Plant Site Reclamation Costs  SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS Building Area (Ft2) Building Demolition Cost per Square Foot  \$29.09		
Area requiring Revegetation (Ac) Revegetation Unit Cost (\$/Ac)  Subtotal Plant Site Revegetation  Total Plant Site Reclamation Costs  S1,800.00  UBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS Building Area (Ft2) Building Demolition Cost per Square Foot  39,738  \$29.09		\$14,997.80
Revegetation Unit Cost (\$/Ac) \$300 Subtotal Plant Site Revegetation \$1,800.00 Total Plant Site Reclamation Costs \$16,797.80  UBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS Building Area (Ft2) 39,738 Building Demolition Cost per Square Foot \$29.09		•
Subtotal Plant Site Revegetation Total Plant Site Reclamation Costs  \$1,800.00 \$16,797.80  SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS Building Area (Ft2) Building Demolition Cost per Square Foot  \$29.09	Area requiring Revegetation (Ac)	
Subtotal Plant Site Revegetation Total Plant Site Reclamation Costs  SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS Building Area (Ft2) Building Demolition Cost per Square Foot  \$1,800.00 \$16,797.80  \$1,155,870.12 39,738 \$29.09	Revegetation Unit Cost (\$/Ac)	\$300
Total Plant Site Reclamation Costs \$16,797.80  SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS  Building Area (Ft2) 39,738  Building Demolition Cost per Square Foot \$29.09	Subtotal Plant Site Revegetation	\$1,800.00
Building Area (Ft2) 39,738 Building Demolition Cost per Square Foot \$29.09	_	\$16,797.80
Building Area (Ft2)  Building Demolition Cost per Square Foot  \$29.09	IIDTOTAL DIIII DING DEMOLITION AND DISDOSAL COSTS	<b>Q</b> 1 155 <b>Q7</b> 0 12
Building Demolition Cost per Square Foot \$29.09		· · · · · · · · · · · · · · · · · · ·
		-
TOTAL BUILDING DEMOLITION AND DISPOSAL COSTS \$1 155 870 12	Building Demolition Cost per Square Foot	\$29.09
	COTAL BILLI DING DEMOLITION AND DISDOSAL COSTS	Q1 155 Q70 12

### **Building Demolition**

R.O. Building

#### L Decontamination Costs

### A. Wall Decontamination

Area to be Decontaminated (ft2)

HCl Application Rate (Gallons/ft<sup>2</sup>)

**HCl Acid Cost** 

Subtotal Wall Decontamination Materials Costs

B. Concrete Floor Decontamination

Area to be Decontaminated (ft2)

HCl Application Rate (Gallons/ft<sup>2</sup>)

HCl Acid Cost

Subtotal Floor Decontamination Materials Costs

C. Decontamination Labor

Labor (man-days)

Subtotal Decontamination Labor Cost

D. Decontamination Equipment Costs

Sprayer pump

Recycle pump

Sprayer with hose

Subtotal Decontamination Equipment Costs

E. Decontamination Waste Disposal (to Ponds)

Total gallons HCl waste

Pumping costs (5 HP/30 gpm)

Subtotal Decontamination Costs

**Total Decontamination Costs** 

### II. Demolition Costs

Assumptions (based on 2017 costs):

Dismantling plant building

A. Building Dismantling

Plant contents and building dismantling (2017 \$'s escalated by CPI)

Subtotal Building and Contents Dismantling

B. Concrete Floor Removal

Area of direct-dispose concrete floors (ft2)

Removal Rate (\$/ft2)

Subtotal Concrete Floor Removal

### **Total Demolition Costs**

### III. Disposal Costs

A. Concrete Floor

Area of Direct-Dispose Concrete Floor (ft<sup>2</sup>)

Average Thickness of Concrete Floor (ft)

Volume of Concrete Floor (ft<sup>3</sup>)

Volume of Concrete Floor (Yd3)

B. Contaminated Soil

Volume of Contaminated Soil (Yd3)

Transportation and Disposal Unit Cost (\$/Yd³) (Unpackaged Bulk)

Subtotal Concrete Floor and Soil Disposal Costs

### **Total Disposal Costs**

### IV Plant Site Reclamation

A. Plant Site Earthwork

Material to be Moved (Yd3)

D8N Bulldozer Earthwork Rate (Yd3/hr)

D8N Hourly Rate

Subtotal Plant Site Earthwork

B. Revegetation

Area requiring Revegetation (Ac)

Revegetation Unit Cost (\$/Ac)

Subtotal Plant Site Revegetation

### **Total Plant Site Reclamation Costs**

### SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS

Building Area (Ft2)

Building Demolition Cost per Square Foot

10,000

\$29.09

### TOTAL BUILDING DEMOLITION AND DISPOSAL COSTS

\$290,900.00

**Evaporation Pond Reclamation** 

Evaporation I	ond Reclamation Commercial Ponds	R&D Ponds	Total
Assemble to Poster	Continercal Folia	Rath rodus	Total
Assumptions/Data: Number of Ponds	3	2	
Area of Ponds (fl2)	250,000	50,000	
Thickness of Liner Material (ft)	0 00833	0 0030	
Leak detection piping size average (in)	6	3	
Leak detection piping length (ft/pond)	2,100	600	
Earthwork Requirements (Yd3/pond) Surface Restoration/Revegetation (Acres)	60,000 20	30,000 10	
Sludge Production Rate (Yd3 sludge/gal)	20	0.000000102	
(1 Yd3 sludge/9,772,000 gal R&D Phase)			
Estimated 1991 to 2019 Total Production (gallons)	26651220240		
Liner Removal Rate (ft2/man-day)	10000	10,000	
Sludge Removal Rate (Yd3/man-day) 2017 - Pond #4 New Liner	8.33 250,000	8 33	
2017 - Point #4 New Lines 2017 - Point #4 Leak detection piping addition	920		
Pond Liner and Piping Removal A. Pond Liner and Piping Removal Labor	•		
Area of Ponds	1,000,000	100,000	
Liner Removal Rate (ft2/Man-Day)	10,000	10,000	
Total Man-Days	100	10	
Labor Rate (\$/man-day)	\$171.52	\$171.52	<b>8</b> 10.047.0
Subtotal Liner and Piping Removal Labor Costs  B Pond Liner and Piping Removal Equipment	\$17,152.00	\$1,715.20	\$18,867.20
Total Man-Days Removal Effort	100	10	
Size of Crew	4	4	
Total Days Removal Effort	25	2.5	
Cat 924G Loader Hourly Rate (\$/hr)	\$213.03	\$213.03	
Subtotal Liner and Piping Removal Equipment Costs	\$42,606.00	\$4,260.60	\$46,866.66
Total Pond Liner and Piping Removal Costs	\$59,758.00	\$5,975,80	\$65,733,8
Pond Sludge Removal			
Pond Sludge Estimate			
Estimated Production Flow since 1991 (gal)	26,651,220,240		
Historical Sludge Production Rate Estumated Pond Sludge Volume (Yd3)	0,000000102 2,718	Cleaned following R&D	
A Pond Shudge Removal Labor	2,710	Citation following Reco	
Pond Sludge Volume (Yd3)	2,718		2,71
Sludge Removal Rate (Yd3/man-day)	8.33		ŕ
Total Man-Days	326		
Labor Rate (\$/man-day)	\$171,52	40.00	****
Subtotal Pond Sludge Removal Labor Costs  B Pond Sludge Removal Equipment	\$55,915.52	\$0.00	<b>\$</b> 55,915.5.
Total Man-Days Removal Effort	326		
Size of Crew	3		
Total Days Removal Effort	109		
Cat 924G Loader Hourly Rate (\$\frac{\frac}\frac{\frac{\frac{\frac{\frac}\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac}	\$213.03		
Subtotal Pond Sludge Removal Equipment Costs	\$185,762.16	\$0.00	\$185,762.16
Total Pond Studge Removal Costs	\$241,677.68	\$0.00	\$241,677.6
Pond Byproduct Material Disposal			
A. Pond Liner Disposal	1 000 000	100.000	
Area of Pond Liner (ft2) Thickness of Pond Liner (ft)	1,000,000 0 00833	100,000 0.00300	
Volume of Pond Liner (ft3)	8,330	300	
Void Space Factor	1.25	1.25	
Total Disposed Volume (yd3)	386	14	400.
Disposal Unit Costs (\$/yd3) (Unpackaged Bulk)	\$220.99	\$220,99	
Subtotal Pond Liner Disposal Costs	\$85,302.14	\$3,093 86	\$88,396.00
B. Pond Piping Disposal	7,220	1,200	
Total Length of Piping Piping Volume Factor (ff3/ft)	0 0103	0.0069	
Total Volume Pond Piping (ft3)	74	8	
Void Space Factor	1.25	1 25	
Total Disposed Volume (yd3)	3 4	0.4	3
Disposal Unit Costs (\$/yd3) (Unpackaged Bulk)	\$220.99	\$220.99	2020 5
Subtotal Pond Piping Disposal Costs	<b>\$</b> 751 37	\$88.40	\$839.7
C. Pond Sludge Disposal  Total Volume Pond Sludge (Yd3)	2,718		2,71
Disposal Unit Costs (\$/yd3) (Soil rate)	\$263.17		2,11
Subtotal Pond Sludge Disposal Costs	\$715,296.06	\$0.00	\$715,296.06
Total Byproduct Material Disposal Costs	\$801,349.57	\$3,182.26	\$804,531.8
Pond Site Reclamation			
A. Pond Earthwork Requirements			
Earthwork Requirements Yd3)	180,000	60,000	
D8N Bulldozer Earthwork Rate (Yd3/hr)	700	700	
Total D8N Hours	257	86	
D8N Hourly Rate	<b>\$</b> 512.12	\$512.12	
Subtotal Pond Earthwork	\$131,614.84	\$44,042.32	\$175,657.10
B Revegetation	20	10	
Area requirmg Revegetation (Ac) Revegetation Unit Cost (\$/Ac)	20 \$300 00	10 \$300 00	
Subtotal Plant Site Revegetation	\$6,000.00	\$3,000.00	•
Total Pond Site Reclamation Costs	\$137,614.84	\$47,042.32	\$184,657.1
Outcombroan Lohan Costa Paristra Pr. 3 Pr. str. 1991	-		-
Supervisory Labor Costs During Pond Reclamation Estimated Duration (months)	4		
Engineer Rate (\$/month)	\$8,868.33		
Total Engineer Labor	\$35,473 32		
Raduation Technician Rate (\$/month)	<b>\$6,505</b> 75		
	\$6,505 75 \$26,023 00		
Raduation Technician Rate (\$/month)	·	\$0.00	\$61,496.32
Radiation Technician Rate (\$/month) Total Radiation Technician Labor Total Supervisory Labor Costs	\$26,023 00 \$61,496.32	·	\$61,496.32 \$1.358.096.79
Radiation Technician Rate (\$/month) Total Radiation Technician Labor	\$26,023 00	\$0.00	\$61,496.3 \$1,358,096.79

### Miscellaneous Site Reclamation

		Miscellaneous Site Reclamation	**********
Rosd Reclimation production arter (Y45hr) Langsh of Main Access Road (18) Average Main Access Road (18) Average Main Access Road (18) Longsh of Wailfield Road (18) Longsh of Wailfield Access Road (18) Longsh of Wailfield Roa	L		
Length of Main Access Road (8)		•	•••
Average Main Accoss Road (Arm Surface (B) 1 Surface Area of Main Access Road (Ac) 10.5 Surface Area of Main Access Road (Ac) 10.5 Surface Area of Main Access Road (Ac) 10.5 Aurenge Willfield Access Road (Ach) 10.5 Aurenge Willfield Access Road (Ach) 10.5 Surface Area of Willfield Access Road (Ach) 10.5 A. Main Access Road Cirevolck DDN Unit Operating Cost (Surfa) 15.1 Substant Millfield Road Cirevolck Willfield Road Cirevolck DDN Unit Operating Cost (Surfa) 15.0 DDN Unit Operating Cost (Surfa) 15.1 Substant Millfield Road Cirevolck Received Costs 15.2 Substant Millfield Road Cirevolck Received Received Cirevolck Received Re			
Depth of Main Access Road Grewel Sustriace (1)   Surface Acres of Main Access Road (Ac)   Length of Weilfield Access Roads (2)   Length of Weilfield Access Roads (2)   Average Weilfield Access Roads (2)   Surface Acres of Weilfield Access Roads (2)   Surface Acres of Weilfield Road (Ac)   Main Access Road Grewel Volume (Yd3)   Surface Acres of Weilfield Road (Ac)   Subtoil Man Access Road Grewel Readless Remend Costs     Surface Access Road Grewel Readless Remend Costs     Surface Acres of Weilfield Road Grewel Readless Remend Costs     Surface Access Road Grewel Readless Remend Costs     Surface Acres of Weilfield Road Grewel Readless Remend Costs     Surface Access Remended Costs     Surface Access Remended Costs     Surface Access Remended Costs     Surface Access Road Grewel Readless Remended Readless Re		· · ·	-
Surface Area of Mann Access Road (Ac) Length of Wellfield Access Road (Ac) Average Wellfield Access Road welch (B) S. \$5.00 Average Wellfield Access Road welch (B) S. \$5.00 Surface Access Ord Wellfield Road (Ac) A Mela Access Road Grewel Surface (B) S. \$16.1  A Mela Access Road Grewel Volume (Y43) Total exclusionation trans (En) S. \$16.2  A Mela Access Road Grewel Volume (Y43) Total exclusionation trans (En) S. \$12.12 Subcotal Melan Access Road Grewel Roadbase Reminal Costs  B. Wellfield Read Grewel Volume (Y43)  B. Wellfield Read Grewel Volume (Y43) Debug Globert Wellfield Road Grewel Roadbase Reminal Costs  Wellfield Read Grewel Volume (Y43) DEBU Unit Operating Cost (Sar) DEBU Unit Operating Cost (Sar) Debug Globert Start (Sar) Debug		, ,	
Length of Weilfield Access Rocks (ti) Average Weilfield Access Rocks (ti) Depth of Weilfield Access Rocks (ti) 1.1 Depth of Weilfield Access Rock (five) Suffice Area of Weilfield Access Rock (five)  A. Main Access Rocd Drivovick Mein Access Rock of Groved Volume (Yd3) Total reclamation time (bits) DEN Vitta (Poeting Cost (bit) Substant Access Rock of Groved Volume (Yd3) Total reclamation for (bits) Substant Access Rock of Groved Volume (Yd3) Substant Access Rock of Groved Roadbate Remonal Costs  Substant Access Rock of Groved Roadbate Remonal Costs  Weilfield Rock (Groved Volume (Yd3) DEN Vitta (Spening Cost (bits) DEN VITTA (Spening Cost (bit		· · · · · · · · · · · · · · · · · · ·	
Depth of Wellfield Access Read Graved Surface (th)   16.1		· ·	
Surface Arms of Welfield Road (As)  A. Main Access Road Growd Volume (Yd3) Todia (road Growd Volume (Yd3) DNI Unit Openting Cost (Shr) Subtoal Man Access Road Growd Volume (Yd3) Todia (road Road Growd Road Road Road Road Road Road Road Roa			12
A. Main Access Road Dritverk  Main Access Road Crewed Volume (Yd3)  15			
Main Access Road Graved Volume (Vd2)         16,944           Total reclamation time (into)         85           DBN Unat Operating Cost (Shr)         5312,12           Subboal Man Access Road Creat Bondbase Removal Costs         43,350,20           B. Weilfield Road Direvick         13,000           Volleting Road Graved Volume (Vd2)         55           DSN Una Operating Cost (Shr)         55           Assumptions         313,287,38           Subcost Discongible Cost (Shr)         26,6           Discongible-citing Unit Cost (Shr)         25,98           Subcost Discongible-citing Unit Cost (Shr)         330,00           Subcost Discongible-citing Unit Cost (Shr)         27,98,00           Assumptions         45,798,00           Pipuline Removal Rate (ff./man-day)         67           Pipuline Removal Rate (ff./man-day)         67           Pipuline Removal Rate (ff./man-day)         4           Length of Poul Pipulines (th)         3,50           Average Pipe Site (Sch 40)         4           A Pipuline Removal Costs         333,58,60           Length of Pipulines (th) <t< td=""><td></td><td>Surface Area of Wellfield Road (Ac)</td><td>16.1</td></t<>		Surface Area of Wellfield Road (Ac)	16.1
Total reclamation time (bits) DBN Unit Operating Cost (Mr) Substated Mann Access Road Grovel Readesse Removal Costs  B. Wellfield Road Corwell Volume (Yd3) Total reclamation time (bits) DBN Unit Operating Cost (Shr) S121.2 Substated Helpfield Road Grovel Readesse Removal Costs  E. Disting/Sending Assumptions Surface Area (cars) Total Access Road Reclamation Costs  II. Waterwater Pipeline Reclamation Assumptions Pipeline Surroull Road (Shram-day) Surface Of Pood Pipelines Pipeline Surroull Road (Shram-day) Surface Of Pood Pipelines A Length of Pood Pipelines (Sh Length of Pood Pipelines (Sh) Length of Pood Pipelines (Sh) Avenage Pipe Size (Sch Hand-day) Surface Area (cars) Surface Area (c		A. Main Access Road Dirtwork	
DSN Unit Operating Cost (Mrs)   Salita		Main Access Road Gravel Volume (Yd3)	16,944
Subtotal Mann Access Road Gravel Readubase Removal Costs  B. Wellfield Road Circuity (Vd1) Wellfield Road Circuity (Vd1) Wellfield Road Circuity (Vd1) Subtotal Highest Road Gravel Roadubase Removal Costs  E. Discung/Seeding Assumptions Surface Area (cares) Discung/Seeding Assumptions Surface Area (cares) Discung/Seeding Unit Cont (Vlaces) Subtotal Determy Seeding Costs Total Access Road Reclamation Costs  II. Westrewiser Pipeliar Reclamation Assumptions Pipeliar Removal Rate (Chinard-day) Pipeliar Stredding Rate (Thinard-day) Pipeliar Stredding Rate (Thinard-day) Pipeliar Stredding Rate (Thinard-day) Number of Pond Pipeliars Length of Pond Pipeliars Length of Pond Pipeliars Length of Pond Pipeliars (Td) A Pipeliar Removal Rots (Rate) A Pipeliar Removal Rots (Rate) Removal Rate (Ghinard-day) Removal Rate (Ghinard-day) Removal Later, Rate (Ghinar		, ,	
B. Wellfield Road Direvork Wellfield Road Carvel Volume (Y43) Total realization time (tar) DEV Unt Operating Cost (Mr) S12.12 Schoom # Riphell Road Creat Realizars Removal Costs  B. Dissing Secting Surface Area (cares) Discing Secting Discing Secting Surface Area (cares) Discing Secting Discing Secting Surface Area (cares) Discing Secting Unit Cost (Vacor) Substant Descriptored Structure Structure (Structure) Discing Secting Unit Cost (Vacor) Surface Area (cares) Discing Secting Unit Cost (Vacor) Substant Descriptored Section Total Access Road Reclamation Costs  II. Wastewater Pipelliae Reclamation Assumptions Pipeliae Removal Rate (ft Immoduly) Pipeliae Sericalization (ft Immoduly) Pipeliae Removal Rate (ft Immoduly) Pipeliae Removal Costs Length of Pool Pipeliae (ft) A. Pipeliae Removal Costs Length of Pool Pipeliae (ft) A. Pipeliae Removal Costs Length of Pipeliae (ft) Removal Rate (ft Immoduly) Removal Lalore Rate (Serian-duly) Removal Lalore Rate (Serian-duly) Structure (Serian-duly) Structur			
Wollfield Road Gravel Volume (Y45)   13,000   105		Subiotal Main Access Koad Gravel Koadbase Removal Costs	\$43,530.20
Total realmantion time (time)   55   55   50   50   50   50   50   5		B. Wellfield Road Dirtwork	
DEN Unit Operating Cost (Shr)   Salsatan Welffeld Road Grave Removal Costs   Sals, 287.80			•
Subscal Halfield Read Gravel Readware Remond Costs   133,287.89   15		,	
E. Discng/Seeding   Assumptions   Striftec Area (scris)   26.6			
Assumptions   Surfine Area (serser)   326.6   Disense/Seeding Unit Cost (Maree)   320.00			\$33,487.80
Surface Area (acres)   25.6   2500.00   25.0			
Disnomp/Seeding Unit Cort (Marce)   \$390.00   Total Access Road Reclamation Corts   \$390.00   Total Access Road Reclamation Corts   \$34,798.00		•	26.6
Substantal Discharge-Searching Coats		· · ·	
			<b>\$</b> 7,980.00
Assumptions Pipeline Removal Rate (ft./man-day) Pipeline Shredding Rate (ft. /man-day) Pipeline Shredding Rate (ft. /man-day) Number of Pond Pipelines (ft.) Number of Pond Pipelines (ft.) Length of Pond Pipelines (ft.) Number of RO Building Pipelines (ft.) Number of RO Building Pipelines (ft.) Length of RO Building Pipelines (ft.) A verage Pipe Size (Sch. 40) A Pipeline Removal Costs Length of Pipelines (ft.) A Pipeline Removal Costs Length of Pipelines (ft.) Removal Rate (ft/man-day) Removal Rate (ft/man-day) Removal Rate (ft/man-day) Removal Rate (ft/man-day) Removal Labor Rate (ft/man-day) Removal Rate (ft/man-day) Removal Rate (ft/man-day) Removal Rate (ft/man-day) Stable Removal Costs Length of Pipelines (ft.) Subtotal Pipeline Removal Costs Length of Pipelines (ft.) Size (ft/man-day) Shredding Labor Rate (ft/man-day) Shredding Labor Rate (ft/man-day) Shredding Rate (ft/man-day) Shredding Labor Rate (ft/man-day) Shredding Labor Rate (ft/man-day) Shredder Use (days) Shredder Oses C Pipeline Tempsportation and Disposal (ftRC-Licensed Facility) Pipe Diameter (inches) Chipped Volume Reduction (ft/ft) Subtotal Volume of Shredding Costs Shredding Labor Rate (ft/man-day) Shredder Ose Final Disposal Volume (vd.) Transportation and Disposal (ftRC-Licensed Facility) Pipe Diameter (inches) Subtotal Volume of Shredder Ose Final Disposal Volume (vd.) Transportation and Disposal (ftRC-Licensed Facility) Pipe Diameter (inches) Subtotal Volume Reduction (ft/ft) Subtotal Volume ft Shredding Costs Stable Tipeline Cost Stable Tipeline Reduction (ft/ft) Subtotal Volume of Shredder Stable St		Total Access Road Reclamation Costs .	\$84,798.00
Assumptions Pipeline Removal Rate (ft./man-day) Pipeline Shredding Rate (ft. /man-day) Pipeline Shredding Rate (ft. /man-day) Number of Pond Pipelines (ft.) Number of Pond Pipelines (ft.) Length of Pond Pipelines (ft.) Number of RO Building Pipelines (ft.) Number of RO Building Pipelines (ft.) Length of RO Building Pipelines (ft.) A verage Pipe Size (Sch. 40) A Pipeline Removal Costs Length of Pipelines (ft.) A Pipeline Removal Costs Length of Pipelines (ft.) Removal Rate (ft/man-day) Removal Rate (ft/man-day) Removal Rate (ft/man-day) Removal Rate (ft/man-day) Removal Labor Rate (ft/man-day) Removal Rate (ft/man-day) Removal Rate (ft/man-day) Removal Rate (ft/man-day) Stable Removal Costs Length of Pipelines (ft.) Subtotal Pipeline Removal Costs Length of Pipelines (ft.) Size (ft/man-day) Shredding Labor Rate (ft/man-day) Shredding Labor Rate (ft/man-day) Shredding Rate (ft/man-day) Shredding Labor Rate (ft/man-day) Shredding Labor Rate (ft/man-day) Shredder Use (days) Shredder Oses C Pipeline Tempsportation and Disposal (ftRC-Licensed Facility) Pipe Diameter (inches) Chipped Volume Reduction (ft/ft) Subtotal Volume of Shredding Costs Shredding Labor Rate (ft/man-day) Shredder Ose Final Disposal Volume (vd.) Transportation and Disposal (ftRC-Licensed Facility) Pipe Diameter (inches) Subtotal Volume of Shredder Ose Final Disposal Volume (vd.) Transportation and Disposal (ftRC-Licensed Facility) Pipe Diameter (inches) Subtotal Volume Reduction (ft/ft) Subtotal Volume ft Shredding Costs Stable Tipeline Cost Stable Tipeline Reduction (ft/ft) Subtotal Volume of Shredder Stable St	IT.	Westewater Pineline Reciemation	
Pipelina Removal Rate (ft./man-day)			
Number of Pond Pipelines (†)   3,500     Number of RO Bulding Pipelines (†)   3,500     Number of RO Bulding Pipelines (†)   300     A Length of RO Bulding Pipelines (†)   4     Length of RO Bulding Pipelines (†)   4     A. Pipeline Removal Costs			67
Length of Pond Pipelines (ft)   3,500   Number of RO Building Pipelines (tt)   4   4   4   4   4   4   4   4   4		Pipeline Shredding Rate (ft /man-day)	1,500
Number of RO Building Pipelines (ft)		•	4
Length of RO Bullding Pipelines (ft)			•
A Pipeline Removal Costs Langth of Pipelines (ft) Removal Rate (ft/man-day) Removal Labor Rate (ft/man-day) Removal Labor Rate (ft/man-day) S171.52 Cit 524G Loader Use (days) Cat 524G Loader Use (days) Cat 524G Loader Use (days) 227 Removal Labor Rate (ft/man-day) S1871.52 Subtoatal Pipeline Removal Costs Subtoatal Pipeline Removal Costs Length of Pipelines (ft) Sirredding Rate (ft/man-day) Sirredding Rate (ft/man-day) Sirredding Rate (ft/man-day) Sirredding Rate (ft/man-day) Sirredding Labor Rate (ft/man-day) Sirredding Use (ft/man-da			
A. Pipeline Removal Costs  Length of Pipelines (ft) Removal Rate (fk/man-day) Removal Rate (fk/man-day) Removal Labor Rate (\$f/man-day) S171.52 Cat 924G Loader Use (fdys) S27 Cat 924G Loader Cost S386.862 48 Subtotal Pipeline Removal Costs S27 Pipeline Streeding Costs Length of Pipelines (ft) Length of Pipelines (ft) Streeding Rate (fk/man-day) Streeding Labor Rate (\$f/man-day) Streeding Rate (\$f/man-day) S			
Length of Pipelines (ft)   Removal Ratie (ft/man-day)		Average Pipe Size (Sch 40)	4
Removal Rate (f/man-day)		•	
Removal Labor Rate (\$Inum-day)			•
Catt 924G Loader Use (days)			
Cat 924G Loader Cost         \$386,862 48           Subtotal Pypeline Removal Costs         \$425,797.52           B. Pipeline Stredding Costs         15,200           Length of Pipelines (ft)         15,200           Shredding Rate (ft/man-day)         \$171.52           Shredding Rate (ft/man-day)         \$171.52           Shredder Lise (days)         10           Shredder Cost         \$1,009 60           Subtotal Pipeline Shredding Costs         \$2,724.80           C. Pipeline Transportation and Disposal (NRC-Licensed Fecility)         4           Pipe Diameter (inches)         4           Chipped Volume Reduction (ft²/ft)         0.0103           Subtotal Volume of Shredded PVC Pipe (yd²)         5.8           Disposal Volume (yd3)         7.25           Transportation and Disposal Unit Cost (\$/yd²) (Unpackaged Bulk)         \$22.09           Subtotal Pipeline Disposal Costs         \$1,602.18           Total Wastewater Pipeline Relamation Costs         \$430,124.50           III. Electrical Distribution System Removal         \$49,640           High Voltage Lines Removal Cost (\$ft²)         \$2,000 00           Subtotal Electrical Distribution System Removal Cost         \$109,718.80           IV. Supervisory Labor Costs During Miscellaneous Reclamation         \$3           <		•	
Subtotal Pipeline Removal Costs   S425,797.52   S. Pipeline Stredding Costs   15,200   Shredding Costs   15,200   Shredding Rate (f/man-day)   1,500   Shredding Rate (f/man-day)   1,500   Shredding Labor Rate (S/man-day)   10   Shredder Use (days)   10   Shredder Use (days)   10   Shredder Use (days)   10   Shredder Use (days)   10   Shredder Lost   Shredding Costs   31,009 60   Subtotal Pipeline Shredding Costs   32,724.80   4   Chipped Volume Reduction (ft <sup>2</sup> /ft)   0,0103   Subtotal Volume of Shredded PVC Pipe (yd <sup>2</sup> )   5.8   0,0103   Subtotal Volume of Shredded PVC Pipe (yd <sup>2</sup> )   5.8   0,0103   0,0103   0,010			
B. Pipeline Shredding Costs   Length of Pipelines (ft)   15,200   15,000   Shredding Rate (ft/man-day)   1,500   Shredding Rate (ft/man-day)   1,500   Shredding Labor Rate (S/man-day)   1,500   Shredding Labor Rate (S/man-day)   10   Shredder Use (days)   10   Shredder Use (days)   10   Shredder Cost   31,009 60   Subtotal Pipeline Shredding Costs   31,009 60   Subtotal Pipeline Shredding Costs   32,724.80   2,72			
Shredding Rate (ft/man-day)   1,500   1,510   1,512   1,520		•	·
Shredding Labor Rate (\$/man-day)   \$171.52     Shredder Use (days)   10     Subrotal Pipeline Shredding Costs   \$1,009 60     Subrotal Pipeline Shredding Costs   \$2,724.80     C. Pipeline Transportation and Disposal (NRC-Licensed Facility)     Pipe Diameter (inches)   4     Chipped Volume Reduction (ft³/ft)   0.0103     Subtotal Volume of Shredded PVC Pipe (yd²)   5.8     Disposal Volume factor   1.25     Final Disposal Volume (yd3)   7.25     Transportation and Disposal Unit Cost (\$\frac{1}{2}\sqrt{2}\		Length of Pipelines (ft)	•
Shredder Use (days)   10   Stredder Cost   \$1,009 60   Subtotal Pipeline Shredding Costs   \$2,724.80   \$2,725   \$2,80   \$2,8			
Shredder Cost   \$1,009 60   \$2,724.80   \$2,725   \$2,80   \$2,80   \$2,90   \$2,			•
Subtotal Pipeline Streeding Costs   \$2,724.80			
C. Pipeline Transportation and Disposal (NRC-Licensed Facility)			
Pipe Diameter (inches)			Ψ2,727.00
Chipped Volume Reduction (ft³/ft)			4
Subtotal Volume of Shredded PVC Pipe (yd³)   5.8     Disposal Volume (yd3)   7.25     Final Disposal Volume (yd3)   7.25     Transportation and Disposal Unit Cost (\$\styd³)\$ (Unpackaged Bulk)   \$220.99     Subtotal Pipeline Disposal Costs   \$1,602.18     Total Wastewater Pipeline Reclamation Costs   \$430,124.50     III. Electrical Distribution System Removal     Assumptions			0.0103
Final Disposal Volume (yd3)   7.25     Transportation and Disposal Unit Cost (\$\psi\yd^3\) (Unpackaged Bulk)   \$220.99     Subtotal Pipeline Disposal Costs   \$1,602.18     Total Wastewater Pipeline Reclamation Costs   \$430,124.50     III. Electrical Distribution System Removal     Assumptions			5.8
Transportation and Disposal Unit Cost (\$\frac{1}{y}\text{d}^3\) (Unpackaged Bulk)			
Subtotal Pipeline Disposal Costs   \$1,602.18   \$430,124.50   \$430,124.			
Total Wastewater Pipeline Reclamation Costs  III. Electrical Distribution System Removal  Assumptions  Length of High Voltage Lines			
III.   Electrical Distribution System Removal			
Assumptions Length of High Voltage Lines High Voltage Line Removal Rate (\$/ft.) High Voltage Line Removal Cost (\$/ft.) Substation Removal Substation Removal Subtotal Electrical Distribution System Removal Costs  IV. Supervisory Labor Costs During Miscellaneous Reclamation Estimated Duration (months) Engineer Rate (\$/month) Total Engineer Labor Radiation Technician Rate (\$/month) Total Radiation Technician Labor Total Supervisory Labor Costs  Total Supervisory Labor Costs  \$49,640 49,640 \$2,000 00 \$109,718.80		Total Wastewater Pipeline Rectamation Costs	3450,12420
Length of High Voltage Lines       49,640         High Voltage Line Removal Rate (\$/ft.)       \$2.17         High Voltage Line Removal Cost (\$/ft.)       \$107,718 80         Substation Removal       \$2,000 00         Subtotal Electrical Distribution System Removal Costs       \$109,718.80         IV. Supervisory Labor Costs During Miscellaneous Reclamation       3         Estimated Duration (months)       3         Engineer Rate (\$/month)       \$8,868.33         Total Engineer Labor       \$26,604 99         Radiation Technician Rate (\$/month)       \$6,505 75         Total Radiation Technician Labor       \$19,517 25         Total Supervisory Labor Costs       \$46,122.24	Ш.	Electrical Distribution System Removal	
High Voltage Line Removal Rate (\$\frac{1}{1}\)   \$2.17     High Voltage Line Removal Cost (\$\frac{1}{1}\)   \$107,718 80     Substation Removal   \$2,000 00     Subtotal Electrical Distribution System Removal Costs   \$109,718.80    IV. Supervisory Labor Costs During Miscellaneous Reclamation     Estimated Duration (months)   3     Engineer Rate (\$\frac{1}{1}\)month)   \$8,868.33     Total Engineer Labor   \$26,604 99     Radiation Technician Rate (\$\frac{1}{1}\)month)   \$6,505 75     Total Radiation Technician Labor   \$19,517 25     Total Supervisory Labor Costs   \$46,122.24		•	
High Voltage Line Removal Cost (\$/ft )   \$107,718 80   \$2,000 00   \$2,000 00   \$2,000 00   \$109,718.80   \$109,71			-
Substation Removal         \$2,000 00           Subtotal Electrical Distribution System Removal Costs         \$109,718.80           IV. Supervisory Labor Costs During Miscellaneous Reclamation			
Subtotal Electrical Distribution System Removal Costs  IV. Supervisory Labor Costs During Miscellaneous Reclamation Estimated Duration (months) Engineer Rate (\$/month) Total Engineer Labor Radiation Technician Rate (\$/month) Total Radiation Technician Labor Total Radiation Technician Labor Total Supervisory Labor Costs  \$19,517.25 \$46,122.24			
IV. Supervisory Labor Costs During Miscellaneous Reclamation       3         Estimated Duration (months)       3         Engineer Rate (\$/month)       \$8,868.33         Total Engineer Labor       \$26,604 99         Radiation Technician Rate (\$/month)       \$6,505 75         Total Radiation Technician Labor       \$19,517 25         Total Supervisory Labor Costs       \$46,122.24			
Estimated Duration (months)       3         Engineer Rate (\$/month)       \$8,868.33         Total Engineer Labor       \$26,604 99         Radiation Technician Rate (\$/month)       \$6,505 75         Total Radiation Technician Labor       \$19,517 25         Total Supervisory Labor Costs       \$46,122.24		·	
Engineer Rate (\$/month)       \$8,868.33         Total Engineer Labor       \$26,604 99         Radiation Technician Rate (\$/month)       \$6,505 75         Total Radiation Technician Labor       \$19,517 25         Total Supervisory Labor Costs       \$46,122.24	IV.		
Total Engineer Labor Radiation Technician Rate (\$/month) So,505 75 Total Radiation Technician Labor Total Supervisory Labor Costs \$19,517 25 \$46,122.24		, ,	
Radiation Technician Rate (\$/month)  Total Radiation Technician Labor  Total Supervisory Labor Costs  \$19,517.25  \$46,122.24			·
Total Radiation Technician Labor  Total Supervisory Labor Costs  \$19,517 25  \$46,122.24			•
Total Supervisory Labor Costs \$46,122.24			•
TOTAL MISCELLANEOUS RECLAMATION COSTS \$670,763.54		<u> </u>	· 
	TO	TAL MISCELLANEOUS RECLAMATION COSTS	\$670,763.54

Deep Disposal Well Reclamation

Cost Basis	. Well # 1	Well # 2
A. Plugging and Abandonment		
Cost Estimate from subcontractor (January 2014)	\$104,900	\$104,900
June 2014 CPI	238.3	238.3
July 2019 CPI ,	256.6	256.6
Subtotal Escalated June 2014 Plugging and Abandonment Costs	. \$112,942.92	\$112,942.92
B. Site Reclamation		·
Cost Estimate from subcontractor (January 2014)	\$7,821	<b>\$7,821</b>
June 2014 CPI	238.3	238.3
July 2019 CPI	256.6	256.6
Subtotal Escalated June 2014 Reclamation Costs	\$8,420.65	\$8,420.65
Subtotal Abandonment cost per well	\$121,363.57	\$121,363.57
OTAL DEEP DISPOSAL WELL RECLAMATION COSTS	\$242,727.14	

### I-196 Brule Aquifer Restoration

1-170 Druie Aduner Restoration	
I. Ground Water Sweep Costs	-
Assumptions PV's Required from I-196a, I-196j and I-196n	. 3
Total Gallons per Pore Volume	337,758
Total Gallons to Treat	1,013,274
Flow Rate (gpm)	1,013,274
Pump Power Requirements (kwh)	3
Power Cost (\$/kw)	\$0.1180
Pumping Labor (man-day per day) (1hr/day)	0.125
Sampling Labor (man-day per day) (.5hr/day)	0.0625
Labor Rate (\$/man-day)	\$171.52
Days to complete	235
A. Electrical Costs	
Cost to pump 3 Pore Volumes	\$1,992.77
B. Labor Costs	<b>7</b> 2,222
Labor for pumping 3 Pore Volumes	\$5,038.40
Total Ground Water Sweep Costs	\$7,031.17
II. Monitoring and Sampling Costs	
A. Labor Costs for Monitoring I-196a, I-196j, and I-196n	\$2,519.20
B. Monitoring for I-196i, I-196m, and I-1961	\$2,519.20
Total Monitoring and Sampling Costs	\$5,038.40
III Additional Ground Water Sweep	
Pump from additional wells and monitor as above	\$12,069.57
Drill 4 additional wells, 50 ft deep at \$26/ft.	\$5,200.00
Total Additional Ground Water Sweep	\$17,269.57
IV Well Abandonment	,
Abandon 14 wells at \$194/well	\$2,716.00
Total Well Abandonment	\$2,716.00
TOTAL I-196 BRULE AQUIFER RESTORATION COSTS	\$32,055.1
	<del></del>

GROUNDWATER RESTORATION
GROUNDWATER IX TREATMENT (GIX) Unit Costs

<del></del>			=:					1 (0111) 01			<del></del>	
Assumptions:												•
<ol> <li>All pumps are 5 hp</li> </ol>	pumpin	ıg at 32 gj	om						•			
2. Cost of electricity	=										\$0.1180	Kw hr
3. Horsepower to kild	owatt cor	nversion =	=								•	Kw/HP
•											\$171.52	
•		6 numne e	+ 1	150 cmm							φ1/1.52	man-uay
3. Labor costs are bas	SCI OI S	օ բառք	ш 1,	150 gpm								
Wellfield Pumping Electr	rical Co	sts per 10	000	Gallons (Include	s blee	ed to the Deepwo	ell / E	vaporation Po	nd)			
10001		-		•		-		-	/			
, , , , , , , , , , , , , , , , , , ,	X	32 onm	X	60 min	X		X			= \$ 0.229		
		<i>э</i> 2 Бри		oo mm		пр		жин				
Wellfield Pumping Labo	r Costs	per 1000	Gal	lons			•					
1000 gal .	v	1 min	v	1 man-day	w	\$171.52	37	2	operators	<b>4 4</b> 0 <b>207</b>		
•	<b>^</b> 1	150 gal	А	1440 min	Λ	man-day	А		•	= \$ \$0.207		
Groundwater IX Produc	tion Re	te										
1150 001				24 be		265 days		1		50 270 000		77
	X		X		X		X	1	•	= 30,3/0,000		_
min		nr		day		year	-	12	month			month
7	POTAT		700	CTC DED 100	0.01	TIONS						
<u> </u>	2. Cost of electricity =  3. Horsepower to kilowatt conversion =  4. Operator labor costs =  5. Labor costs are based on 36 pumps at 1,150 gpm  Vellfield Pumping Electrical Costs per 1000 Gallons (Includes bleed to the Deepwell / Evaporation Pond)  1000 gal X 5 hp 32 gpm X 1 hr X 0.746 kwh x \$ 0.1180   = \$ 0.229  Vellfield Pumping Labor Costs per 1000 Gallons  1000 gal X 1 min x 1 man-day x \$171.52   x 2 operators   = \$ \$0.207  Vellfield Pumping Labor Costs per 1000 Gallons  1000 gal X 1 min x 1 man-day x 1 man-day x 1 man-day x 24 hr								= \$ 0.44			
	1000 gal X											

### Crow Butte Resources, Inc.

### Crow Butte Uranium Project 2019 Surety Estimate (Revised September 2018)

### Groundwater Reverse Osmosis (RO) Treatment Unit Costs

Assumptions:																
1. All pumps are	5 h	p pumping at	32 gpm													
2 Membrane Re	plac	ement													\$0.041	per 1000 gal
3 Cost of electric	city	=												S	0.1180	Kw hr
4 Horsepower to			sion =								,				0.746	Kw/HP
5 Operator labor														\$	171.52	man-day
6 RO System ho			ments for 600 gpn	n rati	ed flow based up											
		RO Unit Pum					) hp									
		Permeate/Inje					) hp						•			
			(I (Bleed - Deepw	ell/	Evap Ponds)		5 hp									
		TOTAL:				37:	5 hp									
7 Chemical cost						•										
		Reductant =													\$0.540	
		Antiscalant =													\$43.27	gal
		C41	000 C - T													
Membrane Replacen				,	17 500 00	A 11										
1100 gal	X	\$660	membrane cost / month	/	17,520,00	nonth month							=\$	0.041		per Kgal
Wellfield Pumping E	lect	rical Costs n				продиц										
1100 gal		5	hp		1	hr		0.746	kwh	x \$	0.1180					
1100 ga	X	32	gpm	X	60	min	X	0.7.10	hp	Χ°	kwh		=\$	0.252		per Kgal
									•							
Reverse Osmosis Ele	ctri	_								_						
1100 gal	X	375	hp	X	1	h <b>r</b>	X	0.746		x \$	0.1180	•	= \$	0.550		per Kgal
		1100	gpm		60	min			hp		kwh					1 0
Reverse Osmosis Lal	har	Costs ner 10	M Callone													
1100 gal		1	min		1	man-day		\$171.52	,		2	operators				
1100 gai	X	1100	gal	X	1440	min	X	man-day	- '	X	2	operators	· <b> \$</b>	\$0.238		per Kgal
			8		2				,							
Treatment chemical Antiscalant:	cost	s per 1000 G	allons						-							
1100 gal	٧,	0.00000300	0 gal antiscalant		\$43.27								_			
J	Х	1	gal	Х	gal antiscalant								= \$	\$0.143		per Kgal
Reductant:			<b>5</b>		<b>0</b>			`								
1100 gal	77	0.00020	0 lbs reductant	77	\$0.540								_	****		
· ·	X	1	gal	Х	lb reductant								=\$	<b>\$</b> 0.119		per Kgal
Reverse Osmosis Pro	duc	tion Rate ne	r Mine Unit			•										
400 gal		-	0 min		2.	4 hr		36	day		1	year		17,520,0	000	eallons
min	X	ŭ	hr	X	-	day	X		year	X	12	month	7	17,020,0		month
														•	•	
TOTAL RO COS	TS	PER 1000	GALLONS								=\$	1.34				
											<del>.</del>	1107				

### **Groundwater Recirculation Unit Costs**

***************************************	<del></del>		<del></del>					<del></del>
Assumptions:	<b>5</b> 1		. 22					
1. All pumps			at 32 gpm				•	Φ0.1100.TZ 1
2. Cost of ele	-		•				•	\$0.1180 Kw hr
3. Horsepow			ersion =				,	0.746 Kw/HP
4. Operator l	abor cost	5 =						\$171.52 man-day
					1		<del>-</del> -	
						` ,	-	
Wellfield Pumping	Electric	al Costs p	er 1000 Gallon	15				
1000	gal y	5	hp	x	1	hr	$x^{0.746}$ kwh $x^{0.1180}$ = \$ 0.	.229 per Kgal
	-	32	gpm		60	min	hp 1 kwh	•
Wellfield Injection	Electric	al Costs p	er 1000 Gallon	18			<del>-</del>	`
1000	gal x	, 0	hp	Х	. 1	hr	X = 0.746  kwh  X = 0.1180 = 0.0000	.000 per Kgal
	. 2	115	0 gpm		60	min	hp A kwh	ooo por regar
Recirculation Labo	or Costs	per 1000	Gallons					
1000	gal	. 1	min	х	1	man-day	X = X = X = X = X = X = X = X = X = X =	.104 per Kgal
	~	115	0 gal	А	1440	min	man-day	.104 per Kgal
Recirculation Prod	luction R	ate						
1150	gal X	,	60 min	Х	24	hr -	$X = \begin{array}{ccccccccccccccccccccccccccccccccccc$	70,000 gallons
	min		hr	Х		day	year 12 month	month
<u> </u>			<u> </u>					
TOTAL RECIF	RCULA	TION (	COSTS PER	1000 GALL	ONS		=\$ 0.33	
			•			· · · · ·	· L	

### **WELL ABANDONMENT Unit Costs**

### Assumptions:

- 1 Use backhoe for 0.25 hr/well to dig, cut off, and cap well.
- 2 Drill rig used 2.5 hrs to plug well.
- 3 Labor for installing chips, etc. will require 2 workers at 0.5 hrs per well

Well Abandonment Costs			Cost per ft (based on 700 ft wells)
Labor Costs	1 hours	X \$ 21.44 per hour =\$	21.44 \$0.0306
Cat 416 Backhoe			
Duill uic	0.25 hours	X \$ 127.43 per hour =\$	31.86 \$0.0455
Drill rig	2.5 hours	X \$ 218.00 per hour =\$	545.00 \$0.7786
Well Cap	1 each	X \$ 11.06 each =\$	11.06 \$0.0158
Materials per foot of well (Var	iable Cost)		
Cement	0.0714 lbs/ft	X \$ 0.070 per pound	\$0.0050
Bentonite Chips	0.007 tubes/ft	X \$ 10.49 per tube	\$0.0734
Plug Gel	0.0086 sacks/ft	X \$ 10,72 per sack	\$0.0922
Total Estimated Cost per	Foot:		\$1.04

### Alternate Concentration Limit (ACL) Unit Cost per Mine Unit

Assumptions:				,		
<ol> <li>Equipment and labor</li> </ol>						
2 Analytical Costs					-	
		ultan	t			
4 Core Holes per Mine Ur	ıit					\
ACL Costs per Core Hole						
Equipment and Labor:						
Drilling Costs						
34 hours	X	\$	218.00	per hour	= \$	7,412.
Analytical Costs:						
XRD Bulk						
1 samples	X	\$	197.07	per sample	= \$	197.
XRD Bulk + Cla	<b>y</b>					
1 samples	x	\$	394.14	per sample	= \$	394.
Selective Extract	ion					
4 samples	X	\$	772.31	per sample	= \$	3,089.
Elemental Analys	sis				,	
1 samples	X	\$	499.06	per sample	= \$	499.
Porosity + Partic	le Size	;				
1 samples	X	\$	356.86	per sample	= .\$	356.
Third Party Engineering Const	altant	Cost	<b>:8:</b>			~
1 months	X	\$		per month	= \$	8,868.
Unit Cost per Core Hole:	nalytical Costs and Party Engineering Consultant ore Holes per Mine Unit  s per Core Hole  t and Labor: rilling Costs 34 hours X \$ 218.00 per hour  Costs: XRD Bulk 1 samples X \$ 197.07 per sample  XRD Bulk + Clay 1 samples X \$ 394.14 per sample  Selective Extraction 4 samples X \$ 772.31 per sample  Elemental Analysis 1 samples X \$ 499.06 per sample  Porosity + Particle Size 1 samples X \$ 356.86 per sample  ty Engineering Consultant Costs: 1 months X \$ 8,868.33 per month  per Core Hole:				= \$	20,816.
Core Holes per Mine Unit:						
<del>-</del>	X	\$	20,816.37	per hole	= \$	41,633.
LOT COOM NEW POST	1812/2-				_	44
ACL COST PER MINE U	INIT				= <b>S</b>	41,633.

#### PIVE YEAR MECHANICAL INTEGRITY TESTS (MIT)

- Assumptions:

  1 Pulling Unst for 8 br/day

  2 MIT Unst for 8 br/day

  3 Labor for operation of pulling unst requires 2 workers (one operator & one laborer)

  4 Labor for operation of MIT Unst requires 1 worker

#### MIT Costs per Well

#### Equipment and Labor:

Pulling Unit includes one operator

	8 hours	х	\$ 24 17	per hour	<b>-\$</b> 193,36
Laborer					
	8 hours	х	\$ 21.44	per hour	<b>-\$</b> 171 52
MIT Unit	ancludes one	operato		•	
	8 hours		\$ 24 17	ner hour	<b>-\$</b> 193 00

TOTAL MIT COST PER DAY =\$ 557 88

6 perday Wells Completed

MIT COSTS PER WELL -\$ 92 9**8** MIT COSTS PER DEEP DISPOSAL WELL (2019 Cost) **-3** 6793

Mine Unit Data

1		Mine Unit 1	Mine Unit 2	Mine Unit 3	Mine Unit 4	Mine Unit 5	Mine Unit 6	Mine Unit 7	Mine Unit 8	Mine Unit 9	Mine Unit 10	Mine Unit
otal number of production wells		3	52	57	103	210	187	205	269	195	298	201
otal number of myection wells		0	79	96	169	236	309	380	412	324	503	284
otal number of shallow monitor wells		Ô	3	3	11	25	28	25	30	20	32	24
otal number of perimeter monitor wells		11	10	7	, 9	25	26	8	20	13	32	19
otal number of restoration wells		10	12	18	43	59	55	25	34	21	36	25
ellfield Area (ft2)		403,712	509,600	586,188	3,119,671	5,647,809	1,507,647	2,222,190	2,722,992	2,132,355	3,319,003	1,834,17
ellfield Area (acres)		9 27	11.70	13.46	71 62	129 66	34.61	51 01	62 51	48 95	<b>76</b> 19	42 11
ffected Ore Zone Area (ft2)		403,712	509,600	586,188	3,119,671	5,647,809	1,507,647	2,222,190	2,722,992	2,132,355	3,319,003	1,834,1
vg Completed Thickness		19 6	163	12 5	129	14.6	15 4	123	164	164	18.8	21.6
prosity		0 29	0.29	0 29	0.29	0 29	0 29	0 29	0 29	0.29	0,29	0 29
ffected Volume (ft3)		7,912,755	8,306,480	7,327,350	40,243,756	82,458,011	23,217,764	27,332,937	44,657,069	34,970,622	62,397,256	39,618,1
are Factor		12	14	1 2	12 ~	12	1.2	12	1.2	12	12	1.2
gallons per Pore Volume		20,597	21,622	19,073	104,756	214,642	60,437	71,149	116,244	91,030	162,423	103,12
mber of Patterns in Unit(s)		•			**	107	187	200	200	105	200	201
	Current	0	52	57 0	96	187 0	187	205 0	269	195	298 - 0	201
	Estimated next report	0	0 52	57	0 96	187	187	205	20 289	0 195	298	201
	Total Estimated	U	52	37	90	187	187	205	289	195	298	201
umber of Wells m Unit(s)								•				
roduction Wells	_	_									***	
	Current	3	52	57	103	210	187	205	269	195	298	201
	Estimated next report	0	0	0	0	0	0	0	0	0	0	0
	Total Estimated	3	52	57	103	210	187	205	269	195	298	201
jection Wells	_				4.00	***	***	***	***		***	201
	Current	0	79	96	169	236	309	380	412	324	503	284
	Estimated next report	0	0	0	0	0	0	0	0	0	0	0
	Total Estimated	0	79	96	169	236	309	380	412	324	503	284
sallow Monitor Wells		_		•		25		0.5	••	••		
	Current	0	3	3	11	25	28	25	30	20	32	24
	Estimated next report	0	0	0	0	0	0	0	0	0	0	0
	Total Estimated	0	3	3	11	25	28	25	30	20	32	24
rimeter Monttor Wells	_			_	_			_				
	Corrent	11	10	7	7	23	26	8	20	13	32	19
	Estimated next report	0	0	0	2	2	0	0	0	0	0	0
	Total Estimated	11	10	7	9	25	26	8	20	13	32	19
number of Wells per Wellfield		14	144	163	292	496	550	618	731	552	865	528
otal Number of Wells		4953			***					,		
verage Well Depth (ft) - Deep Wells		665	631	774	698	675	515	762	500	770	480	790
verage Well Depth (ft) - Shallow Wells		200	200	200	200	200	200	200	200	200	150	300

Elect	trical Costs	<u>.                                    </u>	,
	2019	2020 Est Rate	1.37.
Power cost (adj for current actual cost)	\$0 1090	<b>\$</b> 0 1180	kwHr
Kilowatt to Horsepower	0 746	0 746	Kw/HP
Horsepower per gallon per mimute	0.167	0 167	HP/gpm
	bor Rates		-
	2019	2020 Est Rate	
Operator Labor Cost	\$164 64	\$171 52	day
Pulling Unit Operator	\$185 68	\$193 36	day
Engineer Cost	\$8,358.00	\$8,868 33	month
Radiation Technician Costs	<b>\$</b> 6,571 00	\$6,505.75	month
Costs are from Nebraska Department of Labor			
Che	mical Costs		
	<b>201</b> 9	2020 Est Rate	
Antiscalant for RO (adj for current actual cost)	<b>\$</b> 37 99	\$43 27	gel
Reductant (adj for current actual cost)	\$0 63	<b>\$</b> 0 54	ĪЬ
Cement (ad) for current actual cost)	<b>\$</b> 0 15	\$0 07	pound
Bentonite Tubes (adj for current actual cost)	<b>\$</b> 10 75	\$10 49	tube
Salt (adj for current actual cost)	\$127 46	\$11632	ton
Plug Gel (adj for current actual cost)	\$10 75	\$10.72	sack
Well Cap (adj for current actual cost)	\$10 86	\$11 06	each
Hydrochloric Acid (adj for current actual cost)	\$1 69	\$1 72	gallon

	Analytical Costs		
	2019	2020 Est Rate	
Guideline 8	\$220 00	\$220 00	analysus
5 parameter	\$60 00	\$60,00	analysis
Other (radon, bioassays, etc.)	\$600 00	\$600 00	month
Costs are based on third party lab fees			
An	lytical Costs for Coring		
	2019	2020 Est Rate (CPI)	
XRD Balk	\$193.59	\$197 07	analysis
XRD Bulk + Clay	<b>\$</b> 387 17	\$394 14	analysis
Selective Extraction Method (SEM)	<b>\$</b> 758 65	\$772 31	analysis
Elemental	\$490 24	\$499.06	analysıs
Porosity + Particle Size	<b>\$</b> 350 55	\$356 86	analysis
Costs are based on third party lab fees			
	Spare Parts		
	2019	2020 Est Rate (CPI)	
Restoration spere parts estimate	\$55,596 11	\$56,596 84	year
Pumps, motors, filters, etc			

CPI Escalators (CPI-U, U.S	3. City Average)
1988 CPI (average)	1185
June 2014 CPI (deep well	
estrmate)	238.3
2018 CPI (July 2018 used	
m last update)	252 0
Current CPI (July 2019)	256 6
2019 Escalation Factor	1 02

Equipment Costs								
Egyto <del>nad</del>	Base Rental Rate (\$/hr)	<u>Labor Costs</u> (\$/hr)	Repair Reserve Costs (%/hr)	Fuel Costs (\$/hr)	Mob & Demob (Vhr)	Total (\$\sigma hr)		
Cart 924H Loader	\$44 00	\$21 44	\$125 00	\$22 59	noc	\$213 03		
Cat 420E Beckhoe	\$27.00	\$21 44	\$71 00	<b>\$</b> 7 99	inc	\$127 43		
Pipe Chapper	\$12 62			inc_	mc	\$12 62		
Cat D&T Bulldozer	\$119.00	\$21 44	\$340 00	\$31,68	me	\$512 12		
Pulling Unit	<b>\$</b> 55 67	mc	inc	mc	inc	\$55 67		
Mixing Unit	\$5 00			mc	inc .	\$5.00		
Drall Rug	\$218 00	inc	mc	m¢	inc .	\$218 00		
Bases								
Drilling based on current 2019 contract.					•			
Equipment rates based on Cost from NMC Cat Rental August 2019 Average 2019 costs for off-road fuel	<b>\$</b> 2 76	gallon						

Pipe Volumes						
Nominal Pipe Sizz.	Wall Thickness (m.)	Prps OD (bs.)	<u>Volume per foot</u> (ft3/ft).			
3/8-inch O2 hose		0 37500	0 03130			
2-inch Sch 40 downhole	0.15400	2 37500	0 00740			
1-1/4-moh Sch 40 stmger	0.14000	1.66000	0 00440			
2-mch SDR 13 5 inj & prod.	0.14815	2 29630	0 00690			
4-inch SDR 35	0.11430	4 22860	0 01030			
6-inch Sch 40 process pape	0.28000	6 56000	0.03840			
6-mch Trunkline	0.49100	6,56600	0.06510			
8-mch Trunktine	. 0.63900	8 54800	0 11030			
10-mch Trunkline	0.79600	10.65400	0 17120			
12-nch Trunkine	0,94400	12 63700 -	0 24080			

Pipe Removal and Shredding Costs								
dstrety.	<u>Removal Rate (N/man-</u> day).	Shredding Rate (ft/man-day)	Labor Rate (day)	Activity Cost per fool				
2-inch SDR 13 5 ing & prod Removal	225		\$171 52	\$0.76				
2-mch SDR 13 5 mj & prod Shredding		1920	\$171 52	\$0.09				
Trunkline Removal	, 100		\$171 52	\$1 72				
Trunkline Shredding		100	\$171 52	\$1.72				
Downhole Pipe Removal	2000		\$171 52	\$0.09				
Downhole Pipe Shredding		2250	\$171 52	\$0.08				
Downhole Hose Removal	1000		\$171 52	\$0.17				
Waste and RO Building Pipeline Removal	67		\$171 52	<b>\$2</b> 56				
Waste and RO Building Pipeline Shredding		1500	<b>\$</b> 171 52	\$0.11				

		Wasto	Disposal Ceets					
			<u>Density</u> Correction				Total	
		<b>-</b>	Factor_				Transportation	
Waste Form	<u>Fee</u>		(Tons/Yd3)	Fee per Cubic Yard	Transport Cost		and Dusposal	
Soil, Bulk Byproduct Material*	\$279.43	per Ton	0.54	\$150 89	\$112.28	per Yd3	\$263,17	per Yd3
Unpackaged Bulk Byproduct Material (e.g., pipe, equipment)*	\$258 83	per Ton	0 42	\$108 71	\$112.28	per Yd3	\$220 99	per Yd3
Solid Waste (landfill)	\$0.12	per Lb			Incl	per Lb	\$0 12000	per Lb
Sohd Waste (landfill)	\$1,000 00	per Load			Incl.	per Load	\$1,000 00	per Load
Void Factor (for disposal)	1 25							
*no current myoice, escalation factor applied								

			Plant Dismantilag				
Plant Components:	Number	<u>Units</u>	Estimated Disposal Volume	<u>Units</u>	Activity	<u>Units</u>	2017 Cost
					Dismantle interior		
0	• • •				steel, tanks, psping		
Contaminated Tanks	141	each	, 193	Pt3 each	olectrical,		
Uncontaminated Tanks	21	cach	193	Ft3 each	and Plant Building		\$ 625758 00
Pumps	188	each	5	Pt3 each	_		
					Concrete floor		
Downhole Pumps	1174	each	0.5	Pt3 each	removal rate	Current Cost \$	ft2 1780
Contaminated Piping	11000	feet					
Uncontaminated Piping	4800	foot	See estimate by piping	size and material		1	
Filters	125	cach	100	Pt3 each			
Dryer	2	each	400	Pt3 cach			
Average PVC Pipe Diameter (inches)	6				1		

Plant Decontamination							
Direct Dispose Plant Floor Area	11100 ft2	Decon Solution (HCI) Floor Application Rate	2	gal/ft2			
Uncontammated Plant Floor Area	7270 ft2	• • •		-			
Decontaminated Plant Floor Area*	39738 ft2						
Average concrete thickness	0.5 ft						
Plant Wall Area	36470 ft2	Decon Solution (HCI) Wall Application Rate	ī	gal/ft2			
			•	<b>5</b> —			