CAMECO RESOURCES
CROW BUTTE OPERATION

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September 28, 2021

40-8943

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Sue Dempsey, Drinking Water and Groundwater Division Administrator
Nebraska Department of Environment and Energy
P.O. Box 98922
Lincoln, Nebraska 68509-8922

2022 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 Environment and Energy (NDEE). 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 2022 Surety Estimate is $56,121,073, an increase of $4,737,709 compared to the 2021 Surety Estimate of $51,383,364, submitted on September 28, 2020. The chemical and electrical costs are based on current day invoiced costs, or if there is not a current invoice, current price quotes from vendors. Project management costs have been incorporated into the various phases of decommissioning under the labor costs associated with engineering. There were no significant

NMSS01
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changes to the site infrastructure in 2021 or planned for 2022 that impacted the surety estimate.

The most significant factor contributing to the increased surety estimate is that CBO changed the horsepower assumptions for downhole pumps from 5 hp to 3 hp and the estimated flow rate from 32 gpm to 12 gpm. These changes were made based on the actual field conditions that have been experienced during the heightened restoration efforts over the last several years. Fuel cost increases were also a significant driver of the changes. The CPI escalation factor for the 2022 estimate was 1.05, and this factor is reflected in the cost increases of many of the elements that contribute to the final surety estimate.

Status of Mine Units in Restoration

Mine Unit #2

History

The restoration plan for this mine unit was submitted to NDEE on December 5, 1995 and was approved by NDEE 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.

On May 23, 2013, CBO submitted to NDEE data supporting the successful restoration of the groundwater in Mine Unit #2. By letter June 10, 2013, the NDEE 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 indicated that all the monitored constituents had stabilized and had been returned to the approved NDEE restoration standards. However, a few of the monitored constituents did not meet the concentration limits under 10 CFR 40, Appendix A, Criterion 5B(5). As a result of this, CBO collected coring data from this mine unit and anticipated 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 Unit #3, CBO planned to prepare and submit the ACL application for these mine units together, which would defray significant cost in preparation of the submittal.

2021 status

CBO collected guideline-8 samples from the baseline restoration wells in Mine Unit 2 in November 2019, and again in May 2020. Based on these sample results, CBO has determined that additional treatment is required in Mine Unit 2. CBO initiated this treatment in the third quarter of 2020 and continued through the first quarter of 2021. The mine unit is currently in circulation and CBO anticipates initiating stability monitoring in the first quarter of 2022. If an ACL is required, CBO projects that this submittal will be submitted during the first quarter of 2024, with regulatory review completed by the second quarter of 2026.

Mine Unit #3

History

The restoration plan for this mine unit was submitted to NDEE on March 24, 1999 and was amended and approved by NDEE 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 NDEE data supporting the successful restoration of the groundwater in Mine Unit #3. By letter June 10, 2013, the NDEE 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 NDEE 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.

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. Spot treatment in this area was completed during the third quarter of 2018. The first stability samples following completion of spot treatment were collected on September 4, 2018.

2021 status
CBO plans to submit a stability monitoring report and initiate the ACL process for this mine unit in the fourth quarter of 2021. We project that the regulatory review for this mine unit may extend through the fourth quarter of 2023.

Mine Unit #4

History
The restoration plan for this mine unit was submitted to NDEE on March 4, 2003 and was approved by NDEE 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.

2021 status
The mine unit was placed in stability monitoring September, 2018. Based on the sampling results, CBO has identified several areas in the mine unit that were in need of additional treatment. CBO initiated treatment in the third quarter of 2020, and a small portion of the mine unit currently remains in treatment. CBO anticipates returning the mine unit to stability monitoring in the first quarter of 2022. Stability monitoring will continue through the fourth quarter of 2023. CBO anticipates an ACL submittal in the first quarter of 2024, with regulatory review finished during the first quarter of 2026.

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

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.

2021 Status
The mine unit is currently in stability monitoring. Stability monitoring was initiated in the third quarter of 2018, slightly ahead of the MODFLOW2000 model projections. If an ACL is required, CBO anticipates submitting the application during the fourth quarter of 2022. It is estimated that the regulatory review will be completed during the fourth quarter of 2024.

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.

2021 Status
Mine Unit 6 is currently in IX and RO treatment. Based on the MODFLOW2000 model, stability monitoring of the mine unit should begin during the second quarter of 2022. If an ACL is required, CBO anticipates submitting the application during the second quarter of 2024. It is estimated that the regulatory review will be completed during the second quarter of 2026.

Mine Unit #7

History
On September 6, 2018, CBO permanently ceased mining activities in the mine unit. By letter dated November 6, 2018, CBO provided notice of cessation of mining in Mine Unit #7.

2021 Status

Mine Unit #7 is currently in reverse osmosis treatment. Based on the MODFLOW 2000 model for this mine unit, CBO projects that treatment and recirculation of Mine Unit # 7 will continue

through the third quarter of 2022. It will enter stability monitoring in the fourth quarter of 2022. If an ACL is required, CBO anticipates submitting the application during the first quarter of 2025. It is estimated that the regulatory review will be completed during the fourth quarter of 2026.

Mine Unit #8

History
As referenced earlier, Cameco announced plans to cease production at its U.S. operations on February 5, 2018, and committed to providing an alternate decommissioning schedule for the remaining mine units within 24 months. Injection in Mine Unit #8 ceased at that time.

2021 Status
CBO initiated IX and RO treatment in Mine Unit #8 during the second quarter of 2021. Stability monitoring will be initiated during the first quarter of 2025. If an ACL is required, the application will be submitted during the first quarter of 2027. It is estimated that the regulatory review will be completed during the first quarter of 2029.

Mine Unit #9

History
As referenced earlier, Cameco announced plans to cease production at its U.S. operations on February 5, 2018, and committed to providing an alternate decommissioning schedule for the remaining mine units within 24 months. Injection in Mine Unit #9 ceased at that time.

Current Status
At this time, a small bleed is maintained in Mine Unit #9 to control excursions. Based on operational capabilities and waste water disposal capacity, CBO projects that Mine Unit #9 will enter into treatment during the third quarter of 2029. Stability monitoring will be initiated during the second quarter of 2032. If an ACL is required, the application will be submitted during the second quarter of 2034. It is estimated that the regulatory review will be completed during the second quarter of 2036.

Mine Unit #10

History

As referenced earlier, Cameco announced plans to cease production at its U.S. operations on February 5, 2018, and committed to providing an alternate decommissioning schedule for the remaining mine units within 24 months. Injection in Mine Unit #10 ceased at that time.

Current Status
At this time, a small bleed is maintained in Mine Unit #10 to control excursions. Based on operational capabilities and waste water disposal capacity, CBO projects that Mine Unit #10 will enter into treatment during the third quarter of 2024. Stability monitoring will be initiated during the first quarter of 2030. If an ACL is required, the application will be submitted during the first quarter of 2032. It is estimated that the regulatory review will be completed during the first quarter of 2034.

Mine Unit #11

History
As referenced earlier, Cameco announced plans to cease production at its U.S. operations on February 5, 2018, and committed to providing an alternate decommissioning schedule for the remaining mine units within 24 months. Injection in Mine Unit #11 ceased at that time.

Current Status
At this time, a small bleed is maintained in Mine Unit #11 to control excursions. Based on operational capabilities and waste water disposal capacity, CBO projects that Mine Unit #11 will enter into treatment during the fourth quarter of 2031. Stability monitoring will be initiated during the third quarter of 2036. If an ACL is required, the application will be submitted during the third quarter of 2038. It is estimated that the regulatory review will be completed during the third quarter of 2040.

Sufficient funds have been included in the 2021 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 NDEE, 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
SHEQ Coordinator

Enclosure

cc: ATTN: 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
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CBO - File

ec: CR – Electronic File
Amanda Jones – NDEE Program Coordinator
Kory Winters – NDEE Field Office

Cameco Resources
Crow Butte Operation
Crawford, Nebraska

INDEPENDENT ACCOUNTANTS' REPORT ON APPLYING AGREED-UPON PROCEDURES

Crow Butte Uranium Mine 2022 Surety Estimate

Gardner, Loutzenhiser and Ryan, P.C.
CERTIFIED PUBLIC ACCOUNTANTS

INDEPENDENT ACCOUNTANTS' REPORT

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

We have performed the procedures enumerated below on evaluating the mathematical accuracy of the Crow Butte Uranium Project 2022 Surety Estimate, and to test the supporting assumptions in the master cost worksheet for the period 2022. Cameco Resources Crow Butte Operation is responsible for Crow Butte Uranium Project 2022 Surety Estimate.

Cameco Resources Crow Butte Operation has agreed to and acknowledged that the procedures performed are appropriate to meet the intended purpose of 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 for the period 2022. This report may not be suitable for any other purpose. The procedures performed may not address all the items of interest to a user of this report and may not meet the needs of all users of this report and, as such, users are responsible for determining whether the procedures performed are appropriate for their purposes.

Our procedures and findings are as follows:

1. Obtained the excel file for the Crow Butte Uranium Project 2022 Surety Estimate totaling $56,121,073 from Walt Nelson on September 15, 2021.
    - 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 2022 Surety Estimate spreadsheet.

2. Verified accuracy of cost assumptions used in "MasterCosts" tab of 2022 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 2nd Quarter 2021.
    - 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 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 Gering, 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.

We were engaged by Cameco Resources Crow Butte Operation to perform this agreed-upon procedures engagement and conducted our engagement in accordance with attestation standards established by the AICPA. We were not engaged to and did not conduct an examination or review engagement, the objective of which would be the expression of an opinion or conclusion, respectively, on the mathematical accuracy of the Crow Butte Uranium Project 2022 Surety Estimate. Accordingly, we do not express such an opinion or conclusion. Had we performed additional procedures, other matters might have come to our attention that would have been reported to you.

We are required to be independent of Cameco Resources Crow Butte Operation and to meet our other ethical responsibilities, in accordance with the relevant ethical requirements related to our agreed-upon procedures engagement.

This report 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.

Gardner Lautzenhiser & Ryan PC

September 23, 2021
Chadron, Nebraska

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2022 Surety Estimate
(Revised September 2021)

Total Restoration and Reclamation Cost Estimate

I.	Groundwater Restoration (Sheets 3 to 6)		$26,031,738
II.	Wellfield Reclamation (Sheets 7 to 9)		$14,520,925
III.	Commercial Plant Reclamation/Decommissioning (Sheets 10 to 12)		$1,515,932
IV.	R.O. Building Reclamation/Decommissioning (Sheets 10 to 12)		$381,500
V.	Evaporation Pond Reclamation (Sheets 13)		$1,442,951
VI.	Miscellaneous Site Reclamation (Sheets 14)		$712,896
VII.	Deep Disposal Well Reclamation (Sheet 15)		$258,273
VIII.	I-196 Brule Aquifer Restoration (Sheets 16)		$32,643
	Subtotal Reclamation and Restoration Cost Estimate		$44,896,858
	Contract Administration	10%	$4,489,686
	Contingency	15%	$6,734,529
		TOTAL	$56,121,073

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2022 Surety Estimate
(Revised September 2021)

Comparison of Total Surety and Major Cost Elements to Previous Year
Projected Costs for 2022 are Compared with Costs for 2021 and Changes are Calculated

Total Surety	**2022**	**2021**	**Change**
	$56,121,073	$51,383,364	$4,737,709
Contract Administration	**2022**	**2021**	**Change**
	$4,489,686	$4,110,669	$379,017
	2022	**2021**	**Change**
Contingency	$6,734,529	$6,166,004	$568,525
Groundwater Restoration	**2022**	**2021**	**Change**
Groundwater IX			
Total Gallons Processed (Kgal)	2,893,512	2,893,512	0
Total Cost	$1,736,107	$1,273,145	$462,962
RO Treatment			
Total Gallons Processed (Kgal)	5,787,024	5,787,024	0
Total Cost	$8,738,406	$7,407,391	$1,331,016
Recirculation			
Total Gallons Processed (Kgal)	1,929,008	1,929,008	0
Total Cost	$945,214	$636,573	$308,641
Sampling and Monitoring			
Total 5 Parameter Samples	85,563	85,563	0
Total 5 Parameter Analysis Costs	$5,133,780	$5,133,780	$0
Total Guideline 8 Samples	5,724	5,724	0
Total Guideline 8 Analysis Costs	$1,259,280	$1,259,280	$0
Wellfield Reclamation	**2022**	**2021**	**Change**
Pipeline Removal and Loading	$1,743,713	$1,704,021	$39,692
Well Abandonment			
Total Number of Wells	4,953	4,953	0
Total Abandonment Cost	$3,611,158	$3,152,406	$458,752
Site Reclamation	**2022**	**2021**	**Change**
Site Earthwork	$1,668,989	$1,599,499	$69,491
Plant and Equipment Decontamination	**2022**	**2021**	**Change**
Decontamination Costs	$292,724	$231,082	$61,641
Demolition Costs	$974,875	$949,057	$25,818
Piping Shredding Costs	$492,295	$490,627	$1,667
Transportation and Disposal	**2022**	**2021**	**Change**
Byproduct Material			
Soil-Type Materials, Total Volume (Yd3)	4,411	4,411	0
Soil-Type Materials, Total Cost	$1,534,072	$1,450,380	$83,692
Unpackaged Bulk Materials, Total Volume (Yd3)	3,418	3,418	0
Unpackaged Bulk Materials, Total Cost	$797,052	$741,960	$55,092

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2022 Surety Estimate
(Revised September 2021)

Ground Water Restoration

		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)	(Sheet 25)	$0.60	$0.60	$0.60	$0.60	$0.60	$0.60	$0.60	$0.60	$0.60	$0.60	
Subtotal IX Treatment Costs per Wellfield		**$38,919.60**	**$34,331.40**	**$188,560.80**	**$386,355.60**	**$108,786.60**	**$128,068.20**	**$209,239.20**	**$163,854.00**	**$292,361.40**	**$185,630.40**	**$1,736,107.20**
Total IX Treatment Costs		**$1,736,107.20**										
II. Reverse Osmosis Costs												
PV's Required		6	6	6	6	6	6	6	6	6	6	
Total Kgals for Treatment		129732	114438	628536	1287852	362622	426894	697464	546180	974538	618768	5787024
Reverse Osmosis Unit Cost ($/Kgal)	(Sheet 26)	$1.51	$1.51	$1.51	$1.51	$1.51	$1.51	$1.51	$1.51	$1.51	$1.51	$1.51
Subtotal Reverse Osmosis Costs per Wellfield		**$195,895.32**	**$172,801.38**	**$949,089.36**	**$1,944,656.52**	**$547,559.22**	**$644,609.94**	**$1,053,170.64**	**$824,731.80**	**$1,471,552.38**	**$934,339.68**	**$8,738,406.24**
Total Reverse Osmosis Costs		**$8,738,406.24**										
III. Recirculation Costs												
PV's Required		2	2	2	2	2	2	2	2	2	2	
Total Kgals for Treatment		43244	38146	209512	429284	120874	142298	232488	182060	324846	206256	1929008
Recirculation Unit Cost ($/Kgal)	(Sheet 27)	$0.49	$0.49	$0.49	$0.49	$0.49	$0.49	$0.49	$0.49	$0.49	$0.49	$0.49
Subtotal Recirculation Costs per Wellfield		**$21,189.56**	**$18,691.54**	**$102,660.88**	**$210,349.16**	**$59,228.26**	**$69,726.02**	**$113,919.12**	**$89,209.40**	**$159,174.54**	**$101,065.44**	**$945,213.92**
Total Recirculation Costs		**$945,213.92**										
IV. Consumables												
Spare parts, filters and consumables =	$60,199.23 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 annual rate estimate)		$47,908.55	$42,289.96	$232,168.36	$475,624.08	$133,943.29	$157,721.98	$257,602.54	$201,667.42	$359,891.06	$228,506.24	$2,137,323.48
Subtotal Consumables per Mine Unit		**$47,908.55**	**$42,289.96**	**$232,168.36**	**$475,624.08**	**$133,943.29**	**$157,721.98**	**$257,602.54**	**$201,667.42**	**$359,891.06**	**$228,506.24**	**$2,137,323.48**
Total Consumables Costs		**$2,137,323.48**										

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2022 Surety Estimate
(Revised September 2021)

Ground Water Restoration

		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	328
Total monitor wells		13	10	20	50	54	33	50	33	64	43	370
IX Treatment duration (months)		1.29	1.14	6.24	12.78	3.60	4.24	6.92	5.42	9.67	6.14	57.44
Reverse Osmosis duration (months)		7.40	6.53	35.88	73.51	20.70	24.37	39.81	31.17	55.62	35.32	330.31
Recirculation duration (months)		0.86	0.76	4.16	8.52	2.40	2.83	4.62	3.61	6.45	4.09	38.30
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												
1. Well Sampling prior to restoration start												
# of Wells		0	0	0	0	0	25	34	21	36	25	141
$/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												
# of Wells		12	18	43	59	55	25	34	21	36	25	
Total # samples		24	36	301	767	220	125	238	126	360	175	2372
$/sample		$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	
3. RO Sampling												
# of Wells		12	18	43	59	55	25	34	21	36	25	
Total # samples		84	126	1548	4366	1155	600	1360	651	2016	875	12781
$/sample		$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	

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			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	
5. Stabilization Sampling (Guideline 8)													
# 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. Monitor Well Sampling													
# 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			$44,336.00	$44,336.00	$44,336.00	$44,336.00	$44,336.00	$44,336.00	$44,336.00	$44,336.00	$44,336.00	$44,336.00	
9 Other Laboratory Costs													
Radon, bioassays, 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 Unit			**$165,746.00**	**$179,294.00**	**$591,304.00**	**$1,550,882.00**	**$764,936.00**	**$472,200.00**	**$851,966.00**	**$503,516.00**	**$1,248,980.00**	**$664,406.00**	**$6,993,230.00**
Total Monitoring and Sampling Costs			**$6,993,230.00**										
VI. MIT Costs													
MIT Costs per Well			$106.11	$106.11	$106.11	$106.11	$106.11	$106.11	$106.11	$106.11	$106.11	$106.11	
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			**$15,279.84**	**$17,295.93**	**$30,984.12**	**$105,261.12**	**$116,721.00**	**$131,151.96**	**$155,132.82**	**$175,718.16**	**$275,355.45**	**$168,078.24**	
2-year MIT Costs for Disposal Wells	$10,918												
Number of DDWs	2												
Number of MITs per DDW	8												
Subtotal MIT DDW Costs		**$174,688**											
Total MIT Costs		**$1,365,667**											

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	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 = $8,843.08 month											
HP Technician support = $7,108.67 month											
Active restoration period (months)	9.55	8.43	46.28	94.81	26.70	31.44	51.35	40.20	71.74	45.55	
Stabilization period (months)	24	24	24	24	24	24	24	24	24	24	
1 Engineer support during active restoration	$84,451.41	$74,547.16	$409,257.74	$838,412.41	$236,110.24	$278,026.44	$454,092.16	$355,491.82	$634,402.56	$402,802.29	$3,767,594.23
2 HP Technician support during active restoration	$67,887.80	$59,926.09	$328,989.25	$673,973.00	$189,801.49	$223,496.58	$365,030.20	$285,768.53	$509,975.99	$323,799.92	$3,028,648.85
3 Engineer support during final stabilization								$212,233.92	$212,233.92	$212,233.92	$636,701.76
4 HP Technician support during final stabilization								$170,608.08	$170,608.08	$170,608.08	$511,824.24
5 Cost reduction due to concurrent restoration of Mine Units			-369,123.50	-756,192.71	-212,955.87	-250,761.51	-409,561.18	-512,051.18	-763,610.28	-554,722.11	-3,828,978.31
Subtotal Supervisory Labor per Mine Unit	**$152,339.21**	**$134,473.25**	**$369,123.50**	**$756,192.71**	**$212,955.87**	**$250,761.51**	**$409,561.18**	**$512,051.18**	**$763,610.28**	**$554,722.11**	**$4,115,790.77**
Total Supervisory Labor Costs	**$4,115,790.77**										
TOTAL RESTORATION COST PER WELLFIELD	**$621,998.24**	**$581,881.53**	**$2,432,906.90**	**$5,324,060.07**	**$1,827,409.24**	**$1,723,087.65**	**$2,895,458.68**	**$2,295,029.80**	**$4,295,569.66**	**$2,668,669.87**	**$24,666,071.61**

TOTAL GROUND WATER RESTORATION COSTS $26,031,738.25

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Wellfield Reclamation

	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	Totals
Wellfield Piping												
Assumptions:												
Number of Wellhouses	0	3	3	5	7	7	6	9	7	10	6	63
Total Mine Unit surface 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 injection lines (laterals) (ft)	0	34000	39520	68900	106080	130700	172900	211200	163150	262600	92000	1281050
Total length of 3/8-inch hose (ft)					66300							66300
Total length 1-1/4-inch stinger pipe (ft)	0	0	0	0	0	0	72000	14600	129600	110000	100000	426200
Total length of 2-inch downhole production pipe (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-inch) (ft)	4400	1300	1450	7800	3700	2000	1000	2200	2225	3600	1400	31075
Total Length of Trunkline (10-inch) (ft)								400				400
Total Length of Trunkline (12-inch) (ft)			10800	6500	31900	12000	5000	19100	11525	14500	5000	116325
Total Length of All Trunkline (ft)	5400	3400	16250	14900	35600	18500	6000	22600	13750	23700	6400	166500
Total number of production wells	3	52	57	103	210	187	205	269	195	298	201	1780
Total number of injection wells	0	79	96	169	236	309	380	412	324	503	284	2792
Total number of shallow monitor wells	0	3	3	11	25	28	25	30	20	32	24	201
Total number of perimeter monitor wells	11	10	7	9	25	26	8	20	13	32	19	180
I. Production and Injection Piping												
A. Removal and Loading												
Production and Injection Piping Removal Unit Cost ($/ft of pipe)	$0.78	$0.78	$0.78	$0.78	$0.78	$0.78	$0.78	$0.78	$0.78	$0.78	$0.78	
Subtotal Production and Injection Piping Removal and Loading Costs	*$0.00*	*$26,520.00*	*$30,825.60*	*$53,742.00*	*$82,742.40*	*$101,946.00*	*$134,862.00*	*$164,736.00*	*$127,257.00*	*$204,828.00*	*$71,760.00*	*$999,219.00*
B. Pipe Shredding												
Production and Injection Piping Shredding Unit Cost ($/ft of pipe)	$0.09	$0.09	$0.09	$0.09	$0.09	$0.09	$0.09	$0.09	$0.09	$0.09	$0.09	
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*	*$19,008.00*	*$14,683.50*	*$23,634.00*	*$8,280.00*	*$115,294.50*
C. Equipment Costs												
Cat 926M Loader Unit Costs for removal (450'/day)	$0.00	$137,619.91	$159,962.91	$278,882.70	$429,374.12	$529,027.13	$699,837.72	$854,862.51	$660,373.19	$1,062,911.43	$372,383.29	
Shredder Unit Costs for shredding (450'/day)	$0.00	$7,906.13	$9,189.72	$16,021.55	$24,667.14	$30,392.11	$40,205.01	$49,111.04	$37,937.81	$61,063.25	$21,393.07	
Subtotal Equipment Costs	*$0.00*	*$145,526.04*	*$169,152.63*	*$294,904.25*	*$454,041.26*	*$559,419.24*	*$740,042.73*	*$903,973.55*	*$698,311.00*	*$1,123,974.68*	*$393,776.36*	*$5,483,121.74*
D. Transport and Disposal Costs (NRC-Licensed Facility)												
Chipped Volume Reduction (ft^3/ft)	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	
Chipped Volume per Wellfield (yd^3)	0.0	8.7	10.1	17.6	27.1	33.4	44.2	54.0	41.7	67.1	23.5	
Volume for Disposal Assuming 25% Void Space (yd^3)	0.0	10.9	12.6	22.0	33.9	41.8	55.3	67.5	52.1	83.9	29.4	409.4
Transportation and Disposal Unit Cost ($/$yd^3$) Unpackaged Bulk	$232.93	$232.93	$232.93	$232.93	$232.93	$232.93	$232.93	$232.93	$232.93	$232.93	$232.93	
Subtotal Production and Injection Piping Transport and Disposal Costs	*$0.00*	*$2,538.94*	*$2,934.92*	*$5,124.46*	*$7,896.33*	*$9,736.47*	*$12,881.03*	*$15,722.78*	*$12,135.65*	*$19,542.83*	*$6,848.14*	*$95,361.55*
Total Production and Injection Piping Costs	**$0.00**	**$177,644.98**	**$206,469.95**	**$359,971.71**	**$554,227.19**	**$682,864.71**	**$903,346.76**	**$1,103,440.33**	**$852,387.15**	**$1,371,979.51**	**$480,664.50**	**$6,692,996.79**
II. Trunklines												
A. Removal and Loading												
Trunkline Removal Unit Cost ($/ft of pipe)	$1.75	$1.75	$1.75	$1.75	$1.75	$1.75	$1.75	$1.75	$1.75	$1.75	$1.75	
Subtotal Trunkline Removal and Loading Costs	*$9,450.00*	*$5,950.00*	*$28,437.50*	*$26,075.00*	*$62,300.00*	*$32,375.00*	*$10,500.00*	*$39,550.00*	*$24,062.50*	*$41,475.00*	*$11,200.00*	*$291,375.00*
B. Pipe Shredding												
Trunkline Shredding Unit Cost ($/ft of pipe)	$1.75	$1.75	$1.75	$1.75	$1.75	$1.75	$1.75	$1.75	$1.75	$1.75	$1.75	
Subtotal Trunkline Shredding Costs	*$9,450.00*	*$5,950.00*	*$28,437.50*	*$26,075.00*	*$62,300.00*	*$32,375.00*	*$10,500.00*	*$39,550.00*	*$24,062.50*	*$41,475.00*	*$11,200.00*	*$291,375.00*
C. Equipment Costs												
Cat 926M Loader Unit Costs for removal (200'/day)	$49,178.88	$30,964.48	$147,992.00	$135,697.28	$324,216.32	$168,483.20	$54,643.20	$205,822.72	$125,224.00	$215,840.64	$58,286.08	
Shredder Unit Costs for shredding (200'/day)	$2,825.28	$1,778.88	$8,502.00	$7,795.68	$18,625.92	$9,679.20	$3,139.20	$11,824.32	$7,194.00	$12,399.84	$3,348.48	
Subtotal Equipment Costs	*$52,004.16*	*$32,743.36*	*$156,494.00*	*$143,492.96*	*$342,842.24*	*$178,162.40*	*$57,782.40*	*$217,647.04*	*$132,418.00*	*$228,240.48*	*$61,634.56*	*$1,603,461.60*
D. Transport and Disposal Costs (NRC-Licensed Facility)												
Chipped Volume Reduction (6-inch) (ft^3/ft)	0.0651	0.0651	0.0651	0.0651	0.0651	0.0651	0.0651	0.0651	0.0651	0.0651	0.0651	
Chipped Volume Reduction (8-inch) (ft^3/ft)	0.1103	0.1103	0.1103	0.1103	0.1103	0.1103	0.1103	0.1103	0.1103	0.1103	0.1103	
Chipped Volume Reduction (10-inch) (ft^3/ft)	0.1712	0.1712	0.1712	0.1712	0.1712	0.1712	0.1712	0.1712	0.1712	0.1712	0.1712	
Chipped Volume Reduction (12-inch) (ft^3/ft)	0.2408	0.2408	0.2408	0.2408	0.2408	0.2408	0.2408	0.2408	0.2408	0.2408	0.2408	
Chipped Volume per Wellfield (yd^3)	20.4	10.4	111.9	91.3	299.6	126.0	48.7	184.0	111.9	157.5	50.3	
Volume for Disposal Assuming 25% Void Space (ft^3)	25.5	13.0	139.9	114.1	374.5	157.5	60.9	230.0	139.9	196.9	62.9	1515.1
Transportation and Disposal Unit Cost ($/$ft^3$)	$232.93	$232.93	$232.93	$232.93	$232.93	$232.93	$232.93	$232.93	$232.93	$232.93	$232.93	
Subtotal Transport and Disposal Costs	*$5,939.72*	*$3,028.09*	*$32,586.91*	*$26,577.31*	*$87,232.29*	*$36,686.48*	*$14,185.44*	*$53,573.90*	*$32,586.91*	*$45,863.92*	*$14,651.30*	*$352,912.27*
Total Trunkline Costs	**$76,843.88**	**$47,671.45**	**$248,955.91**	**$222,220.27**	**$554,674.53**	**$279,598.88**	**$92,967.84**	**$350,320.94**	**$213,129.91**	**$357,054.40**	**$98,685.86**	**$2,539,123.87**

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	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	Totals
III. Downhole Pipe												
A. Removal and Loading												
Downhole Piping Removal Unit Cost ($/ft of pipe)	$0.090	$0.090	$0.090	$0.090	$0.090	$0.090	$0.090	$0.090	$0.090	$0.090	$0.090	
Downhole Hosing Removal Unit Cost ($/ft of pipe)	$0.170	$0.170	$0.170	$0.170	$0.170	$0.170	$0.170	$0.170	$0.170	$0.170	$0.170	
Removal of 1-1/4-inch stinger pipe	$0.00	$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	
Removal of downhole production pipe	$108.00	$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	
Removal of downhole hose	$0.00	$0.00	$0.00	$0.00	$11,271.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	
Subtotal Downhole Piping Removal and Loading Costs	*$108.00*	*$1,800.00*	*$2,700.00*	*$1,980.00*	*$15,771.00*	*$4,050.00*	*$15,840.00*	*$7,839.00*	*$20,214.00*	*$16,380.00*	*$17,775.00*	*$104,457.00*
B. Pipe Shredding												
Downhole Piping Shredding Unit Cost ($/ft of pipe)	$0.080	$0.080	$0.080	$0.080	$0.080	$0.080	$0.080	$0.080	$0.080	$0.080	$0.080	
Subtotal Downhole Piping Shredding Costs	*$96.00*	*$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*	*$82,832.00*
C. Equipment Costs												
Smeal Unit Costs for removal	$104.85	$1,747.47	$2,621.20	$1,922.21	$4,368.67	$3,931.80	$15,377.71	$7,610.22	$19,624.05	$15,901.95	$17,256.23	
Shredder Unit Costs for shredding	$27.90	$465.07	$697.60	$511.57	$1,162.67	$1,046.40	$4,092.59	$2,025.37	$5,222.70	$4,232.11	$4,592.53	
Subtotal Equipment Costs	*$132.75*	*$2,212.54*	*$3,318.80*	*$2,433.78*	*$5,531.34*	*$4,978.20*	*$19,470.30*	*$9,635.59*	*$24,846.75*	*$20,134.06*	*$21,848.76*	*$114,542.87*
D. Transport and Disposal Costs (NRC-Licensed Facility)												
Chipped Volume Reduction - 1-1/4-inch stinger (ft^3/ft)	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	
Chipped Volume Reduction - 2-inch downhole production (ft^3/ft)	0.0074	0.0074	0.0074	0.0074	0.0074	0.0074	0.0074	0.0074	0.0074	0.0074	0.0074	
Volume Reduction - 3/8-inch hose (ft3/ft)	0.0313	0.0313	0.0313	0.0313	0.0313	0.0313	0.0313	0.0313	0.0313	0.0313	0.0313	
Chipped Volume - 1-1/4-inch stinger (ft^3)	0	0	0	0	0	0	317	64	570	484	440	
Chipped Volume - 2-inch downhole production (ft^3)	9	148	222	163	370	333	770	537	703	533	722	
Volume 3/8-inch hose (ft3)	0	0	0	0	2075	0	0	0	0	0	0	
Volume for Disposal Assuming 25% Void Space (yd^3)	0.4	6.9	10.3	7.5	113.2	15.4	50.3	27.8	58.9	47.1	53.8	391.6
Transportation and Disposal Unit Cost ($/$yd^3$) (Unpackaged Bulk)	$232.93	$232.93	$232.93	$232.93	$232.93	$232.93	$232.93	$232.93	$232.93	$232.93	$232.93	
Subtotal Downhole Piping Transport and Disposal Costs	*$93.17*	*$1,607.22*	*$2,399.18*	*$1,746.98*	*$26,367.68*	*$3,587.12*	*$11,716.38*	*$6,475.45*	*$13,719.58*	*$10,971.00*	*$12,531.63*	*$91,215.39*
Total Downhole Piping Costs	**$429.92**	**$7,219.76**	**$10,817.98**	**$7,920.76**	**$51,670.02**	**$16,215.32**	**$61,106.68**	**$30,918.04**	**$76,748.33**	**$62,045.06**	**$67,955.39**	**$393,047.26**
IV. Surface Reclamation												
A. Removal and disposal of contaminated soil around wells and wellhouses												
Volume of contaminated soil (0.37 yd3 per injection and production well)	1.11	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	35	35	30	45	35	50	30	
Estimated volume of contaminated soil from spills in the Mine Unit (yd3)	0	116	57	40	170	253	64	70	81	13	1	
Disposal of contaminated soil $274.40 per yd3	$304.58	$49,246.57	$35,290.58	$45,451.62	$101,533.49	$129,385.09	$85,187.48	$100,696.57	$84,523.43	$98,611.13	$57,747.48	$787,978.02
Equipment (Cat 926M loader at 2 yd3/hr)	$126.36	$5,517.82	$6,444.48	$11,456.86	$18,785.88	$20,891.92	$24,640.67	$28,684.26	$21,860.70	$33,738.76	$20,428.59	
Labor (1 man-hour per 2 Yd3)	$12.12	$529.17	$618.04	$1,098.74	$1,801.61	$2,003.58	$2,363.09	$2,750.88	$2,096.49	$3,235.62	$1,959.15	
Subtotal removal and disposal of contaminated soil	*$443.06*	*$55,293.56*	*$42,353.10*	*$58,007.22*	*$122,120.98*	*$152,280.59*	*$112,191.24*	*$132,131.71*	*$108,480.62*	*$135,585.51*	*$80,135.22*	*$999,022.81*
B. Recontour and seeding												
Recontour and seeding (est. $300/acre)	$2,781.00	$3,510.00	$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	
Subtotal Recontour and Seeding	*$2,781.00*	*$3,510.00*	*$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*	*$165,327.00*
Total Surface Reclamation	**$3,224.06**	**$58,803.56**	**$46,391.10**	**$79,493.22**	**$161,018.98**	**$162,663.59**	**$127,494.24**	**$150,884.71**	**$123,165.62**	**$158,442.51**	**$92,768.22**	**$1,164,349.81**
IV. Well Houses												
Total Quantity	0	3	3	5	7	7	6	9	7	10	6	
Average Well House Weight (Lbs.) (Includes wellhead covers for each well)	9200	9200	9200	9200	9200	9200	9200	9200	9200	9200	9200	
A. Removal												
Dismantlement at 2-man-days per wellhouse (man-days)	0	6	6	10	14	14	12	18	14	20	12	
Dismantlement Labor Costs	$0.00	$1,048.08	$1,048.08	$1,746.80	$2,445.52	$2,445.52	$2,096.16	$3,144.24	$2,445.52	$3,493.60	$2,096.16	$22,009.68
Equipment (Cat 926M at 2 hours per wellhouse) (hrs)	0	6	6	10	14	14	12	18	14	20	12	
Equipment Costs	$0.00	$1,366.08	$1,366.08	$2,276.80	$3,187.52	$3,187.52	$2,732.16	$4,098.24	$3,187.52	$4,553.60	$2,732.16	$28,687.68
Subtotal Well House Dismantlement Costs	*$0.00*	*$2,414.16*	*$2,414.16*	*$4,023.60*	*$5,633.04*	*$5,633.04*	*$4,828.32*	*$7,242.48*	*$5,633.04*	*$8,047.20*	*$4,828.32*	*$50,697.36*
B. Disposal												
Total Disposal Weight (9200 lbs per wellhouse) (Lbs)	0	27600	27600	46000	64400	64400	55200	82800	64400	92000	55200	
Subtotal Disposal Costs	*$0.00*	*$3,312.00*	*$3,312.00*	*$5,520.00*	*$7,728.00*	*$7,728.00*	*$6,624.00*	*$9,936.00*	*$7,728.00*	*$11,040.00*	*$6,624.00*	*$69,552.00*
Total Well House Removal and Disposal Costs	**$0.00**	**$5,726.16**	**$5,726.16**	**$9,543.60**	**$13,361.04**	**$13,361.04**	**$11,452.32**	**$17,178.48**	**$13,361.04**	**$19,087.20**	**$11,452.32**	**$120,249.36**
TOTAL REMOVAL AND DISPOSAL COSTS PER WELLFIELD	**$80,497.86**	**$297,065.91**	**$515,361.10**	**$679,149.56**	**$1,334,951.76**	**$1,154,703.54**	**$1,196,367.84**	**$1,652,742.50**	**$1,278,792.05**	**$1,968,608.68**	**$751,526.29**	**$10,909,767.09**

TOTAL WELLFIELD BUILDINGS AND EQUIPMENT REMOVAL AND DISPOSAL COSTS	**$10,909,767.09**

Crow Butte Resources, Inc.
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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
I. 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	790	660
Shallow Well Average Depth (ft)		200	200	200	200	200	200	200	200	200	150	300	205
Total Mine Unit Well Depth (ft)		9310	89571	124440	198338	322925	274430	456866	356500	413640	404640	405360	3056020
Well Abandonment Unit Cost ($/ft. of well)		$1.18	$1.18	$1.18	$1.18	$1.18	$1.18	$1.18	$1.18	$1.18	$1.18	$1.18	
Subtotal Abandonment Cost per Wellfield		**$10,985.80**	**$105,693.78**	**$146,839.20**	**$234,038.84**	**$381,051.50**	**$323,827.40**	**$539,101.88**	**$420,670.00**	**$488,095.20**	**$477,475.20**	**$478,324.80**	**$3,606,103.60**
II. Downhole Pump Disposal													
Number of Downhole Pumps	1174												
Pump Disposal Volume(ft3)	0.5												
Total Pump Disposal Volume(yd3)	21.7												21.7
Downhole Pump Disposal Rate ($/yd3)	$232.93												232.93
Subtotal Downhole Pump Disposal		**$5,054.58**											**$5,054.58**
Total Wellfield Abandonment Costs		**$3,611,158.18**											

Plant Equipment Decommissioning

	Commercial Plant	R.O. Building
I. Removal and Loading Costs		
Tankage		
Number of Contaminated Tanks	141	
Volume of Contaminated Tank Construction Material (ft^3)	2721	
Number of Chemical Tanks	21	
Disposal Void Factor	1.25	
A. Labor to Remove and Load Tankage		
Number of Persons	2	
Tanks/Day	1	
Number of Days	162	
$/Day/Person	$174.68	
Subtotal Removal Labor Costs	*$56,596.32*	
B. Labor to Clean Chemical Tankage		
Number of Persons	1	
Tanks/Day	1	
Number of Days	21	
$/Day/Person	$174.68	
Subtotal Cleaning Labor Costs	*$3,668.28*	
C. Equipment		
Saws, scaffolding, etc.	$6,000	
Subtotal Equipment Costs	*$6,000*	
Total Equipment Removal and Loading Costs	**$66,264.60**	
II. Transportation and Disposal Costs (NRC-Licensed Facility)		
A. Tankage		
Volume of Tank Construction Material (ft^3)	2721	
Volume for Disposal Assuming Void Space (yd^3)	126.0	
Transportation and Disposal Unit Cost ($/$yd^3$) (Unpackaged Bulk)	$232.93	
Subtotal Tankage Transportation and Disposal Costs	*$29,349.18*	
B. Contaminated PVC Pipe		
Volume of Shredded PVC Pipe (ft^3)	422.4	
Volume for Disposal Assuming Void Space (yd^3)	19.6	
Transportation and Disposal Unit Cost ($/$yd^3$) (Unpackaged Bulk)	$232.93	
Subtotal Contaminated PVC Pipe Transportation and Disposal Costs	*$4,565.43*	
C. Pumps		
Volume of Process Pumps (yd^3) (no void factor used)	34.8	
Transportation and Disposal Unit Cost ($/$yd^3$) (Unpackaged Bulk)	$232.93	
Subtotal Pump Transportation and Disposal Costs	*$8,105.96*	
D. Filters (injection, backwash and yellowcake filters)		
Volume of Filters (yd^3) (no void factor used)	463.0	
Transportation and Disposal Unit Cost ($/$yd^3$) (Unpackaged Bulk)	$232.93	
Subtotal Filter Transportation and Disposal Costs	*$107,846.59*	
E. Dryer		
Dryer Volume (yd^3) (no void factor used)	29.6	
Transportation and Disposal Unit Cost ($/$yd^3$) (Unpackaged Bulk)	$232.93	
Total Dryer Transportation and Disposal Costs	*$6,894.73*	
Total Contaminated Equipment Transportation and Disposal Costs	**$156,761.89**	
III. Transportation and Disposal (Solid Waste for Landfill Disposal)		
A. Cleaned Tankage		
Volume of Tank Construction Material (ft^3)	405	
Number of Landfill Trips	1	
Transportation and Disposal Unit Cost ($/Load)	$411.00	
Subtotal Tankage Transportation and Disposal Costs	*$411.00*	
B. Uncontaminated PVC Pipe		
Volume of Shredded PVC Pipe (ft^3)	184.3	
Number of Landfill Trips	1	
Transportation and Disposal Unit Cost ($/Load)	$411.00	
Subtotal PVC Pipe Transportation and Disposal Costs	*$411.00*	
Total Uncontaminated Equipment Transportation and Disposal Costs	**$822.00**	
IV. Supervisory Labor Costs During Plant Decommissioning		
Estimated Duration (months)	6	
Engineer	$53,058.48	
Radiation Technician	$42,652.02	
Total Supervisory Labor Costs	**$95,710.50**	
SUBTOTAL EQUIPMENT REMOVAL AND DISPOSAL COSTS PER FACILITY	$319,558.99	
Building Area (Ft2)	39,738	10,000
Building Equipment Removal and Disposal Cost per Square Foot	$8.04	$8.04
TOTAL EQUIPMENT REMOVAL AND DISPOSAL COSTS	**$319,558.99**	**$80,400.00**

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Building Demolition

	Commercial Plant
I. Decontamination Costs	
A. Wall Decontamination	
Area to be Decontaminated (ft^2)	36,470
HCl Application Rate (Gallons/ft^2)	1
HCl Acid Cost	$1.83
Subtotal Wall Decontamination Materials Costs	$66,740.10
B. Concrete Floor Decontamination	
Area to be Decontaminated (ft^2)	39738
HCl Application Rate (Gallons/ft^2)	2
HCl Acid Cost	$1.83
Subtotal Floor Decontamination Materials Costs	$145,441.08
C. Decontamination Labor	
Labor (man-days)	60
Subtotal Decontamination Labor Cost	$10,480.80
D. Decontamination Equipment Costs	
Sprayer pump	$500
Recycle pump	$500
Sprayer with hose	$1,000
Subtotal Decontamination Equipment Costs	$2,000
E. Decontamination Waste Disposal (to Ponds)	
Total gallons HCl waste	115,946
Pumping costs (5 HP/30 gpm)	$1,797.08
Subtotal Decontamination Costs	$226,459.06
Total Decontamination Costs	**$226,459.06**
II. Demolition Costs	
Assumptions (based on 2017 costs):	
Dismantling plant building	$625,758.00
A. Building Dismantling	
Plant contents and building dismantling (2017 $'s escalated by CPI)	$657,045.90
Subtotal Building and Contents Dismantling	*$657,045.90*
B. Concrete Floor Removal	
Area of direct-dispose concrete floors (ft2)	11,100
Removal Rate ($/ft2)	$17.80
Subtotal Concrete Floor Removal	*$197,580.00*
Total Demolition Costs	**$854,625.90**
III. Disposal Costs	
A. Concrete Floor	
Area of Direct-Dispose Concrete Floor (ft^2)	11,100
Average Thickness of Concrete Floor (ft)	0.50
Volume of Concrete Floor (ft^3)	5,550
Volume of Concrete Floor (Yd3)	206
B. Contaminated Soil	
Volume of Contaminated Soil (Yd3)	206
Transportation and Disposal Unit Cost ($/$Yd^3$) (Unpackaged Bulk)	$232.93
Subtotal Concrete Floor and Soil Disposal Costs	*$95,967.16*
Total Disposal Costs	**$95,967.16**
IV Plant Site Reclamation	
A. Plant Site Earthwork	
Material to be Moved (Yd3)	20,500
D8T Bulldozer Earthwork Rate (Yd3/hr)	700
D8T Hourly Rate	$598.27
Subtotal Plant Site Earthwork	*$17,520.76*
B. Revegetation	
Area requiring Revegetation (Ac)	6
Revegetation Unit Cost ($/Ac)	$300
Subtotal Plant Site Revegetation	*$1,800.00*
Total Plant Site Reclamation Costs	**$19,320.76**
SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS	$1,196,372.88
Building Area (Ft2)	39,738
Building Demolition Cost per Square Foot	$30.11

TOTAL BUILDING DEMOLITION AND DISPOSAL COSTS	**$1,196,372.88**

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2022 Surety Estimate
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Building Demolition

R.O. Building

I. Decontamination Costs
- A. Wall Decontamination
  - Area to be Decontaminated (ft^2)
  - HCl Application Rate (Gallons/ft^2)
  - HCl Acid Cost
  - Subtotal Wall Decontamination Materials Costs
- B. Concrete Floor Decontamination
  - Area to be Decontaminated (ft^2)
  - HCl Application Rate (Gallons/ft^2)
  - 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^2)
  - Average Thickness of Concrete Floor (ft)
  - Volume of Concrete Floor (ft^3)
  - Volume of Concrete Floor (Yd3)
- B. Contaminated Soil
  - Volume of Contaminated Soil (Yd3)
  - Transportation and Disposal Unit Cost ($/$Yd^3$) (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)
  - D8T Bulldozer Earthwork Rate (Yd3/hr)
  - D8T 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)	10,000
Building Demolition Cost per Square Foot	$30.11

TOTAL BUILDING DEMOLITION AND DISPOSAL COSTS	**$301,100.00**

Crow Butte Resources, Inc.
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Evaporation Pond Reclamation

	Commercial Ponds	R&D Ponds	Total
Assumptions/Data:			
Number of Ponds	3	2	
Area of Ponds (ft2)	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)	60,000	30,000	
Surface Restoration/Revegetation (Acres)	20	10	
Sludge Production Rate (Yd3 sludge/gal)		0.000000102	
(1 Yd3 sludge/9,772,000 gal R&D Phase)			
Estimated 1991 to 2021 Total Production (gallons)	26661732240		
Liner Removal Rate (ft2/man-day)	10000	10,000	
Sludge Removal Rate (Yd3/man-day)	8.33	8.33	
2017 - Pond #4 New Liner	250,000		
2017 - Pond #4 Leak detection piping addition	920		
I. 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)	$174.68	$174.68	
Subtotal Liner and Piping Removal Labor Costs	*$17,468.00*	*$1,746.80*	*$19,214.80*
B. Pond Liner and Piping Removal Equipment			
Total Man-Days Removal Effort	100	10	
Size of Crew	4	4	
Total Days Removal Effort	25	2.5	
Cat 926M Loader Hourly Rate ($/hr)	$227.68	$227.68	
Subtotal Liner and Piping Removal Equipment Costs	*$45,536.00*	*$4,553.60*	*$50,089.60*
Total Pond Liner and Piping Removal Costs	**$63,004.00**	**$6,300.40**	**$69,304.40**
II. Pond Sludge Removal			
Pond Sludge Estimate			
Estimated Production Flow since 1991 (gal)	26,661,732,240		
Historical Sludge Production Rate	0.000000102		
Estimated Pond Sludge Volume (Yd3)	2,719	Cleaned following R&D	
A. Pond Sludge Removal Labor			
Pond Sludge Volume (Yd3)	2,719		2,719
Sludge Removal Rate (Yd3/man-day)	8.33		
Total Man-Days	326		
Labor Rate ($/man-day)	$174.68		
Subtotal Pond Sludge Removal Labor Costs	*$56,945.68*	*$0.00*	*$56,945.68*
B. Pond Sludge Removal Equipment			
Total Man-Days Removal Effort	326		
Size of Crew	3		
Total Days Removal Effort	109		
Cat 926M Loader Hourly Rate ($/hr)	$227.68		
Subtotal Pond Sludge Removal Equipment Costs	*$198,536.96*	*$0.00*	*$198,536.96*
Total Pond Sludge Removal Costs	**$255,482.64**	**$0.00**	**$255,482.64**
III. Pond Byproduct Material Disposal			
A. Pond Liner Disposal			
Area of Pond Liner (ft2)	1,000,000	100,000	
Thickness of Pond Liner (ft)	0.00833	0.00300	
Volume of Pond Liner (ft3)	8,330	300	
Void Space Factor	1.25	1.25	
Total Disposed Volume (yd3)	386	14	400.0
Disposal Unit Costs ($/yd3) (Unpackaged Bulk)	$232.93	$232.93	
Subtotal Pond Liner Disposal Costs	*$89,910.98*	*$3,261.02*	*$93,172.00*
B. Pond Piping Disposal			
Total Length of Piping	7,220	1,200	
Piping Volume Factor (ft3/ft)	0.0103	0.0069	
Total Volume Pond Piping (ft3)	74	8	
Void Space Factor	1.25	1.25	
Total Disposed Volume (yd3)	3.4	0.4	3.8
Disposal Unit Costs ($/yd3) (Unpackaged Bulk)	$232.93	$232.93	
Subtotal Pond Piping Disposal Costs	*$791.96*	*$93.17*	*$885.13*
C. Pond Sludge Disposal			
Total Volume Pond Sludge (Yd3)	2,719		2,719
Disposal Unit Costs ($/yd3) (Soil rate)	$274.40		
Subtotal Pond Sludge Disposal Costs	*$746,093.60*	*$0.00*	*$746,093.60*
Total Byproduct Material Disposal Costs	**$836,796.54**	**$3,354.19**	**$840,150.73**
IV Pond Site Reclamation			
A. Pond Earthwork Requirements			
Earthwork Requirements Yd3)	180,000	60,000	
D8T Bulldozer Earthwork Rate (Yd3/hr)	700	700	
Total D8T Hours	257	86	
D8T Hourly Rate	$598.27	$598.27	
Subtotal Pond Earthwork	*$153,755.39*	*$51,451.22*	*$205,206.61*
B. Revegetation			
Area requiring Revegetation (Ac)	20	10	
Revegetation Unit Cost ($/Ac)	$300.00	$300.00	
Subtotal Plant Site Revegetation	*$6,000.00*	*$3,000.00*	
Total Pond Site Reclamation Costs	**$159,755.39**	**$54,451.22**	$214,206.61
V. Supervisory Labor Costs During Pond Reclamation			
Estimated Duration (months)	4		
Engineer Rate ($/month)	$8,843.08		
Total Engineer Labor	$35,372.32		
Radiation Technician Rate ($/month)	$7,108.67		
Total Radiation Technician Labor	$28,434.68		
Total Supervisory Labor Costs	**$63,807.00**	**$0.00**	$63,807.00
TOTAL EVAPORATION POND RECLAMATION	**$1,378,845.57**	**$64,105.81**	**$1,442,951.38**

TOTAL EVAPORATION POND RECLAMATION COSTS $1,442,951.38

Crow Butte Resources, Inc.
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Miscellaneous Site Reclamation

I. Access Road Reclamation	
Assumptions	
Road Reclamation production rate (Yd3/hr)	200
Length of Main Access Roads (ft)	18,300
Average Main Access Road width (ft)	25
Depth of Main Access Road Gravel Surface (ft)	1
Surface Area of Main Access Road (Ac)	10.5
Length of Wellfield Access Roads (ft)	58,500
Average Wellfield Access Road width (ft)	12
Depth of Wellfield Access Road Gravel Surface (ft)	0.5
Surface Area of Wellfield Road (Ac)	16.1
A. Main Access Road Dirtwork	
Main Access Road Gravel Volume (Yd3)	16,944
Total reclamation time (hrs)	85
D8T Unit Operating Cost ($/hr)	$598.27
Subtotal Main Access Road Gravel Roadbase Removal Costs	*$50,852.95*
B. Wellfield Road Dirtwork	
Wellfield Road Gravel Volume (Yd3)	13,000
Total reclamation time (hrs)	65
D8T Unit Operating Cost ($/hr)	$598.27
Subtotal Wellfield Road Gravel Roadbase Removal Costs	*$38,887.55*
E. Discing/Seeding	
Assumptions	
Surface Area (acres)	26.6
Discing/Seeding Unit Cost ($/acre)	$300.00
Subtotal Discing/Seeding Costs	*$7,980.00*
Total Access Road Reclamation Costs	**$97,720.50**
II. Wastewater Pipeline Reclamation	
Assumptions	
Pipeline Removal Rate (ft./man-day)	67
Pipeline Shredding Rate (ft./man-day)	1,500
Number of Pond Pipelines	4
Length of Pond Pipelines (ft)	3,500
Number of RO Building Pipelines	4
Length of RO Building Pipelines (ft)	300
Average Pipe Size (Sch 40)	4
A. Pipeline Removal Costs	
Length of Pipelines (ft)	15,200
Removal Rate (ft/man-day)	67
Removal Labor Rate ($/man-day)	$174.68
Cat 926M Loader Use (days)	227
Cat 926M Loader Cost	$413,466.88
Subtotal Pipeline Removal Costs	*$453,119.24*
B. Pipeline Shredding Costs	
Length of Pipelines (ft)	15,200
Shredding Rate (ft/man-day)	1,500
Shredding Labor Rate ($/man-day)	$174.68
Shredder Use (days)	10
Shredder Cost	$1,046.40
Subtotal Pipeline Shredding Costs	*$2,793.20*
C. Pipeline Transportation and Disposal (NRC-Licensed Facility)	
Pipe Diameter (inches)	4
Chipped Volume Reduction (ft^3/ft)	0.0103
Subtotal Volume of Shredded PVC Pipe (yd^3)	5.8
Disposal Void Factor	1.25
Final Disposal Volume (yd3)	7.25
Transportation and Disposal Unit Cost ($/$yd^3$) (Unpackaged Bulk)	$232.93
Subtotal Pipeline Disposal Costs	*$1,688.74*
Total Wastewater Pipeline Reclamation Costs	**$457,601.18**
III. Electrical Distribution System Removal	
Assumptions	
Length of High Voltage Lines	49,640
High Voltage Line Removal Rate ($/ft.)	$2.17
High Voltage Line Removal Cost ($/ft.)	$107,718.80
Substation Removal	$2,000.00
Subtotal Electrical Distribution System Removal Costs	**$109,718.80**
IV. Supervisory Labor Costs During Miscellaneous Reclamation	
Estimated Duration (months)	3
Engineer Rate ($/month)	$8,843.08
Total Engineer Labor	$26,529.24
Radiation Technician Rate ($/month)	$7,108.67
Total Radiation Technician Labor	$21,326.01
Total Supervisory Labor Costs	**$47,855.25**
TOTAL MISCELLANEOUS RECLAMATION COSTS	**$712,895.73**

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Deep Disposal Well Reclamation

		Well # 1	Well # 2
I.	**Cost Basis**		
	A. Plugging and Abandonment		
	Cost Estimate from subcontractor (January 2014)	$104,900	$104,900
	June 2014 CPI	238.3	238.3
	July 2021 CPI	273.0	273.0
	Subtotal Escalated June 2014 Plugging and Abandonment Costs	*$120,176.31*	*$120,176.31*
	B. Site Reclamation		
	Cost Estimate from subcontractor (January 2014)	$7,821	$7,821
	June 2014 CPI	238.3	238.3
	July 2021 CPI	273.0	273.0
	Subtotal Escalated June 2014 Reclamation Costs	*$8,959.95*	*$8,959.95*
	Subtotal Abandonment cost per well	**$129,136.26**	**$129,136.26**
TOTAL DEEP DISPOSAL WELL RECLAMATION COSTS		**$258,272.52**	

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I-196 Brule Aquifer 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)	3
Pump Power Requirements (kwh)	3
Power Cost ($/kw)	$0.1244
Pumping Labor (man-day per day) (1hr/day)	0.125
Sampling Labor (man-day per day) (.5hr/day)	0.0625
Labor Rate ($/man-day)	$174.68
Days to complete	235
A. Electrical Costs	
Cost to pump 3 Pore Volumes	*$2,101.02*
B. Labor Costs	
Labor for pumping 3 Pore Volumes	*$5,131.23*
Total Ground Water Sweep Costs	**$7,232.25**
II. Monitoring and Sampling Costs	
A. Labor Costs for Monitoring I-196a, I-196j, and I-196n	$2,565.61
B. Monitoring for I-196i, I-196m, and I-196l	$2,565.61
Total Monitoring and Sampling Costs	**$5,131.22**
III Additional Ground Water Sweep	
Pump from additional wells and monitor as above	$12,363.47
Drill 4 additional wells, 50 ft deep at $26/ft.	$5,200.00
Total Additional Ground Water Sweep	**$17,563.47**
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	**$32,642.94**

GROUNDWATER RESTORATION
GROUNDWATER IX TREATMENT (GIX) Unit Costs

Assumptions:

1. All pumps are 5 hp pumping at 32 gpm
2. Cost of electricity = $0.1244 Kw hr
3. Horsepower to kilowatt conversion = 0.746 Kw/HP
4. Operator labor costs = $174.68 man-day
5. Labor costs are based on 36 pumps at 1,150 gpm

Wellfield Pumping Electrical Costs per 1000 Gallons (Includes bleed to the Deepwell / Evaporation Pond)

$$1000\ \text{gal} \times \frac{3\ \text{hp}}{12\ \text{gpm}} \times \frac{1\ \text{hr}}{60\ \text{min}} \times \frac{0.746\ \text{kwh}}{\text{hp}} \times \frac{\$\ 0.1244}{\text{kwh}} = \$\ 0.387$$

Wellfield Pumping Labor Costs per 1000 Gallons

$$1000\ \text{gal} \times \frac{1\ \text{min}}{1150\ \text{gal}} \times \frac{1\ \text{man-day}}{1440\ \text{min}} \times \frac{\$174.68}{\text{man-day}} \times 2\ \text{operators} = \$\ \$0.211$$

Groundwater IX Production Rate

$$\frac{1150\ \text{gal}}{\text{min}} \times \frac{60\ \text{min}}{\text{hr}} \times \frac{24\ \text{hr}}{\text{day}} \times \frac{365\ \text{day}}{\text{year}} \times \frac{1\ \text{year}}{12\ \text{month}} = \textit{50,370,000}\ \frac{\textit{gallons}}{\textit{month}}$$

TOTAL GIX COSTS PER 1000 GALLONS	**= $ 0.60**

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Groundwater Reverse Osmosis (RO) Treatment Unit Costs

Assumptions:

1. All pumps are 5 hp pumping at 32 gpm
2. Membrane Replacement — $0.041 per 1000 gal
3. Cost of electricity = — $0.1244 Kw hr
4. Horsepower to kilowatt conversion = — 0.746 Kw/HP
5. Operator labor costs = — $174.68 man-day
6. RO System horsepower requirements for 600 gpm rated flow based upon:

RO Unit Pump	300 hp
Permeate/Injection pump	50 hp
Waste pump ((Bleed - Deepwell / Evap Ponds)	25 hp
TOTAL:	375 hp

7. Chemical costs:
   - Reductant = — $0.730 lb
   - Antiscalant = — $18.66 gal

Membrane Replacement Costs per 1000 Gallons

1100 gal X $660 membrane cost / month / 17,520,000 gallons month = $ 0.041 per Kgal

Wellfield Pumping Electrical Costs per 1000 Gallons

1100 gal X 3 hp / 12 gpm X 1 hr / 60 min X 0.746 kwh / hp X $ 0.1244 / kwh = $ 0.425 per Kgal

Reverse Osmosis Electrical Costs per 1000 Gallons

1100 gal X 375 hp / 1100 gpm X 1 hr / 60 min X 0.746 kwh / hp X $ 0.1244 / kwh = $ 0.580 per Kgal

Reverse Osmosis Labor Costs per 1000 Gallons

1100 gal X 1 min / 1100 gal X 1 man-day / 1440 min X $174.68 / man-day X 2 operators = $ $0.243 per Kgal

Treatment chemical costs per 1000 Gallons

Antiscalant:

1100 gal X 0.000003000 gal antiscalant / 1 gal X $18.66 / gal antiscalant = $ $0.062 per Kgal

Reductant:

1100 gal X 0.000200 lbs reductant / 1 gal X $0.730 / lb reductant = $ $0.161 per Kgal

Reverse Osmosis Production Rate per Mine Unit

400 gal/min X 60 min/hr X 24 hr/day X 365 day/year X 1/12 year/month = *17,520,000 gallons/month*

TOTAL RO COSTS PER 1000 GALLONS	**= $ 1.51**

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Groundwater Recirculation Unit Costs

Assumptions:

1. All pumps are 5 hp pumping at 32 gpm
2. Cost of electricity = $0.1244 Kw hr
3. Horsepower to kilowatt conversion = 0.746 Kw/HP
4. Operator labor costs = $174.68 man-day

Wellfield Pumping Electrical Costs per 1000 Gallons

1000 gal X (3 hp / 12 gpm) X (1 hr / 60 min) X (0.746 kwh / hp) X ($ 0.1244 / kwh) = $ 0.387 per Kgal

Wellfield Injection Electrical Costs per 1000 Gallons

1000 gal X (.0 hp / 1150 gpm) X (1 hr / 60 min) X (0.746 kwh / hp) X ($ 0.1244 / kwh) = $ 0.000 per Kgal

Recirculation Labor Costs per 1000 Gallons

1000 gal X (1 min / 1150 gal) X (1 man-day / 1440 min) X ($174.68 / man-day) X 1 operators = $ 0.105 per Kgal

Recirculation Production Rate

1150 gal/min X 60 min/hr X 24 hr/day X 365 day/year X 1 year/12 month = *50,370,000 gallons/month*

TOTAL RECIRCULATION COSTS PER 1000 GALLONS	**= $ 0.49**

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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 $ 21.84	per hour	=$ 21.84	$0.0312
Cat 416 Backhoe	0.25 hours	X $ 131.40	per hour	=$ 32.85	$0.0469
Drill rig	2.5 hours	X $ 250.00	per hour	=$ 625.00	$0.8929
Well Cap	1 each	X $ 6.75	each	=$ 6.75	$0.0096
Materials per foot of well (Variable Cost)					
Cement	0.0714 lbs/ft	X $	0.060 per pound		$0.0043
Bentonite Chips	0.007 tubes/ft	X $	11.49 per tube		$0.0804
Plug Gel	0.0086 sacks/ft	X $	12.90 per sack		$0.1109
Total Estimated Cost per Foot:					**$1.18**

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Alternate Concentration Limit (ACL) Unit Cost per Mine Unit

Assumptions:

1 Equipment and labor
2 Analytical Costs
3 Third Party Engineering Consultant
4 Core Holes per Mine Unit

ACL Costs per Core Hole

Equipment and Labor:

Drilling Costs

34 hours	X	$	250.00	per hour	=	$	8,500.00

Analytical Costs:

XRD Bulk

1 samples	X	$	209.61	per sample	=	$	209.61

XRD Bulk + Clay

1 samples	X	$	419.22	per sample	=	$	419.22

Selective Extraction

4 samples	X	$	821.47	per sample	=	$	3,285.88

Elemental Analysis

1 samples	X	$	530.83	per sample	=	$	530.83

Porosity + Particle Size

1 samples	X	$	379.58	per sample	=	$	379.58

Third Party Engineering Consultant Costs:

1 months	X	$	8,843.08	per month	=	$	8,843.00

Unit Cost per Core Hole: = $ 22,168.12

Core Holes per Mine Unit:

2 Holes	X	$	22,168.12	per hole	=	$	44,336.00

TOTAL ACL COST PER MINE UNIT = **$ 44,336.00**

FIVE YEAR MECHANICAL INTEGRITY TESTS (MIT)

Assumptions:

1 Pulling Unit for 8 hr/day
2 MIT Unit for 8 hr/day
3 Labor for operation of pulling unit requires 2 workers (one operator & one laborer)
4 Labor for operation of MIT Unit requires 1 worker

MIT Costs per Well

Equipment and Labor:

Pulling Unit includes one operator					
	8 hours	X	$ 28.87	per hour	=$ 230.96
Laborer					
	8 hours	X	$ 21.84	per hour	=$ 174.72
MIT Unit includes one operator					
	8 hours	X	$ 28.87	per hour	=$ 231.00
				TOTAL MIT COST PER DAY	=$ 636.68
Wells Completed		6		per day	

MIT COSTS PER WELL =$ 106.11
MIT COSTS PER DEEP DISPOSAL WELL (2021 Cost) =$ **10918**

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Mine Unit Data

		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 number of production wells		3	52	57	103	210	187	205	269	195	298	201
Total number of injection wells		0	79	96	169	236	309	380	412	324	503	284
Total number of shallow monitor wells		0	3	3	11	25	28	25	30	20	32	24
Total number of perimeter monitor wells		11	10	7	9	25	26	8	20	13	32	19
Total number of restoration wells		10	12	18	43	59	55	25	34	21	36	25
Wellfield 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	1,834,174
Wellfield Area (acres)		9.27	11.70	13.46	71.62	129.66	34.61	51.01	62.51	48.95	76.19	42.11
Affected 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	1,834,174
Avg. Completed Thickness		19.6	16.3	12.5	12.9	14.6	15.4	12.3	16.4	16.4	18.8	21.6
Porosity		0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Affected 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	39,618,158
Flare Factor		1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Kgallons per Pore Volume		20,597	21,622	19,073	104,756	214,642	60,437	71,149	116,244	91,030	162,423	103,128
Number of Patterns in Unit(s)												
	Current	0	52	57	96	187	187	205	269	195	298	201
	Estimated next report	0	0	0	0	0	0	0	20	0	0	0
	Total Estimated	0	52	57	96	187	187	205	289	195	298	201
Number of Wells in Unit(s)												
Production 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
Injection Wells												
	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
Shallow Monitor Wells												
	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
Perimeter Monitor Wells												
	Current	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
Total Number of Wells		4953										
Average Well Depth (ft) - Deep Wells		665	631	774	698	675	515	762	500	770	480	790
Average Well Depth (ft) - Shallow Wells		200	200	200	200	200	200	200	200	200	150	300

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Electrical Costs	2021	2022 Est Rate	
Power cost (adj for current actual cost)	$0.1180	$0.1244	kwHr
Kilowatt to Horsepower	0.746	0.746	Kw/HP
Horsepower per gallon per minute	0.167	0.167	HP/gpm

Labor Rates	2021	2022 Est Rate	
Operator Labor Cost	$174.44	$174.68	day
Pulling Unit Operator	$217.78	$230.96	day
Engineer Cost	$8,813.50	$8,843.08	month
Radiation Technician Costs	$6,907.67	$7,108.67	month

Costs are from: Nebraska Department of Labor

Chemical Costs	2021	2022 Est Rate	
Antiscalent for RO (adj for current actual cost)	$16.82	$18.66	gal
Reductant (adj for current actual cost)	$0.65	$0.73	lb
Cement (adj for current actual cost)	$0.06	$0.06	pound
Bentonite Tubes (adj for current actual cost)	$10.12	$11.49	tube
Salt (adj for current actual cost)	$109.60	$117.76	ton
Plug Gel (adj for current actual cost)	$10.75	$12.90	sack
Well Cap (adj for current actual cost)	$7.50	$6.75	each
Hydrochloric Acid (adj for current actual cost)	$1.30	$1.83	gallon

Costs are based off of current invoices. No current invoices for well caps so escalation factor applied.

Analytical Costs	2021	2022 Est Rate	
Guideline 8	$220.00	$220.00	analysis
5 parameter	$60.00	$60.00	analysis
Other (radon, bioassays, etc.)	$600.00	$600.00	month

Costs are based on third party lab fees

Analytical Costs for Coring	2021	2022 Est Rate (CPI)	
XRD Bulk	$199.63	$209.61	analysis
XRD Bulk + Clay	$399.26	$419.22	analysis
Selective Extraction Method (SEM)	$782.35	$821.47	analysis
Elemental	$505.55	$530.83	analysis
Porosity + Particle Size	$361.50	$379.58	analysis

Costs are based on third party lab fees

Spare Parts	2021	2022 Est Rate (CPI)	
Restoration spare parts estimate	$57,332.60	$60,199.23	year

Pumps, motors, filters, etc

CPI Escalators (CPI-U, U.S. City Average)	
1988 CPI (average)	118.5
June 2014 CPI (deep well estimate)	238.3
2020 CPI (August 2020 used in last update)	259.9
Current CPI (July 2021)	273.0
2021 Escalation Factor	1.05

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Equipment Costs

Equipment	Base Rental Rate ($/hr)	Labor Costs ($/hr)	Repair Reserve Costs ($/hr)	Fuel Costs ($/hr)	Mob & Demob ($/hr)	Total ($/hr)
Cat 926M Loader	$56.65	$21.84	$125.00	$24.19	inc.	$227.68
Cat 420F Backhoe	$30.00	$21.84	$71.00	$8.56	inc.	$131.40
Pipe Chipper	$13.08			inc	inc	$13.08
Cat D8T Bulldozer	$202.50	$21.84	$340.00	$33.93	inc.	$598.27
Pulling Unit	$65.53	inc	inc	inc	inc	$65.53
Mixing Unit	$5.00			inc	inc	$5.00
Drill Rig	$250.00	inc	inc	inc	inc	$250.00

Basis:
Drill rig based on current 2021 contract.
Equipment rates based on Cost from NMC Cat Rental September 2021
Average 2021 costs for off-road fuel: $2.95 gallon

Pipe Volumes

Nominal Pipe Size	Wall Thickness (in.)	Pipe OD (in.)	Volume per foot (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-inch Sch. 40 stinger	0.14000	1.66000	0.00440
2-inch 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 pipe	0.28000	6.56000	0.03840
6-inch Trunkline	0.49100	6.56600	0.06510
8-inch Trunkline	0.63900	8.54800	0.11030
10-inch Trunkline	0.79600	10.65400	0.17120
12-inch Trunkline	0.94400	12.63700	0.24080

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Pipe Removal and Shredding Costs

Activity	*Removal Rate (ft/man-day)*	*Shredding Rate (ft/man-day)*	*Labor Rate (day)*	*Activity Cost per foot*
2-inch SDR 13.5 inj & prod. Removal	225		$174.68	$0.78
2-inch SDR 13.5 inj & prod. Shredding		1920	$174.68	$0.09
Trunkline Removal	100		$174.68	$1.75
Trunkline Shredding		100	$174.68	$1.75
Downhole Pipe Removal	2000		$174.68	$0.09
Downhole Pipe Shredding		2250	$174.68	$0.08
Downhole Hose Removal	1000		$174.68	$0.17
Waste and RO Building Pipeline Removal	67		$174.68	$2.61
Waste and RO Building Pipeline Shredding		1500	$174.68	$0.12

Waste Disposal Costs

Waste Form	*Fee*		*Density Correction Factor (Tons/Yd3)*	*Fee per Cubic Yard*	*Transport Cost*		*Total Transportation and Disposal*	
Soil, Bulk Byproduct Material*	$296.33	per Ton	0.54	$160.02	$114.38	per Yd3	$274.40	per Yd3
Unpackaged Bulk Byproduct Material (e.g., pipe, equipment)	$282.25	per Ton	0.42	$118.55	$114.38	per Yd3	$232.93	per Yd3
Solid Waste (landfill)	$0.12	per Lb			Incl.	per Lb	$0.12000	per Lb
Solid Waste (landfill)	$411.00	per Load			Incl.	per Load	$411.00	per Load
Void Factor (for disposal)	1.25							
*no current invoice, esoalation factor applied								

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Plant Dismantling

Plant Components:	*Number*	*Units*	*Estimated Disposal Volume*	*Units*
Contaminated Tanks	141	each	19.3	Ft3 each
Uncontaminated Tanks	21	each	19.3	Ft3 each
Pumps	188	each	5	Ft3 each
Downhole Pumps	1174	each	0.5	Ft3 each
Contaminated Piping	11000	feet		
Uncontaminated Piping	4800	feet	See estimate by piping size and material	
Filters	125	each	100	Ft3 each
Dryer	2	each	400	Ft3 each
Average PVC Pipe Diameter (inches)	6			

Activity	*Units*	*2017 Cost*
Dismantle interior steel, tanks, piping electrical, and Plant Building		$ 625758.00
Concrete floor removal rate	Current Cost $/ft2	17.80

Plant Decontamination

Direct Dispose Plant Floor Area	11100 ft2	Decon Solution (HCl) Floor Application Rate	2	gal/ft2
Uncontaminated Plant Floor Area	7270 ft2			
Decontaminated Plant Floor Area*	39738 ft2			
Average concrete thickness	0.5 ft			
Plant Wall Area	36470 ft2	Decon Solution (HCl) Wall Application Rate	1	gal/ft2