



Lance M. Hauer, P.E.

Legacy Site Team Leader - Remediation

GE
Global Operations - EHS
412 Creamery Way
Exton, PA 19341

T 484-213-0300
Lance.Hauer@ge.com

Sent via Email

March 31, 2020

Mr. James Smith, Health Physicist
Division of Decommissioning, Uranium Recovery, and Waste Programs
Office of Nuclear Materials Safety and Safeguards
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Two White Flint North, Mail Stop 5A10
Rockville, MD 20852

Re: Financial Surety Rebaselining Report
Source Materials License No. SUA-1475
Church Rock Site, Gallup, New Mexico

Dear Mr. Smith:

Pursuant to the Nuclear Regulatory Commission's (NRC) request dated November 26, 2019, enclosed is a report prepared by Stantec on behalf of United Nuclear Corporation (UNC) providing a cost estimate for re-baselining of the financial surety required in License Condition 25 of the license for the Church Rock Site. The report provides information to support UNC's 2018 license amendment request to the NRC to modify the reclamation plan described in License Condition 34 as well as the reclamation timelines defined in License Condition 35. This report provides the estimated costs for the reclamation activities described in the LAR, remaining decommissioning, short-term surveillance activities, and the long-term surveillance fee.

Following NRC's review and approval, UNC will update the existing bond to provide a financial surety amount of \$23,495,837.

Please contact me at (484) 213-030 if you have any questions or would like additional information.

Sincerely,

A handwritten signature in black ink, appearing to read 'Lance M. Hauer'.

Lance M. Hauer, P.E.
Legacy Site Team Leader

Enclosure: March 31, 2020 Church Rock Mill Site Financial Surety Cost Estimate



**United Nuclear Corporation
Church Rock Mill Site Financial
Surety Cost Estimate**

Nuclear Regulatory Commission
SUA-1475

March 31, 2020

Prepared for:

United Nuclear Corporation
PO Box 3077
Gallup, NM 67305

and

General Electric Company
412 Creamery Way
Exton, PA 19341

Prepared by:



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

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UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

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UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Abbreviations

amsl	above mean sea level
AOC	Administrative Settlement Agreement and Order on Consent for Design and Cost Recovery
CAP	corrective action program
CFR	Code of Federal Regulations
CPI	consumer price index
cy	cubic yard
DOE	US Department of Energy
ET	evapotranspirative
fps	feet per second
ft	feet
HDPE	high-density polyethylene
kg	kilogram
LAR	License Amendment Request
mg	milligram
Mill Site	Church Rock Mill Site
Mine Site	Northeast Church Rock Mine Site
MWH	MWH Americas, Inc.
NECR	Northeast Church Rock
NRC	US Nuclear Regulatory Commission
NUREG	Nuclear Regulatory Guide
pCi	picocuries
pCi/g	picocuries per gram
pCi/m ² /s	picocuries per square meter per second
PDS	Pre-design Studies
PTW	principal threat waste
Ra-226	radium 226
RA	Removal Action (Mine Site) or Remedial Action (Mill Site)
ROD	Record of Decision
SOW	Statement of Work
TDA	Tailings Disposal Area
UNC	United Nuclear Corporation
USEPA	US Environmental Protection Agency



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Purpose and Scope

1.0 PURPOSE AND SCOPE

In November 2019, the US Nuclear Regulatory Commission (NRC) notified United Nuclear Corporation (UNC) that re-baselining of the financial surety evaluation is necessary given the 2018 submission to NRC of a license amendment request (LAR) for Source Material License SUA-1475 (license) for the UNC Mill Site near Church Rock, New Mexico (Stantec, 2018). The submittal provides information to support UNC's request to the NRC to modify the reclamation plan described in License Condition 34 as well as the reclamation timelines defined in License Condition 35. This Cost Estimate for the Mill Site provides the estimated costs for the reclamation activities described in the LAR, remaining decommissioning, short-term surveillance activities, and the long-term surveillance fee. NUREG 1620, Appendix C (NRC, 2003), has been used as guidance to prepare this document.

Proposed activities at the site include construction of a Repository for mine-impacted soil and debris on the licensed mill tailings disposal area (TDA). The 2018 LAR proposes transporting mine waste from the Northeast Church Rock Mine Site (based on defined cleanup standards), to a Repository located on the existing TDA. The Repository design includes specific procedures for protection of the existing radon barrier over the mill tailings and an erosion-resistant, evapotranspirative (ET) cover over the mine waste. Stormwater controls will be added in the vicinity of the Repository and to the Pipeline Arroyo.

Additional activities at the Mill Site include decommissioning of wells and the existing evaporation ponds. Mill Site operations currently add water, pumped from the Mill Site Well and piped to the evaporation ponds, to minimize dust from the pond liners and protect the integrity of the high-density polyethylene (HDPE). This process is completed regularly to maintain water levels in the ponds. Once the groundwater corrective action program (CAP) is terminated, any remaining water in the ponds will be allowed to evaporate, and the ponds will be decommissioned. Remaining 11e.(2) materials onsite will be interred in the ponds and the NRC-approved tailings cover for the South Cell will be installed to complete reclamation of the South Cell. For the proposed Repository design, Stantec has assumed the evaporation ponds will be reclaimed and the South Cell cover will be completed as originally designed. Updated calculations for stormwater and erosion controls on the south cell, near the ponds, may be required.

Costs associated with decommissioning and reclamation of the Mill Site are summarized in Section 4. Costing calculation details are included in the appendices as:

- Appendix A – Cost Estimate Summary for the Mill Site Activities
 - A.1 – Basis of Estimate report
 - A.2 – Cost Estimate
 - A.3 – Work Crew Calculations
 - A.4 – Unitary Costs and Cost Assumptions



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Purpose and Scope

- Appendix B – Well Decommissioning and Groundwater Monitoring Cost Estimates provided by Wood PLC

This Cost Estimate for the Mill Site excludes all expenditures for previously completed reclamation activities at the Mill Site. Reclamation activities discussed in this Cost Estimate have been priced in 2020 dollars. There also is an existing \$2,000,000 financial assurance (FA) bond held by US Environmental Protection Agency (USEPA Region 6) for the Groundwater Corrective Action Program. This existing FA has been deducted from the Cost Estimate.



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Facility Description

2.0 FACILITY DESCRIPTION

2.1 SITE LOCATION

The Mill Site is a non-operating uranium mill site located approximately 17 miles northeast of Gallup in McKinley County, New Mexico. The Mill Site included an ore processing mill and a TDA which covers approximately 10 and 40 hectares (25 and 100 acres), respectively. The Mill Site encompasses Section 2, Township 16 North, Range 16 West and extends to Section 36, Township 17 North, Range 16 West, which is also owned by UNC. The Mill Site is located near the end of NM Highway 566 (NM 566) which extends from I-40 near Church Rock, NM to the NECR Mine Site where the highway ends. NM 566 is located within Pipeline Canyon. The elevation of the Mill Site is approximately 6,970 ft amsl.

2.2 FACILITY LAYOUT AND HISTORY

The existing Mill Site features and infrastructure are shown in Figure 1. Two soil borrow pits were previously excavated within the Central Tailings Cell as a source of borrow soil for construction of the tailings impoundment. Borrow Pit 1 was located near the center of the Central Tailings Cell and Borrow Pit 2 was located on the east side of the Central Cell. The existing evaporation ponds are located on the South Tailings Cell. The “rock jetty”, a buried riprap slope, is located northeast of the evaporation ponds, outside of the tailings area, and perpendicular to Pipeline Arroyo. Dilco Hill is a prominent natural rock outcrop located east of the North Tailings Cell and is one of the highest points of elevation on the site. The upstream diversion channels (North and South) are located along the east/southeast side of the tailings area and the North Upstream Diversion channel was constructed by cutting through the rock on the east side of Dilco Hill.

The Mill Site operated from May 1977 to May 1986 under a license issued by the New Mexico Environmental Improvement Division. On June 1, 1986, the NRC assumed regulatory authority for uranium and thorium milling activities and mill tailings in the State of New Mexico (51 FR 19432; May 29, 1986) and subsequently issued Source Material License No. SUA-1475 to UNC for the Mill Site. Source Material License SUA-1475 was most recently amended (No. 53) on November 17, 2016. The tailings reclamation plan (Canonie, 1991) for the TDA associated with the former mill was submitted by UNC on August 30, 1991 and approved by NRC on March 1, 1991.

Source Material License Condition 30 includes details for requirement of a groundwater corrective action program (CAP). License Condition 34 grants the licensee permission to construct and operate “*an enhanced evaporation system in accordance with the system described in the submittal dated June 14, 1990.*” The as-built report for the evaporation ponds, constructed on the south cell, is dated March 1989 (Canonie, 1989).

The UNC site processed uranium ore from the NECR mine as well as ore from other sources, including Quivira’s mine. Mill operations ended in 1982 and the mill was decommissioned from 1991 to 1993. Interim tailings reclamation activities were implemented between 1989 and 1991 based on the proposed



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Facility Description

reclamation plan (Canonie, 1987). The evaporation ponds were constructed in 1988 to dispose of collected seepage water from the site groundwater pumpback system. As-built reports are available for the evaporation pond system, north cell interim stabilization, central cell interim stabilization, north cell final reclamation, and central cell final reclamation (Canonie, 1989; 1990; 1992; 1994; and 1995, respectively).

2.3 PREVIOUS DECOMMISSIONING

UNC submitted a mill decommissioning plan dated December 29, 1988, later revised on April 10, 1990, in accordance with Condition 26 of the source material license. The mill decommissioning completion report was submitted to NRC on April 13, 1993. The report included details of the mill facilities demolition and placement of the debris within the TDA. Mill debris was placed in the former borrow pit (no. 2) on the east side of the Central Tailings Cell within the TDA beginning in July 1991.

Decommissioned mill material placed in 1991 included structural steel and siding from demolished buildings, process equipment, piping, tanks, wooden staves, and barrels containing lab ore samples. The decommissioned materials in 1992 consisted primarily of concrete from the process area foundations, sumps, and floors. A small volume of decommissioned materials including piping, solution pumps, and other miscellaneous items, was placed in the southeast corner in 1993. In 1994, a small amount of remaining miscellaneous mill equipment was placed in a mound in the center of Borrow Pit No. 2. This mound was covered with soil, and the entire borrow pit was backfilled to near the surface. This fill was referred to as the interim cover and was compacted to form the base for the radon attenuation cover. In 1995, several tanks were cut up and placed in Borrow Pit No. 2, and 5,000 cubic yards of contaminated soil that was removed during swale construction was placed in the borrow pit. These materials were buried beneath the clean soils that made up the interim cover. The borrow pit area was compacted and the radon attenuation layer, as a component of the final cover system was constructed.

2.4 TAILINGS RECLAMATION

Source Material License Condition 34 indicates the approved tailings reclamation plan was submitted August 30, 1991 and modified by licensee submittals dated March 5, April 10, and June 21, 1996. The three primary cells within the TDA (North, Central, and South) were reclaimed in phases and covered between 1989 and 1995. Source Material License Condition 35 states that the licensee shall complete site reclamation in accordance with the approved reclamation plan and groundwater CAP as authorized by License Condition Nos. 34 and 30, respectively. Condition 35 also includes the following schedule and target date items (not yet completed, in the area of the evaporation ponds):

- *Placement of final radon barrier designed and constructed to limit radon emissions to an average flux of no more than 20 picocuries per square meter per second (pCi/m²/s) above background – December 31, 2019.*
- *Placement of erosion protection as part of reclamation to comply with Criterion 6 of Appendix A of 10 CFR Part 40 – December 31, 2019.*



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Facility Description

- *Projected completion of groundwater corrective actions to meet performance objectives specified in the groundwater corrective action plan – December 31, 2018.*

The schedule of items listed above, and in the source material license, are specific to completion of the groundwater CAP and reclamation (placement of final radon barrier and erosion protection) of the existing evaporation ponds located on the South Cell of the TDA.

The mill buildings were previously released for unrestricted use by the NRC and therefore decommissioning of the structures is not included in the Cost Estimate.



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Modification of Existing Tailings and Mill Site Decommissioning

3.0 MODIFICATION OF EXISTING TAILINGS AND MILL SITE DECOMMISSIONING

3.1 MODIFICATION OF EXISTING TAILINGS RECLAMATION

The required design elements for the removal action described in the Administrative Settlement Agreement and Order on Consent for Design and Cost Recovery (AOC) and Statement of Work (SOW) (USEPA, 2015) include activities at both the Mine Site and Mill Site. The selected remedy for the NECR mine is to remove mine waste material from the Mine Site and dispose of the mine waste at the nearby Mill Site on the TDA. Approximately 1.0M cubic yards of mine-impacted materials will be removed from the Northeast Church Rock (NECR) Mine Site (Mine Site) and transported to the UNC TDA. The proposed Repository will be located on the existing North and Central cells of the reclaimed TDA. This proposed action would be a modification to License Conditions 34 and 35 and requires revisions both to the tailings reclamation plan for the area of the TDA influenced by the Repository as well as to the schedule to complete reclamation. The analyses included in the LAR represent an updated tailings reclamation plan for the source material license specific to modifications of the reclaimed TDA near the Repository.

Mine-impacted soils will be excavated and removed from the Mine Site, located approximately 0.5-mile northwest of the former Mill Site. These materials will be transported to, and disposed in, the Repository to be constructed on portions of the reclaimed North and Central cells of the TDA. The project components that pertain to the TDA and the Cost Estimate are listed below:

- Construct a mine haul road within the license area to transport material to the Repository
- Remove the existing erosion protection layer on the TDA cover within the footprint of the Repository
- Enhance the Repository footprint by compacting the existing tailings radon barrier to provide separation between the Repository and underlying tailings
- Transport mine waste within the license area to the TDA for placement in the Repository
- Construct an evapotranspirative (ET) cover over the final mine waste surface of the Repository
- Upgrade the stormwater channels adjacent to the Repository
- Reconstruct the “rock jetty” area located in the Pipeline Arroyo adjacent to the west side of the TDA
- Restore and revegetate areas at the Mill Site disturbed by construction



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Modification of Existing Tailings and Mill Site Decommissioning

Materials to be placed in the Repository include soil, waste rock, and mine debris (metal, concrete, wood, etc.), and removed vegetation. Sections 3 and 4 of the LAR provide further details on the Repository design.

3.2 MILL SITE DECOMMISSIONING

3.2.1 Salvageable Building and Equipment Decontamination

The existing Mill Site buildings were previously released by NRC and will remain at the site.

3.2.2 Non-Salvageable Building and Equipment Demolition and Disposal

Stantec conducted an inventory of observable surface debris and solid waste for the Mill Site as part of the Pre-Design Studies (MWH, 2013). The survey included surficial debris located in the southwest area of the Mill Site, materials and wastes located near the tailings impoundment, the tailings impoundment evaporation sprinkler system, and other observed materials. The debris located near the Mill Site office buildings and shaft construction yard were also inventoried and are included in the volume estimates. The areas with remaining debris for disposal at the Mill Site are shown on Figure 1. The remaining contaminated non-salvageable debris or equipment identified will be disposed of in the evaporation ponds. The table below summarizes the estimated total volume of debris based on the material type. The total estimated volume of debris at the Mill site is approximately 6,870 cy.

Table 1 Summary of Mill Site Debris Volume by Type

Material	Volume (cy)
Metal	1,870
Concrete	615
Plastic	450
Wood	175
Fiberglass/Rubber	60
Misc. Buried Debris	3,700
Total	6,870

3.2.3 Decommission and Cover Two Evaporation Ponds

The Repository design and analyses assume that the existing evaporation ponds will be reclaimed, and the previously planned and approved cover will be completed in that area (Canonie, 1991).

Closure of evaporation ponds 1 and 2 will consist of:

- Disposal of jetty area impacted soil and groundwater decontamination equipment into evaporation ponds
- Addition of soil backfill and rock cover



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Modification of Existing Tailings and Mill Site Decommissioning

- Area recontouring and reseeded
- Re-establishment of surface drainage swales

The Cost Estimate assumes that conventional methods would be used for the decommissioning and closure of the two 5-acre evaporation ponds. Heavy earth-moving equipment will be used to close the ponds and grade the surrounding areas to required specifications. Pond closure methods include backfilling the ponds with both imported soils from the jetty area and the soils used as the pond's bermed material, then capping. Remaining debris and 11e.(2) materials on site will be buried in the ponds and the NRC-approved tailings cover for the South Cell (Canonie, 1991) will be installed to complete reclamation of the South Cell. For the proposed Repository design, Stantec has assumed the evaporation ponds will be reclaimed and the South Cell cover will be completed as originally designed. The cover consists of 1.5 feet of radon attenuation soil cover and 0.5 feet of soil and rock matrix for erosion protection.

The estimated costs of evaporation pond closure are detailed in Section 4. Table 3 summarizes the costs associated with each general reclamation task. Total field cost calculations and descriptions for the project components pertaining to the Mill Site Decommissioning are detailed in Appendix A.

3.3 GROUNDWATER CLEANUP AND WELL DECOMMISSIONING

The approved method of site groundwater cleanup includes extraction and evaporation of contaminated groundwater from three saturated zones as detailed in the US Environmental Protection Agency (EPA) Record of Decision (ROD) signed September 30, 1988 (using evaporation ponds and 28 water cannons for additional evaporation).

In April 2015 the NRC issued License Amendment No. 52 approving UNC requests for alternative groundwater protection standards for arsenic, lead, lead-210, nickel, radium-226, and -228, selenium, thorium-230, and uranium at NECR. Groundwater cleanup activities were conducted and groundwater monitoring continues. Groundwater monitoring is assumed to continue through the end of 2025..

3.3.1 Well Decommissioning

Well decommissioning will include removal of well casing, bentonite plugging, and surface completion and restoration. Well decommissioning will be performed in accordance with the Tailings and Reclamation Plan (Canonie, 1991) and NMOSE regulations (NMAC 19.27.4). The remaining monitoring wells at the Mill Site are summarized in Table 2 and additional details including well ID, depth, casing, and diameter of each well are included in Appendix B. The costs for well decommissioning were estimated by and obtained from Wood PLC and are included in Appendix B.



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Modification of Existing Tailings and Mill Site Decommissioning

Table 2 Monitoring Well Summary

Outside Diameter of Well (in)	No. of Wells	Total Depth of Wells (ft)
7	8	1,165
6.5	62	8,713
5	8	1,163
4.5	22	2,857
2.5	30	4,832
TOTAL	130	18,730

3.4 RADIOLOGICAL SURVEY AND MONITORING

Radiological survey and monitoring costs for the Mill Site activities were taken as a percentage of the total radiological survey and monitoring costs for the RA and are shown in Table 4 as Item No. 13 and will include:

- Pre-construction activities
 - Personnel dosimeter setup
 - Radiation safety training
- Remedial action radiologic support
 - Work and personnel air sampling
 - Personnel exposure rate and dosimetry
 - Clean area, equipment, and personnel surveys
 - Swipe paper sampling
- Radiation protection and perimeter radiologic air monitoring plan
 - Perimeter, road crossing, and material and equipment release surveys
 - Perimeter air radiologic monitoring for release to unrestricted areas
 - Radiological survey and monitoring reporting

Detailed costing tables and crew breakdown for radiological surveying and monitoring are included in **Appendix C**.



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Estimated Costs

4.0 ESTIMATED COSTS

4.1 KEY COST ASSUMPTIONS

Key assumptions are summarized below, and additional details of assumptions are included in Appendix A.1 Basis of Estimate Report.

- The site is accessible and allows unrestricted access for contractors
- United Nuclear Corporation (UNC) will provide site-specific radiologic safety training for workers
- All direct work is performed by construction contractors
- All support work is performed by UNC or its consulting contractors, or their subcontractors
- Well decommissioning is based on the current number of operable active wells (130 wells as of March 2020)
- Heavy equipment work scheduled to be performed on a 5-day week, 12-hour work day, which results in 8.5 effective hours (less travel, startup, lunch, breaks, etc.)
- A swell factor of 25% was used to convert bank material to loose cubic yards
- Dust suppression during earth moving activities is included in the crews calculations

4.2 SUMMARY OF UNC MILL SITE SURETY COSTS

Table 3 summarizes the costs for the Modification of the Existing Tailings Disposal Area and the Mill Site Decommissioning activities and breaks down the total costs into labor, equipment, and material costs; indirect costs; non-labor and miscellaneous costs; and contingency.

Table 3 Summary of UNC Mill Site Surety Costs

Item	Cost
Direct labor, equipment, material costs	\$15,951,187
Indirect costs (not including contingency)	\$5,928,355
Non-labor, miscellaneous direct costs	\$201,517
Contingency	\$2,422,906
Long-term surveillance fee	\$991,871
Total	\$25,495,837



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Estimated Costs

4.3 SUMMARY OF CAPITAL COSTS – MODIFICATION TO TAILINGS RECLAMATION AND DECOMMISSIONING

Table 4 summarizes the Mill Site modification to TDA and decommissioning costs, which are also included in more detail in Appendix A.

Table 4 Tailings Reclamation and Mill Site Decommissioning Cost Summary

Item No.	Reclamation or Decommissioning Task	Total Field Cost
1	Procurement	\$22,500
2	Site Preparation Work	\$378,216
3	Jetty Borrow Haul Road Construction	\$10,349
4	Repository Construction/Preparation for Mine Waste	\$675,368
5	Mine Waste Transportation within Site and Disposal in Repository	\$1,451,637
6	Repository ET Cover Construction (Material Placement and Grading)	\$3,860,829
7	Mill Site Final Grading and Seeding	\$78,018
8	Permanent Stormwater Features Construction	\$5,128,370
9	Final Revegetation	\$191,008
10	Monitoring, Testing, and Verification Controls	\$3,026,190
11	Mill Site Debris Excavation and Disposal	\$465,842
12	Cover Evaporation Ponds	\$347,698
13	Mill Site Well Decommissioning (Wood PLC)	\$539,180
14	Post-Construction Short-Term Surveillance of Repository	\$1,241,835
15	Groundwater Monitoring and Sampling	\$2,819,195
16	Land Surveying	\$673,755
17	Engineering, Fees, and Contingency	\$4,585,848
	Total	\$25,495,837

4.4 SUMMARY OF CAPITAL COSTS – REMAINING MILL SITE DECOMMISSIONING

Table 5 summarizes the evaporation ponds closure cost and Table 6 summarizes the well decommissioning costs. These costs and calculations are included in more detail in Appendix A.



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Estimated Costs

4.4.1 Evaporation Ponds Closure

The costs associated with closure of the evaporation ponds are summarized in line items 14 and 15 in Table 4. Additional cost breakdown is provided in Table 5.

Table 5 Summary of Costs – Evaporation Pond Closure

Item	Cost
Prep Evaporation Ponds for Debris	\$61,963
Mill Site Debris Excavation and Disposal	\$58,625
Place impacted soil around debris	\$315,507
Final Grading	\$29,747
Construct final cover to match south cell	\$347,698
Subtotal	\$813,540

4.4.2 Well Decommissioning

The costs associated with decommissioning of the site monitoring wells are summarized in line item 16 in Table 4. Additional cost breakdown is provided in Table 6 and Appendix B.

Table 6 Summary of Costs – Monitoring Well Decommissioning

Item	Cost
Mobilization/Demobilization	\$55,700
Well removal and abandonment	\$407,464
Equipment and materials	\$41,875
Estimated State and Local Taxes	\$34,141
Subtotal	\$539,180

4.5 INDIRECT COSTS

4.5.1 Short-Term Surveillance Cost

Short-term surveillance cost is shown in Table 7 and is included in Appendix A. Surveillance duration has been assumed to be 10 years, post-construction (Appendix W of the LAR) and includes:

- Post-closure and stormwater inspections
- Revegetation inspections



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Estimated Costs

- Engineering inspections
- Maintenance and repair costs
- Yearly surveillance reporting

Cost estimation for short-term surveillance was based on the crews and unit rates for labor and equipment used in the capital cost estimate (2020 U.S. Dollars). These unit rates were applied to the total length of the access roads and a portion of the repository and surrounding area that may require periodic regrading. It was assumed that a grader and water truck, each with an operator, would conduct the work.

4.5.2 Long-Term Surveillance Fee

The long-term surveillance fee is shown in Table 7 and included in Appendix A. Following guidance from NUREG 1620, the long-term surveillance fee was calculated based on \$250,000 (1978 dollars). The annual consumer price index (CPI) for the year 1978 (65.2) and the current CPI for February 2020 (258.68) were obtained from the U.S. Department of Labor, Bureau of Labor Statistics and used for the fee calculation.

4.5.3 Project Management and Engineering Costs

Engineering and associated costs are included in Item No. 19 of Table 4. Engineering/permitting and contractor management represent project management and miscellaneous costs in the estimation summary table in Appendix A. These costs were calculated by percent of direct project cost (direct costs do not include procurement or surveying). Project management accounts for 2 percent and contractor management accounts for 5.25 percent of direct costs.

Table 7 Summary of Costs – Indirect

Item	Cost
Procurement	\$22,500
Short-Term Surveillance of Repository	\$1,241,835
Groundwater Monitoring and Sampling	\$2,819,195
Surveying	\$673,755
Project Management and Administration Cost Estimate	\$848,017
Engineering and Permitting Cost Estimate	\$323,054
Long-Term Surveillance Fee	\$991,871
Subtotal	\$6,920,227



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Estimated Costs

4.6 OTHER COSTS

4.6.1 Labor and Equipment Overhead, Contractor Profit

Overhead costs are included in the hourly wages at a markup of 35 percent which also includes taxes, training, and PPE. These are shown in the Unitary Costs and Assumptions in **Appendix A.4**. Contractor profit was assumed to be 20 percent, as shown in **Appendix A.4**, Assumptions. This percent markup is applied to the crew hourly rate calculations, **Appendix A.3**.

4.6.2 Contingency Factor

NUREG 1620, Appendix C (NRC, 2003) states that the licensee should add a contingency amount to the total cost estimate for the final site closure, and that a 15 percent contingency is an acceptable minimum contingency. Based on the recommendations in NUREG 1620, a 15 percent contingency (\$2,422,906) was applied to the Cost Estimate. With the 15 percent contingency, the total Mill Site Project Cost is \$25,495,837

4.7 ONGOING SITE AND GROUNDWATER MONITORING

The costs for ongoing site monitoring and well sampling related to groundwater monitoring were estimated by and obtained from Wood PLC. The costs include monthly or quarterly sampling of wells, a semi-annual groundwater monitoring report, an annual CAP report update, and instrumentation, training, and well monitoring. The costs associated with ongoing site and groundwater monitoring are summarized in line item 18 in Table 4. The overall cost assumes groundwater monitoring will continue through 2025. Additional cost breakdown is provided in Table 8 and Appendix B.

Table 8 Summary of Costs – Groundwater Sampling and Maintenance

Item	Cost
Monitoring Well Sampling	\$1,171,137
Short-Term Surveillance for groundwater monitoring	\$991,258
Short-Term Surveillance for Mill License area	\$656,800
Subtotal	\$2,819,195

4.8 TOTAL SURETY COSTS

Table 9 shows total costs including modification of the existing TDA, remaining Mill Site decommissioning (evaporation ponds and well decommissioning), and ongoing site and groundwater monitoring and sampling activities.



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Estimated Costs

Table 9 Summary of Surety Costs

Item No.	Reclamation or Decommissioning Task	Total Field Cost
1	Procurement	\$22,500
2	Site Preparation Work	\$378,216
3	Jetty Borrow Haul Road Construction	\$10,349
4	Repository Construction/Preparation for Mine Waste	\$675,368
5	Mine Waste Transportation within Site and Disposal in Repository	\$1,451,637
6	Repository ET Cover Construction (Material Placement and Grading)	\$3,860,829
7	Mill Site Final Grading and Seeding	\$78,018
8	Permanent Stormwater Features Construction	\$5,128,370
9	Final Revegetation	\$191,008
10	Monitoring, Testing, and Verification Controls	\$3,026,190
11	Mill Site Debris Excavation and Disposal	\$465,842
12	Cover Evaporation Ponds	\$347,698
13	Mill Site Well Decommissioning (Wood PLC)	\$539,180
14	Short-Term Surveillance	\$1,241,835
15	Groundwater Monitoring – Maintenance and Sampling (Wood PLC)	\$2,819,195
16	Land Surveying	\$673,755
17	Engineering, Fees, and Contingency	\$4,585,848
Total Project Cost		\$25,495,837
<i>Existing USEPA Financial Assurance Bond</i>		<i>(\$2,000,000)</i>
Total Surety Amount		\$23,495,837



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Adjustments to the Cost Estimate

5.0 ADJUSTMENTS TO THE COST ESTIMATE

UNC will adhere to 10 CFR Part 40, Appendix A, Criterion 9, which requires an annual cost estimate adjustment for inflation and changes in reclamation plans. This submittal will be in the form of a request for amendment to the license.

5.1 ADJUSTMENTS FOR INFLATION

UNC will submit a revised surety estimate incorporating inflation adjustments to cost estimations 90 days before each anniversary of the date on which the first reclamation plan and cost estimate was approved. The inflation adjustment will be made using the Urban Consumer Price Index published by the U.S. Department of Labor, Bureau of Labor Statistics.

5.2 CHANGES IN PLANS

UNC will submit a revised surety estimate if project plans change by, but not limited to:

- The process, such as size or method of operation.
- Licensee-initiated changes in reclamation plans or reclamation/decommissioning activities performed.
- Adjustments to reclamation plans required by NRC.

Proposed revisions to reclamation plans must be thoroughly documented and cost estimates and the basis for cost estimates must be detailed for NRC review and approval.



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

References

6.0 REFERENCES

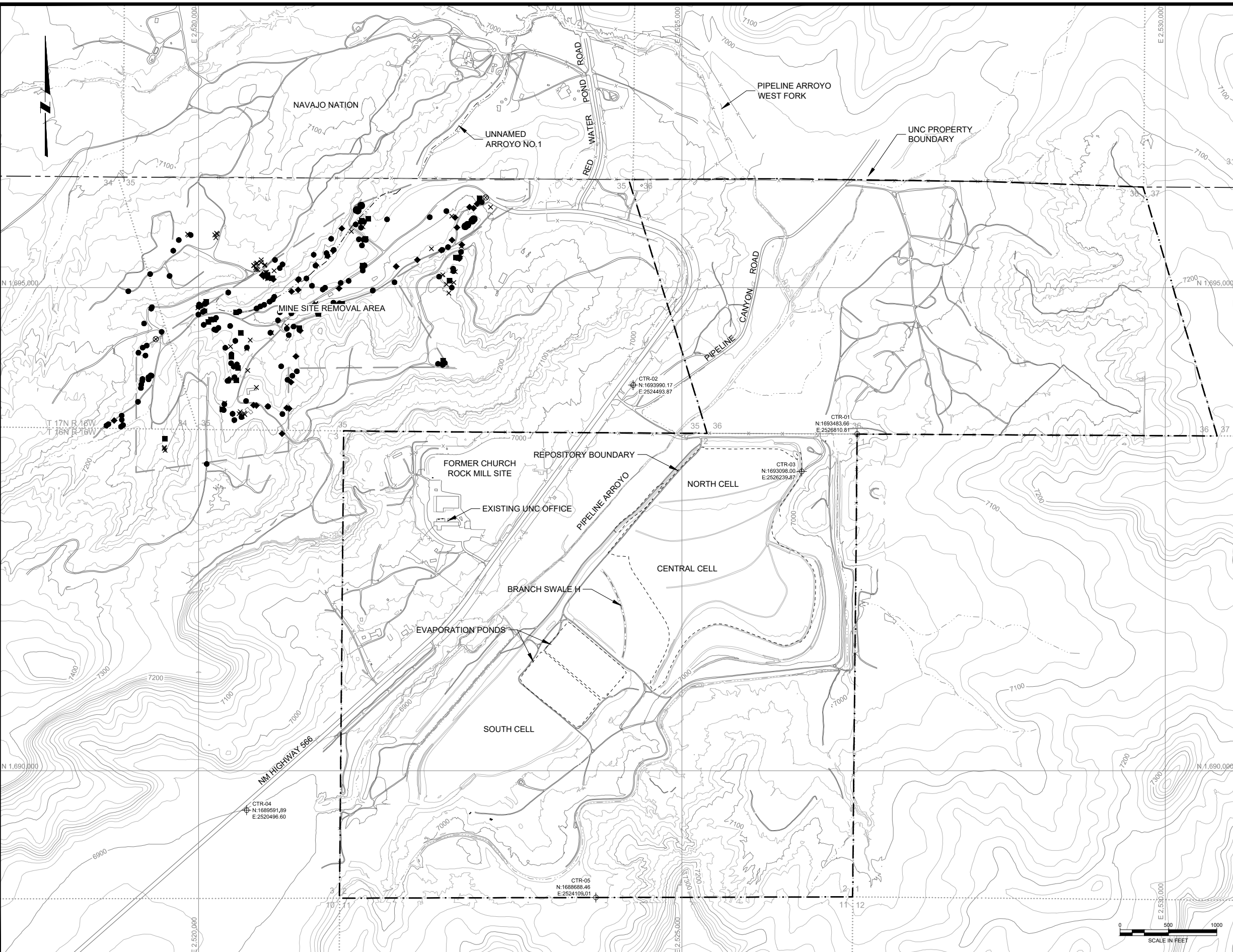
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FIGURES

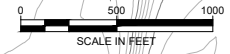


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- LEGEND:**
- EXISTING GROUND SURFACE CONTOUR & ELEVATION, FEET
 - NECR MINE PERMIT BOUNDARY
 - UNC PROPERTY BOUNDARY
 - APPROXIMATE NAVAJO NATION BOUNDARY
 - ROADS
 - NATURAL DRAINAGE
 - EXISTING FENCE
 - STRUCTURES
 - SECTION LINE
 - 36 SECTION NUMBER
 - SURVEY CONTROL POINTS

- DEBRIS GROUP:**
- METAL
 - CONCRETE
 - PLASTIC
 - WOOD
 - OTHER (INCLUDING MIXED DEBRIS IN BONEYARD AND POND 1)



REV	DATE	BY	DESCRIPTION	APPROVED
E	03/10/20	CF	ISSUED FOR COST ESTIMATE	
D	09/24/18	KR	ISSUED FOR LAR	DESIGNED_K REED
C	04/09/18	KR	ISSUED FOR REVISED 95% DESIGN	
B	10/30/17	KR	ISSUED FOR 95% DESIGN	CHECKED_S DOWNNEY
A	07/15/16	KR	ISSUED FOR 30% DESIGN	
				APPROVED_J CUMBERS



UNITED NUCLEAR CORPORATION AND NORTHEAST CHURCH ROCK MINE
MCKINLEY COUNTY, NEW MEXICO

NORTHEAST CHURCH ROCK PROJECT COST ESTIMATE
EXISTING SITE FEATURES AND INFRASTRUCTURE

APPENDICES



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Appendix A **Tailings Reclamation Modification and Mill Site Decommissioning Cost Estimate**

Appendix A **TAILINGS RECLAMATION MODIFICATION AND
MILL SITE DECOMMISSIONING COST ESTIMATE**



UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Appendix A Tailings Reclamation Modification and Mill Site Decommissioning Cost Estimate

A.1 BASIS OF ESTIMATE



Project No. 233001048

31 March 2020

PREPARED FOR:

**United Nuclear Corporation
P.O. Box 3077
Gallup, New Mexico 87305**

**General Electric Company
412 Creamery Way
Exton, PA 19341**

CONCERNING:

**Northeast Church Rock UNC Mill Site
Feasibility Study
Basis of Estimate
Revision D**

PREPARED BY:



**Stantec – Mining
1438 West Broadway Road, Suite 101
Tempe, Arizona 85282**

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1.0 INTRODUCTION

1.1 Project Description

The Mill Site is a non-operating uranium mill site located approximately 17 miles northeast of Gallup, New Mexico, in McKinley County on Highway 566.

The Selected Remedy involves excavating mine wastes from the Mine Site and consolidating them into a repository constructed within the footprint of the existing Tailings Disposal Area (TDA) at the nearby UNC Mill Site.

Excavation of mine spoils that exceed the Action Levels at the mine site, Potential Threat Waste (PTW), will be transported off site to the White Mesa Mill disposal facility in Utah. These PTW related costs and assumptions are not included in this cost estimate.

An evapotranspirative cover over the final mine waste surface in the repository will be constructed. Restoration and revegetation of disturbed areas will take place following construction.

Temporary stormwater controls will be put into place prior to construction, and permanent stormwater and erosion controls will be constructed as part of the project.

Costs are included here for the Mill Site portion of the work including Modification of the existing Tailings Disposal Area and the Mill Site Decommissioning activities.

1.2 Estimating Team Responsibilities

Stantec team members directly involved in the estimate are listed in Table 1.

Table 1: Cost Estimating Team Members/Responsibilities

Position	Name	Responsibility	Company
Project Design Lead	Jason Cumbers		Stantec
Project Engineer	Stephanie Downey		Stantec
Estimator	Justin Martin	Cost Estimate and Basis of Estimate	Stantec
Estimator	Kirk Farrell	Review of Cost Estimate	Stantec
Reviewer		Peer review	

1.3 Reference Documents

License Amendment Request (LAR) for Source Material License SUA-1475 for the United Nuclear Corporation (UNC) Mill Site near Church Rock New Mexico, submitted to the US NRC in 2018.

1.4 Definitions

- Direct Work or Direct Cost – The costs of materials, labor, equipment, and all directly involved efforts or expenses required to complete the project
- Indirect Cost – Costs for efforts provided in support of direct work. In this estimate, procurement and surveying are considered indirect costs
- Support Work – Effort supplied by NECR in support of the project

1.5 Assumptions

- The site is accessible and unrestricted access for contractors
- UNC will provide site specific safety training
- All direct work is performed by contractors
- All support work is performed by NECR

1.6 Contingencies

NUREG 1620, Appendix C states that the licensee should add a contingency amount to the total cost estimate for the final site closure, and that a 15 percent contingency is considered to be the acceptable minimum contingency. Based on the recommendations in NUREG 1620, the 15 percent contingency was applied to the cost estimate.

2.0 GENERAL COST ESTIMATING METHODS

2.1 Estimating and Scheduling Software

The cost estimate was prepared by Stantec using Microsoft Excel. For review purposes, the estimate will be provided in Excel format, complete with details of quantities and unit rates.

2.2 Currency

All costs for the project are in 2020 United States dollars (US\$).

2.3 Estimate Accuracy

The estimate is prepared to a feasibility study level of accuracy (+30%/-15%).

2.4 Units of Measure

The estimate is based on the following imperial units of measure.

- Feet (FT)
- Linear Feet (LF)
- Square feet (SF)
- Square yard (SY)
- Cubic feet (CF)
- Cubic yards (CY)
- Loose cubic yards (LCY)
- Tons (TN)
- Month (MN)
- Hour (HR)

2.5 Budget Quotations

At the request of GE, and to maintain confidentiality of the project, work packages specific to the project were not solicited to the public. For some work items with a generalized nature, such as traffic control signage, or temporary site facilities, quotations were solicited from contractors. These quotes obtained from contractors are budgetary in nature.

2.6 Estimate Details

The following subsections describe the approach taken. These items are listed by the section number of the item as identified in the estimate spreadsheet. For each similar earthmoving activity, a crew group was established with an assortment of equipment and manpower necessary for the task. Using an estimated/calculated performance rate of the crew group, a cost per hour and then a cost per unit was established. The unit costs were applied to the engineered quantities of materials to determine the total cost of the work in each section.

These crew groups are used throughout the portion of the estimate that is dependent on the use of heavy machinery to accomplish the work. Details of the crew groups can be found in the estimate spreadsheet.

1.0 Procurement

Procurement costs were calculated by using Stantec standard estimated hours to prepare a complete bid package through award of contract.

3.0 Mine Waste Roads, Haul Roads, and Access Roads

Haul roads within the Mill License area and haul roads to access borrow sources will be completed prior to hauling of waste materials.

The material in the Jetty Borrow is sufficient for the Repository cover. The estimate does not include developing roads to the South, West, North, or East borrow areas.

4.0 Prepare the Repository for Waste Material

A crew group was established with a unique assortment of equipment and manpower necessary for these activities. Using the estimated performance rate of the crew group, the unit costs were applied to the engineered quantities of materials in each item to estimate the total cost to prepare the Repository area.

5.0 Mine Waste Material Hauling – Phases 2-6

The haul performance for a Loose Cubic Yard (LCY) of mine waste material from each identified area was determined considering the quantity of material, haul distance to the repository within the Mill License area, hauling time, and dumping time. Details of the calculations can be found in the estimate.

A crew group using the above performance calculations was used to calculate costs of the hauling within the Mill License area.

A contractor markup of 20% is added to the cost of labor and equipment for this activity.

6.0 Construct an Evapotranspirative (ET) Cover over the Repository

The required cover soil for the repository is 449,000 CY. The Jetty excavation engineering indicates that it will produce 485,500 CY of soil. The estimate is based on using the excavated soil from the Jetty for the repository cover.

8.0 Permanent Storm Water Controls

Estimated performance for placing riprap, excavation of soils, and installation of permanent storm water features were calculated and used as the basis for each of the items.

The Price of riprap was obtained from a quarry specializing in large stone product based in Arizona. The cost is consistent with what it will cost to have a crushing operator set up in one of the projects identified pits and produce the sizes and quantities of riprap needed. The price includes anticipated royalties and loading of the materials. Trucking is separated in the estimate from the price of the rock.

9.0 Final Revegetation

Details in the design were used in pricing the grading and revegetation of areas used during construction.

10.0 Monitoring, Testing, and Verification Controls

UNC Mill Site – Cost Estimate – Basis of Estimate

The quality assurance and quality control activities will be performed on-site by a combination of Stantec Engineers and sub-contractors performing inspections and testing during the work.

A cost estimate to Implement Remedial Action Radiologic Support (Excavation Control, Final Status Survey and Verification Survey and radon cover survey & emission Testing Program) for NECR Removal Action was supplied by AVM Environmental Services, Inc.

A cost estimate to Implement Radiation Protection & Perimeter Radiologic Air Monitoring Plan for NECR Removal Action was supplied by AVM Environmental Services, Inc.

Fifty percent of these monitoring, testing, and verification control costs were applied to the Mill Site Cost Estimate.

11.0 Mill Site Debris Excavation and Disposal

Quantities for Mill Site Debris excavation to be placed in the evaporation ponds was obtained from the Pre-Design Studies Report (MWH, 2013). The unit costs and crew performance used in the Mine Waste Removal were applied to the debris removal.

12.0 Construct Existing Cover over Evaporation Ponds

The design features for the NRC-approved tailings cover for the South Cell (Canonie, 1991) were used to calculate quantities of material for the cover. Unit costs and crew performance used in the Repository Cover were applied to the evaporation pond cover.

13.0 Mill Site Well Decommissioning

A quote was obtained from a local drilling company for the well abandonment.

14.0 Short-Term Surveillance

The short-term surveillance activities will be performed on-site by a combination of Stantec Engineers and sub-contractors performing inspections and maintenance post-construction.

15.0 Groundwater Monitoring and Sampling

A cost estimate for groundwater monitoring and sampling was supplied by Wood PLC.

16.0 Land Surveying

During removal activities, land surveying for monthly quantity calculations is estimated using a Stantec geomatics crew out of the Phoenix, Arizona office. The crew will be on-site weekly taking measurement and calculating earth movement. The costs include manpower, equipment, travel, lodging, and all travel related expenses. Fifty percent of the land surveying costs were applied to the Mill Site Cost Estimate.

17.0 Engineering, Fees, Contingency

Engineering and permitting fees are given an allowance of 2% of the direct costs of the project.

A capital cost contingency of 15 percent was applied to the cost estimate, based on the recommendations in NUREG 1620, Appendix C.

A contractor management and administration allowance of 5.3% of direct costs of the project was included. This allowance is to cover the prime contractor's general supervision and field administration fees of the project.

2.7 Direct Cost Estimating Methods

2.7.1 Material Takeoffs

Material takeoffs (MTOs) were compiled through the combined efforts of the Stantec estimating, and design groups. This process involved designers calculating, checking, and entering neat quantities into a MTO spreadsheet. The estimators then applied allowances to the neat quantities.

2.7.2 Neat Quantity Takeoff

Construction design drawings were prepared by Stantec. MTOs were prepared based on the drawings and were presented in an Excel spreadsheet as neat quantities. A 25% swell allowance to neat quantities was added to waste materials to obtain final estimating quantities.

2.7.3 Estimate Buildup

Using the selected method of Removal Action, and the material takeoffs developed by the design team, direct cost estimates for activities, including all disciplines required to complete the activities, were developed by known and expected performance factors. These direct cost estimates were then used in the estimate to build up the cost of each activity using the quantities in the MTO's.

2.7.4 Contractor Markup

A contractor markup of 20% is included in the cost of labor, equipment, materials, and subcontracts.

3.0 EXCLUSIONS AND EXCEPTIONS

The following items are not included in the estimate prepared by Stantec.

- Project finance costs
- Legacy costs
- Federal or local sales taxes on permanent materials or services
- Finance charges and interest charges
- Land acquisition, rights-of-way, licenses, and royalties
- Inflation
- Licenses, permits, and maintenance of same, including, but not limited to, the following
 - Requirements for environment
 - Construction
- Value-added tax, customs, excise, duties, sales, or other import taxes
- Employee housing except where lodging is specifically included
- Telephone, facsimile, and satellite links provided for communications
- Surface facilities other than those specifically identified in cost estimates
- Site restoration required for exploration, construction, operations, and closure
- Personnel providing service functions
- Site security

4.0 RISKS AND OPPORTUNITIES

The estimate contingency may be required to cover the following risks and opportunities.

Risks

- Productivities are based on typical contractor performance. Involvement of new hire company employees could affect schedule and costs.
- Coordination of the execution of multiple contracts.
- Potential delays in delivery of mobile and fixed plant equipment.
- Volatility in labor and commodity rates and pricing.

End of Report

UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Appendix A **Tailings Reclamation Modification and Mill Site Decommissioning Cost Estimate**

A.2 CAPITAL COST ESTIMATE





Scope #	Description	Total Labor	Total Equipment	Total Materials	Total L/E/M	Other Costs	Total Field Cost
1.0 Procurement							
	Sub-Total Section 1	\$ -	\$ -	\$ -	\$ -	\$ 22,500	\$ 22,500
				Estimated Hours	170	Days	20.00
SITE PREPARATION WORK							
2.0 Early Works and Construction Support							
	Sub-Total Section 2	\$ 110,519	\$ 120,247	\$ 110,495	\$ 341,261	\$ 36,955	\$ 378,216
				Estimated Hours	170	Days	20.00
3.0 Access Roads, Mine Waste Roads, and Haul Roads							
	Sub-Total Section 3	\$ 809	\$ 1,423	\$ 8,117	\$ 10,349	\$ -	\$ 10,349
				Estimated Hours	163	Days	19.18
MODIFICATION OF EXISTING TDA							
4.0 Prepare the Repository for Waste Material							
	Sub-Total Section 4	\$ 206,790	\$ 468,578	\$ -	\$ 675,368	\$ -	\$ 675,368
				Estimated Hours	210	Days	25
5.0 Mine Waste Material Hauling							
	Sub-Total Section 5	\$ 252,776	\$ 1,198,860	\$ -	\$ 1,451,637	\$ -	\$ 1,451,637
				Estimated Hours	2455	CY per Day	6276
				Working fronts	2	Days	144
6.0 Construct Evapotranspirative (ET) Cover over the Repository							
	Sub-Total Section 6	\$ 1,284,102	\$ 2,576,727	\$ -	\$ 3,860,829	\$ -	\$ 3,860,829
				Estimated Hours	772	Days	91
SEEDING, REVEGETATION, AND CLEAN-UP							
7.0 Mill Site Final Grading and Seeding							
	Sub-Total Section 7	\$ 32,758	\$ 45,260	\$ -	\$ 78,018	\$ -	\$ 78,018
				Estimated Hours	102	Days	12
PERMANENT STORMWATER CONTROLS							
8.0 Mill Site Stormwater Controls							
	Sub-Total Section 8	\$ 737,118	\$ 1,355,709	\$ 3,035,543	\$ 5,128,370	\$ -	\$ 5,128,370
				Estimated Hours	2203	Days	259
9.0 Final Revegetation							
	Sub-Total Section 9	\$ 125,111	\$ 65,896	\$ -	\$ 191,008	\$ -	\$ 191,008
				Estimated Hours	17	Days	2
				Estimated Hours	106	Days	12
10.0 Monitoring, Testing, and Verification Controls							
	Sub-Total Section 10	\$ 2,521,074	\$ 340,555	\$ -	\$ 2,861,629	\$ 164,562	\$ 3,026,190
EVAPORATION POND CLOSURE							
11.0 Mill Site Debris Excavation and Disposal							
	Sub-Total Section 11	\$ 99,950	\$ 365,891	\$ -	\$ 465,842	\$ -	\$ 465,842
				Estimated Hours	90	Days	11
12.0 Construct Cover over Evaporation Ponds							
	Sub-Total Section 12	\$ 101,660	\$ 162,937	\$ -	\$ 347,698	\$ -	\$ 347,698
				Estimated Hours	30	Days	4
13.0 Mill Site Well Decommissioning							
	Sub-Total Section 13	\$ 539,180	\$ -	\$ -	\$ 539,180	\$ -	\$ 539,180
INDIRECT COSTS							
14.0 Short-Term Surveillance							
	Sub-Total Section 14	\$ 718,058	\$ 523,777	\$ -	\$ 1,241,835	\$ -	\$ 1,241,835
				Concurrent to other activities			
15.0 Groundwater Monitoring and Sampling							
	Sub-Total Section 15	\$ -	\$ -	\$ -	\$ -	\$ 2,819,195	\$ 2,819,195
				Concurrent to other activities			
16.0 Land Surveying							
	Sub-Total Section 16	\$ 635,463	\$ 38,292	\$ -	\$ 673,755	\$ -	\$ 673,755
				Concurrent to other activities			
17.0 Engineering, Fees, Contingency							
	Sub-Total Section 17	\$ -	\$ -	\$ -	\$ -	\$ 4,585,848	\$ 4,585,848
				Concurrent to other activities			
	Total Project Cost	\$ 7,365,368	\$ 7,264,152	\$ 3,154,156	\$ 17,866,777	\$ 7,629,060	\$ 25,495,837

Total Project Cost -15%	\$ 21,671,461
Total Project Cost +30%	\$ 33,144,588

Days	618.88
Weeks	123.78
Months	28.57
Years	2.38

Stantec OPCC Disclaimer – Any opinions of probable construction costs ("OPCC") prepared by Stantec, including evaluations of Client's project budget, represent Stantec's best judgment as a design professional familiar with the construction industry. Unless and to the extent otherwise indicated by Stantec, such opinions or evaluations are based upon current market rates for labor, materials and equipment. The Client acknowledges that Stantec has no control over the costs of labor, materials or equipment, construction contractor's methods of determining bid prices, competitive bidding environments, unidentified field conditions, market conditions, inflation or any other factors that may affect the OPCC, the project budget or negotiating conditions at the time of execution of the construction contract. Furthermore, this OPCC is based on stable market conditions that exhibit predictable supply/demand relationships and does not attempt to capture the impacts of hyper-inflationary or deflationary market cycles. Client further acknowledges that the OPCC is a "snapshot in time" and that the reliability of the OPCC will degrade over time. Accordingly, Stantec cannot and does not warrant or represent that construction bids or negotiated construction prices will not vary from Client's project budget or Stantec's good faith Class 4 OPCC.

Note: **AAEC International CLASS 3 Cost Estimate** - Class 3 estimates are typically prepared to support full project funding requests, and become the first of the project phase "control estimates" against which all actual costs and resources will be monitored for variances to the budget. They are used as the project budget until replaced by more detailed estimates. Typical accuracy ranges for Class 3 estimates are -10% to -20% on the low side, and +10% to +30% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.



United Nuclear Corporation

UNC Mill Site

Budget Authorization - Surety Cost Estimate - Rev K - 25 March 2020

Scope of Work

Estimate Name and Version Information: Budget Authorization - Surety Cost Estimate	Rev K 25 March 2020	Client: United Nuclear Corporation	Property: UNC Mill Site
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Scope #	Description	QTY	UNIT	Cost / Unit	Total Cost
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1.0 Procurement

1.1	Prepare Bid Documents	QTY	UNIT	Cost / Unit	Total Cost
1.1.1	Solicitation of civil earthworks contractor bids	1	LS	\$ 22,500.00	\$ 22,500.00

SITE PREPARATION WORK

2.0 Early Works and Construction Support

2.1	Mobilization and Demobilization	QTY	UNIT	Cost / Unit	Total Cost
2.1.1	Transportation of equipment	2	LS	\$ 9,819.86	\$ 19,639.72
2.1.2	Setup and removal of site facilities	2	LS	\$ 9,630.73	\$ 19,261.46

2.2	Construct Support Facilities	QTY	UNIT	Cost / Unit	Total Cost
2.2.1	Sanitation facilities	34	MN	\$ 770.20	\$ 26,186.80
2.2.2	Office facilities and break area - 3 units	3	EA	\$ 5,659.23	\$ 16,977.69
2.2.3	Decontamination station - 1 unit	1	EA	\$ 16,977.69	\$ 16,977.69

2.3	Site Preparation and Construction Access Development	QTY	UNIT	Cost / Unit	Total Cost
2.3.1	Preparation of site laydown and staging areas	25600	SY	\$ 4.21	\$ 107,882.60
2.3.2	Area for decontamination of vehicles	67	SY	\$ 22.32	\$ 1,488.01
2.3.3	Water Filling stations	34	MO	\$ 2,273.53	\$ 77,300.00
2.3.4	Repair fencing	500	LF	\$ 11.36	\$ 5,677.50
2.3.5	Install Temporary fencing and gates	5640	LF	\$ 14.38	\$ 81,075.00
2.3.6	Flagging of exclusion areas	500	LF	\$ 11.50	\$ 5,749.93

3.0 Access Roads and Haul Roads

3.1	Construct Borrow Access Haul Roads	QTY	UNIT	Cost / Unit	Total Cost
3.1.1	Jetty Borrow Area	1463	SY	\$ 1.34	\$ 1,960.21
3.1.2	Road Gravel delivered from off-site	162	CY	\$ 50.00	\$ 8,117.34
3.1.3	Compaction and conditioning	1463	SY	\$ 0.19	\$ 271.76

MODIFICATION OF EXISTING TDA

4.0 Prepare the Repository for Waste Material

4.1	Cover Stripping	QTY	UNIT	Cost / Unit	Total Cost
4.1.1	Removal and Stockpiling of existing cover materials	56500	LCY	\$ 3.66	\$ 206,758.80

4.2	Screening of Cover Material	QTY	UNIT	Cost / Unit	Total Cost
4.2.1	Screening of cover materials	64204	TON	\$ 3.81	\$ 244,813.07
4.2.2	Screening of filter materials	20446	TON	\$ 3.81	\$ 77,961.31

4.3	Compact 95% existing radon barrier	QTY	UNIT	Cost / Unit	Total Cost
4.3.1	Compaction of Radon Barrier	271245	SY	\$ 0.19	\$ 50,402.93

Storm Water Controls

4.4	Repository Stormwater berms	QTY	UNIT	Cost / Unit	Total Cost
4.4.1	Stormwater berm around perimeter of Repository	7200	CY	\$ 3.66	\$ 26,348.02

4.5	Channels, weirs, spillways, catch basin, check dams, and sediment basins	QTY	UNIT	Cost / Unit	Total Cost
4.5.1	Miscellaneous stormwater controls	10000	CY	\$ 3.66	\$ 36,594.48
4.5.2	Rip Rap check dams - 9"	200	CY	\$ 6.32	\$ 1,263.25
4.5.2	Fill in existing Branch "D" swale	8533	CY	\$ 3.66	\$ 31,226.07



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HAULING MINE WASTE

5.0 Mine Waste Material Hauling

5.1	Phase 2 (217K CY; Haul)	QTY	UNIT	Cost / Unit	Total Cost
5.1.1	Vent Hole No 3	9227	LCY	\$ 1.59	\$ 14,706.46
5.1.2	Vent Hole No 8	9227	LCY	\$ 1.59	\$ 14,706.46
5.1.3	Boneyard to Haul Road (46,256 minus Debris)	31612	LCY	\$ 1.59	\$ 50,385.78
5.1.4	Sandfill No 2	27974	LCY	\$ 1.59	\$ 44,587.25
5.1.5	NECR shaft 2	27974	LCY	\$ 1.59	\$ 44,587.25
5.1.6	Drainage and Sandfill No 3	27974	LCY	\$ 1.59	\$ 44,587.25
5.1.7	Area North of Sediment Pond and Pond 3	17214	LCY	\$ 1.59	\$ 27,436.52
5.1.8	Sandfill No 1	51146	LCY	\$ 1.59	\$ 81,520.60

5.2	Phase 3 (557K CY; Haul)	QTY	UNIT	Cost / Unit	Total Cost
5.2.1	Sediment Pad	28858	LCY	\$ 1.59	\$ 45,995.17
5.2.2	NECR shaft 1	264046	LCY	\$ 1.59	\$ 420,855.04
5.2.3	Pond 3 Drainage	264046	LCY	\$ 1.59	\$ 420,855.04

5.3	Phase 4 (54K CY; Haul)	QTY	UNIT	Cost / Unit	Total Cost
5.3.1	TPH Stockpile - concrete, metal, wood, debris	6781	LCY	\$ 1.59	\$ 10,808.45
5.3.2	Pond 1 (36,628 minus Debris)	35272	LCY	\$ 1.59	\$ 56,218.38
5.3.3	Pond 2	9698	LCY	\$ 1.59	\$ 15,456.58
5.3.4	TPH Stockpile area	1218	LCY	\$ 1.59	\$ 1,940.54

5.4	Phase 5 (43K CY; Haul)	QTY	UNIT	Cost / Unit	Total Cost
5.4.1	Pond 3 and haul route	42840	LCY	\$ 1.59	\$ 68,281.49

5.5	Phase 6 (35K CY; Haul)	QTY	UNIT	Cost / Unit	Total Cost
5.5.1	Drainage East of Sandfill 1 - both sides of Hwy	35445	LCY	\$ 2.50	\$ 88,708.56

REPOSITORY COVER AND GRADING

6.0 Construct Evapotranspirative (ET) Cover over the Repository

6.1	Borrow Area Development	QTY	UNIT	Cost / Unit	Total Cost
6.1.1	Screening for small rock - 2.0"	9000	CY	\$ 3.81	\$ 34,317.55
6.1.2	Screening for small rock - 3.0"	20500	CY	\$ 3.81	\$ 78,167.75

6.2	Excavate and Haul Topsoil for Cover of Repository	QTY	UNIT	Cost / Unit	Total Cost
6.2.1	Hauling of small rock to site	29500	CY	\$ 1.82	\$ 53,833.06
6.2.2	Hauling of recovered rock from Repository cover	19000	CY	\$ 2.79	\$ 53,000.68
6.2.3	Hauling of topsoil from Jetty Area	351500	CY	\$ 2.79	\$ 980,512.54

6.3	Replace erosion protection layer	QTY	UNIT	Cost / Unit	Total Cost
6.3.1	Placing of cover materials - 400,000 CY	400000	CY	\$ 5.41	\$ 2,162,054.44

6.4	Final Grading of the Cover	QTY	UNIT	Cost / Unit	Total Cost
6.4.1	Grading	91	AC	\$ 1,859.19	\$ 169,186.22
6.4.2	Compaction of Cover Materials - 91 Acres	440000	SY	\$ 0.19	\$ 81,761.10

6.5	Seeding of the Cover	QTY	UNIT	Cost / Unit	Total Cost
6.5.1	Seeding of the Cover	91	AC	\$ 2,725.23	\$ 247,995.56

SEEDING, REVEGETATION, AND CLEAN-UP

7.0 Mill Site Final Grading and Seeding



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7.1	West Apron and Southwest Re-Grading and Seeding	QTY	UNIT	Cost / Unit	Total Cost
7.1.1	West Apron and Southwest Final Grading	6.6	AC	\$ 1,859.19	\$ 12,254.39
7.1.2	West Apron and Southwest Seeding	6.6	AC	\$ 2,725.23	\$ 17,961.96
7.2	Final Grading	QTY	UNIT	Cost / Unit	Total Cost
7.2.1	Mill Site Final Grading	4	AC	\$ 1,859.19	\$ 6,828.80
7.2.2	Repository Area Final Grading	22	AC	\$ 1,859.19	\$ 40,972.81

PERMANENT STORMWATER CONTROLS

8.0 Mill Site Storm Water Controls

8.1	East Repository Channel	QTY	UNIT	Cost / Unit	Total Cost
8.1.1	Rock Check Dam - 9" Riprap	30	CY	\$ 6.32	\$ 189.49
8.1.2	Type I and II filter material - delivered	2416	CY	\$ 15.75	\$ 38,044.59
8.1.3	Drainage Channel Type I filter material - placement	1208	CY	\$ 5.41	\$ 6,530.21
8.1.4	Drainage Channel Type II filter material - placement	1208	CY	\$ 5.41	\$ 6,530.21
8.1.5	3.0" Riprap - 980 LF - Section A	481	CY	\$ 23.87	\$ 11,477.89
8.1.6	9.0" Riprap - 1309 LF - Section B and C	2182	CY	\$ 26.57	\$ 57,958.67
8.1.7	Hauling materials from offsite	2693	CY	\$ 4.71	\$ 12,680.20

8.2	Dilco Hill Channels	QTY	UNIT	Cost / Unit	Total Cost
8.2.1	Type I and II filter material - delivered	906	CY	\$ 15.75	\$ 14,270.80
8.2.2	Drainage Channel Type I filter material - placement	453	CY	\$ 5.41	\$ 2,449.53
8.2.3	Drainage Channel Type II filter material - placement	453	CY	\$ 5.41	\$ 2,449.53
8.2.4	Drainage Channel A - Section D - 750 LF - 6" Riprap	500	CY	\$ 23.87	\$ 11,933.12
8.2.5	Drainage Channel B - Section E - 844 LF - 6" Riprap	406	CY	\$ 23.87	\$ 9,698.53
8.2.6	Hauling materials from offsite	906	CY	\$ 4.71	\$ 4,268.36

8.3	Runoff Control Ditch	QTY	UNIT	Cost / Unit	Total Cost
8.3.1	Type I and II filter material - delivered	622	CY	\$ 15.75	\$ 9,796.89
8.3.2	Drainage Channel Type I filter material - placement	311	CY	\$ 5.41	\$ 1,681.60
8.3.3	Drainage Channel Type II filter material - placement	311	CY	\$ 5.41	\$ 1,681.60
8.3.4	Runoff Control Ditch - 750 LF - 3" Riprap (6" depth)	311	CY	\$ 23.87	\$ 7,425.05
8.3.5	Hauling materials from offsite	311	CY	\$ 4.71	\$ 1,465.11

8.4	North Diversion Channel Improvements	QTY	UNIT	Cost / Unit	Total Cost
8.4.1	Rock Check Dams (2) - 9" Riprap	60	CY	\$ 26.57	\$ 1,593.97
8.4.2	Removal of Aggraded Sediments	194	CY	\$ 3.66	\$ 711.56
8.4.3	Diversion Berm general fill	1444	CY	\$ 5.41	\$ 7,807.42
8.4.4	Import material on-site	1444	CY	\$ 2.79	\$ 4,029.29
8.4.5	Hauling materials from offsite	60	CY	\$ 4.71	\$ 282.56

8.5	North Cell Drainage Channel	QTY	UNIT	Cost / Unit	Total Cost
8.5.1	North Cell Raised Earthen Berm	36800	LCY	\$ 3.66	\$ 134,667.68
8.5.2	Import material on-site	36800	LCY	\$ 2.79	\$ 102,653.94

8.6	Jetty - Pipeline Arroyo - Riprap Chute	QTY	UNIT	Cost / Unit	Total Cost
8.6.1	Excavation of Rock Jetty - remaining material	120900	CY	\$ 3.66	\$ 442,427.24
8.6.2	Type I and II filter material - delivered	45500	CY	\$ 15.75	\$ 716,397.50
8.6.3	Type I filter material - placement	13000	CY	\$ 5.41	\$ 70,266.77
8.6.4	Type II filter material - placement	32500	CY	\$ 5.41	\$ 175,666.92
8.6.5	27" Riprap - material cost	86000	CY	\$ 25.65	\$ 2,205,900.00
8.6.6	27" Riprap - placement	86000	CY	\$ 6.32	\$ 543,196.24



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8.6.7	Hauling materials from offsite		86000	CY	\$ 4.71	\$ 404,998.85
8.6.8	Traffic control management		9	MO	\$ 15,700.70	\$ 141,306.29

9.0 Final Revegetation

9.1	Reclaim Haul Roads	QTY	UNIT	Cost / Unit	Total Cost
9.1.1	Removal of imported gravel surfacing	3115	CY	\$ 3.66	\$ 11,399.18
9.1.2	Excavation of road embankment	4100	CY	\$ 3.66	\$ 15,003.81
9.1.3	Removal of road embankment materials	4100	CY	\$ 2.79	\$ 11,437.04
9.1.4	Final Grading	4	AC	\$ 1,859.19	\$ 7,178.27
9.1.5	Traffic control management	2	MO	\$ 15,700.70	\$ 31,401.40

9.2	Reclamation of Facility areas	QTY	UNIT	Cost / Unit	Total Cost
9.2.1	Reclaim Repository Yard and Access Roads	6.2	AC	\$ 1,859.19	\$ 11,526.97
9.2.2	Reclaim Former Mill Site Yard	16.5	AC	\$ 1,859.19	\$ 30,676.62

9.3	Seeding of Remaining Areas	QTY	UNIT	Cost / Unit	Total Cost
9.3.1	Seeding of Remaining Areas	26.6	AC	\$ 2,725.23	\$ 72,384.64

10.0 Monitoring, Testing, and Verification Controls

10.1	Quality Assurance and Quality Control	QTY	UNIT	Cost / Unit	Total Cost
10.1.1	Labor Personnel and administration	34	MN	\$ 25,589.71	\$ 870,050.00
10.1.2	Lab Testing costs - Soil Testing	1	LS	\$ 10,846.00	\$ 10,846.00
10.1.3	Lab Testing costs - Rock Testing	1	LS	\$ 1,680.00	\$ 1,680.00
10.1.4	Monthly Lodging & Expenses	1	LS	\$ 52,991.55	\$ 52,991.55

10.2	Remedial Action Radiologic Support	QTY	UNIT	Cost / Unit	Total Cost
10.2.1	Labor Personnel and administration	34	MN	\$ 31,169.26	\$ 1,059,755.00
10.2.2	Project Management	34	MN	\$ 724.71	\$ 24,639.97
10.2.3	Equipment, Supplies, Fees and Expenses	34	MN	\$ 5,494.34	\$ 186,807.56
10.2.4	Monthly Lodging & Expenses	1	LS	\$ 62,044.09	\$ 62,044.09

10.3	Radiation Protection & Perimeter Radiologic Air Monitoring Plan	QTY	UNIT	Cost / Unit	Total Cost
10.3.1	Labor Personnel and administration	34	MN	\$ 16,665.55	\$ 566,628.80
10.3.2	Equipment, Supplies, Fees and Expenses	34	MN	\$ 4,521.99	\$ 153,747.50
10.3.3	Monthly Lodging & Expenses	1	LS	\$ 37,000.00	\$ 37,000.00

EVAPORATION POND CLOSURE

11.0 Mill Site Debris Excavation and Disposal

11.1	Evaporation Pond Preparation for Waste	QTY	UNIT	Cost / Unit	Total Cost
11.1.1	Removal of existing cover materials	13000	LCY	\$ 3.66	\$ 47,572.82
11.1.2	Compaction of Subgrade	77440	SY	\$ 0.19	\$ 14,389.95

12.0 Construct Existing Cover over the Evaporation Ponds

12.1	Borrow Area Development	QTY	UNIT	Cost / Unit	Total Cost
12.1.1	Screening for small rock - 1.5"	4409	CY	\$ 8.70	\$ 38,336.79

12.2	Excavate and Haul Material to Pond Location	QTY	UNIT	Cost / Unit	Total Cost
12.2.1	Hauling of small rock to site	4409	CY	\$ 2.79	\$ 12,298.95
12.2.2	Hauling of topsoil from Jetty Area	13230	CY	\$ 2.79	\$ 36,905.21

12.3	Material Placement	QTY	UNIT	Cost / Unit	Total Cost
12.3.1	Placing of materials	17639	CY	\$ 5.41	\$ 95,341.20



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12.4 Branch Swale H		QTY	UNIT	Cost / Unit	Total Cost
12.4.1	Type I and II filter material - delivered	1550	CY	\$ 15.75	\$ 24,404.75
12.4.2	Drainage Channel Type I filter material - placement	775	CY	\$ 5.41	\$ 4,188.98
12.4.3	Drainage Channel Type II filter material - placement	775	CY	\$ 5.41	\$ 4,188.98
12.4.4	3.0" Riprap - 2550 LF	1550	CY	\$ 23.87	\$ 36,992.66
12.4.5	Hauling materials from offsite	1550	CY	\$ 4.71	\$ 7299.397843

12.5 Final Grading of the Cover		QTY	UNIT	Cost / Unit	Total Cost
12.5.1	Grading	16	AC	\$ 1,859.19	\$ 29,747.03
12.5.2	Compaction of Cover Materials - 16 Acres	77440	SY	\$ 0.19	\$ 14,389.95

12.6 Seeding of the Cover		QTY	UNIT	Cost / Unit	Total Cost
12.6.1	Seeding of the Cover	16	AC	\$ 2,725.23	\$ 43,603.62

13.0 Mill Site Well Decommissioning

13.1 Well Decommissioning		QTY	UNIT	Cost / Unit	Total Cost
13.1.1	Mill Site Well Decommissioning	130	EA	\$ 4,147.54	\$ 539,179.64

INDIRECT COSTS

14.0 Short-Term Surveillance

14.1 Annual Observation and Maintenance		QTY	UNIT	Cost / Unit	Total Cost
14.1.1	Observation and Maintenance	120	MO	\$ 4,255.37	\$ 510,644.67
14.1.2	Maintenance of Access Roads	120	MO	\$ 1,445.28	\$ 173,433.36
14.1.3	Grading of Repository and Surrounding Areas	10	YR	\$ 55,775.68	\$ 557,756.78

15.0 Groundwater Monitoring and Sampling

15.1 Well Sampling and Groundwater Monitoring		QTY	UNIT	Cost / Unit	Total Cost
15.1.1	Monitoring Well Sampling	1	LS	\$ 1,171,137.00	\$ 1,171,137.00
15.1.2	Short-Term Surveillance for groundwater monitoring	1	LS	\$ 991,258.00	\$ 991,258.00
15.1.3	Short-Term Surveillance for Mill License area	1	LS	\$ 656,800.00	\$ 656,800.00

16.0 Land Surveying

16.1 Survey Tracking of Monthly Volumes		QTY	UNIT	Cost / Unit	Total Cost
16.1.1	Construction Staking and Land Surveying	14	MO	\$ 48,125.33	\$ 673,754.62

17.0 Engineering, Fees, Contingency

17.1 Allowances for Indirect Costs		QTY	UNIT	Cost / Unit	Total Cost
17.1.1	Engineering/Permitting - 2%	2%	LS		\$ 323,054.09
17.1.2	Contractor management and administration	5%	LS		\$ 848,016.98
17.1.3	Contingency	15%	LS		\$ 2,422,905.66
17.1.4	Long-Term Surveillance Fee	1	LS		\$ 991,871.17



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 Mill Site Surety Cost Estimate

Item No.	Description	QTY	Unit	Labor Unit Cost	Total Labor	Equipment Unit Cost	Total Equipment	Materials Unit Cost	Total Materials	Total L/E/M	Other Costs	Total Field Cost
1.0 Procurement												
1.1 Prepare Bid Documents												
1.1.1	Solicitation of civil earthworks contractor bids	1	LS		\$ -		\$ -		\$ -	\$ -	\$ 22,500.00	\$ 22,500.00
Sub-total					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 22,500.00	\$ 22,500.00
Sub-Total Section 1					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 22,500	\$ 22,500
SITE PREPARATION WORK												
2.0 Early Works and Construction Support												
2.1 Mobilization and Demobilization												
2.1.1	Transportation of equipment	2	LS	\$ 10,949.49	\$ 10,949.49	\$ 8,690.22	\$ 8,690.22		\$ -	\$ 19,639.72		\$ 19,639.72
2.1.2	Setup and removal of site facilities	2	LS	\$ 17,939.22	\$ 17,939.22	\$ 1,322.25	\$ 1,322.25		\$ -	\$ 19,261.46		\$ 19,261.46
Sub-total					\$ 28,888.71	\$ -	\$ 10,012.47	\$ -	\$ -	\$ 38,901.18	\$ -	\$ 38,901.18
2.2 Construct Support Facilities												
2.2.1	Sanitation facilities	34	MN		\$ -	\$ 1,540.40	\$ 26,186.80		\$ -	\$ 26,186.80		\$ 26,186.80
2.2.2	Office facilities and break area - 3 units	3	EA		\$ -	\$ -	\$ -		\$ -	\$ -	\$ 16,977.69	\$ 16,977.69
2.2.3	Decontamination station - 1 unit	1	EA		\$ -	\$ -	\$ -		\$ -	\$ -	\$ 16,977.69	\$ 16,977.69
Sub-total					\$ -	\$ -	\$ 26,186.80	\$ -	\$ -	\$ 26,186.80	\$ 33,955.38	\$ 60,142.18
2.3 Site Preparation and Construction Access Development												
2.3.1	Preparation of site laydown and staging areas	25,600	SY	\$ 0.49	\$ 6,216.20	\$ 0.72	\$ 9,219.53	\$ 7.22	\$ 92,446.87	\$ 107,882.40		\$ 107,882.40
2.3.2	Area for decontamination of vehicles	67	SY	\$ 0.50	\$ 16.76	\$ 0.84	\$ 27.91	\$ 28.30	\$ 943.33	\$ 988.01	\$ 500.00	\$ 1,488.01
2.3.3	Water Filling stations	34	MO		\$ -	\$ 4,400.00	\$ 74,800.00		\$ -	\$ 74,800.00	\$ 2,500.00	\$ 77,300.00
2.3.4	Repair fencing	500	LF	\$ 22.71	\$ 5,677.50		\$ -		\$ -	\$ 5,677.50		\$ 5,677.50
2.3.5	Install Temporary fencing and gates	5,640	LF	\$ 22.71	\$ 64,042.20		\$ -	\$ 6.04	\$ 17,032.80	\$ 81,075.00		\$ 81,075.00
2.3.6	Flagging of exclusion areas	500	LF	\$ 22.71	\$ 5,677.50		\$ -	\$ 0.29	\$ 72.43	\$ 5,749.93		\$ 5,749.93
Sub-total					\$ 81,430.16	\$ 84,047.45	\$ 110,495.43	\$ 276,173.04	\$ 3,000.00	\$ 779,173.04	\$ -	\$ 779,173.04
Sub-Total Section 2					\$ 110,519	\$ 120,247	\$ 110,495	\$ 341,261	\$ 36,955	\$ 378,216	\$ -	\$ 378,216
3.0 Access Roads and Haul Roads												
3.1 Construct Borrow Access Haul Roads												
3.1.1	Jetty Borrow Area	1,463	SY	\$ 0.50	\$ 735.47	\$ 0.84	\$ 1,224.74		\$ -	\$ 1,960.21		\$ 1,960.21
3.1.2	Road Gravel delivered from off-site	162	CY		\$ -		\$ -	\$ 50.00	\$ 8,117.34			\$ 8,117.34
3.1.3	Compaction and conditioning	1,463	SY	\$ 0.05	\$ 73.66	\$ 0.14	\$ 198.11		\$ -	\$ 271.76		\$ 271.76
Sub-total					\$ 809.13	\$ -	\$ 1,422.84	\$ 8,117.34	\$ 10,349.31	\$ -	\$ -	\$ 10,349.31
Sub-Total Section 3					\$ 809	\$ -	\$ 1,423	\$ 8,117	\$ 10,349	\$ -	\$ -	\$ 10,349
MODIFICATION OF EXISTING TDA												
4.0 Prepare the Repository for Waste Material												
4.1 Cover Stripping												
4.1.1	Removal and Stockpiling of existing cover materials	56,500	LCY	\$ 0.95	\$ 53,400.48	\$ 2.71	\$ 153,358.32		\$ -	\$ 206,758.80		\$ 206,758.80
Sub-total					\$ 53,400.48	\$ 153,358.32	\$ -	\$ -	\$ 206,758.80	\$ -	\$ -	\$ 206,758.80
4.2 Screening of Cover Material												
4.2.1	Screening of cover materials	64,204	TON	\$ 1.36	\$ 87,271.18	\$ 2.45	\$ 157,541.89		\$ -	\$ 244,813.07		\$ 244,813.07
4.2.2	Screening of filter materials	20,446	TON	\$ 1.36	\$ 27,917.72	\$ 2.45	\$ 50,169.59		\$ -	\$ 77,961.31		\$ 77,961.31
Sub-total					\$ 115,062.90	\$ 207,711.48	\$ -	\$ -	\$ 322,774.38	\$ -	\$ -	\$ 322,774.38
4.3 Compact 95% existing radon barrier												
4.3.1	Compaction of Radon Barrier	271,245	SY	\$ 0.05	\$ 13,660.94	\$ 0.14	\$ 36,741.99		\$ -	\$ 50,402.93		\$ 50,402.93
Sub-total					\$ 13,660.94	\$ 36,741.99	\$ -	\$ -	\$ 50,402.93	\$ -	\$ -	\$ 50,402.93
Storm Water Controls												
4.4 Repository Stormwater berms												
4.4.1	Stormwater berm around perimeter of Repository	7,200	CY	\$ 0.95	\$ 6,805.02	\$ 2.71	\$ 19,543.01		\$ -	\$ 26,348.02		\$ 26,348.02
Sub-total					\$ 6,805.02	\$ 19,543.01	\$ -	\$ -	\$ 26,348.02	\$ -	\$ -	\$ 26,348.02
4.5 Channels, weirs, spillways, catch basin, check dams, and sediment basins												
4.5.1	Miscellaneous stormwater controls	10,000	CY	\$ 0.95	\$ 9,451.41	\$ 2.71	\$ 27,143.07		\$ -	\$ 36,594.48		\$ 36,594.48
4.5.2	Rip Rap check dams - 9'	200	CY	\$ 1.72	\$ 344.29	\$ 4.59	\$ 918.96		\$ -	\$ 1,263.25		\$ 1,263.25
4.5.2	Fill in existing Branch "D" swale	8,533	CY	\$ 0.95	\$ 8,064.89	\$ 2.71	\$ 23,161.18		\$ -	\$ 31,226.07		\$ 31,226.07
Sub-total					\$ 17,860.59	\$ 51,223.20	\$ -	\$ -	\$ 69,083.79	\$ -	\$ -	\$ 69,083.79
Sub-Total Section 4					\$ 206,790	\$ 468,578	\$ -	\$ -	\$ 675,368	\$ -	\$ -	\$ 675,368
HAULING MINE WASTE												
5.0 Mine Waste Material Hauling												
5.1 Phase 2 (217K CY; Haul)												
5.1.1	Vent Hole No 3	9,227	LCY	\$ 0.28	\$ 2,618.98	\$ 1.31	\$ 12,087.48		\$ -	\$ 14,706.46		\$ 14,706.46
5.1.2	Vent Hole No 8	9,227	LCY	\$ 0.28	\$ 2,618.98	\$ 1.31	\$ 12,087.48		\$ -	\$ 14,706.46		\$ 14,706.46
5.1.3	Boneyard to Haul Road (46,256 minus Debris)	31,612	LCY	\$ 0.28	\$ 8,972.90	\$ 1.31	\$ 41,412.89		\$ -	\$ 50,385.78		\$ 50,385.78
5.1.4	Sandfill No 2	27,974	LCY	\$ 0.28	\$ 7,940.27	\$ 1.31	\$ 36,646.98		\$ -	\$ 44,587.25		\$ 44,587.25
5.1.5	NECR shaft 2	27,974	LCY	\$ 0.28	\$ 7,940.27	\$ 1.31	\$ 36,646.98		\$ -	\$ 44,587.25		\$ 44,587.25
5.1.6	Drainage and Sandfill No 3	27,974	LCY	\$ 0.28	\$ 7,940.27	\$ 1.31	\$ 36,646.98		\$ -	\$ 44,587.25		\$ 44,587.25
5.1.7	Area North of Sediment Pond and Pond 3	17,214	LCY	\$ 0.28	\$ 4,886.00	\$ 1.31	\$ 22,550.52		\$ -	\$ 27,436.52		\$ 27,436.52
5.1.8	Sandfill No 1	51,146	LCY	\$ 0.28	\$ 14,517.51	\$ 1.31	\$ 67,003.09		\$ -	\$ 81,520.60		\$ 81,520.60
Sub-total					\$ 57,435.20	\$ 265,082.38	\$ -	\$ -	\$ 322,517.58	\$ -	\$ -	\$ 322,517.58
5.2 Phase 3 (557K CY; Haul)												
5.2.1	Sediment Pad	28,858	LCY	\$ 0.28	\$ 8,191.00	\$ 1.31	\$ 37,804.17		\$ -	\$ 45,995.17		\$ 45,995.17
5.2.2	NECR shaft 1	264,046	LCY	\$ 0.28	\$ 74,947.53	\$ 1.31	\$ 345,907.51		\$ -	\$ 420,855.04		\$ 420,855.04
5.2.3	Pond 3 Drainage	264,046	LCY	\$ 0.28	\$ 74,947.53	\$ 1.31	\$ 345,907.51		\$ -	\$ 420,855.04		\$ 420,855.04
Sub-total					\$ 158,086.05	\$ 729,619.19	\$ -	\$ -	\$ 887,705.24	\$ -	\$ -	\$ 887,705.24
5.3 Phase 4 (54K CY; Haul)												
5.3.1	IPH Stockpile - concrete, metal, wood, debris	6,781	LCY	\$ 0.28	\$ 1,924.81	\$ 1.31	\$ 8,883.64		\$ -	\$ 10,808.45		\$ 10,808.45
5.3.2	Pond 1 (36,628 minus Debris)	35,272	LCY	\$ 0.28	\$ 10,011.59	\$ 1.31	\$ 46,206.79		\$ -	\$ 56,218.38		\$ 56,218.38
5.3.3	Pond 2	9,698	LCY	\$ 0.28	\$ 2,752.57	\$ 1.31	\$ 12,704.01		\$ -	\$ 15,456.58		\$ 15,456.58
5.3.4	IPH Stockpile area	1,218	LCY	\$ 0.28	\$ 345.58	\$ 1.31	\$ 1,594.96		\$ -	\$ 1,940.54		\$ 1,940.54
Sub-total					\$ 15,034.55	\$ 69,389.39	\$ -	\$ -	\$ 84,423.94	\$ -	\$ -	\$ 84,423.94
5.4 Phase 5 (43K CY; Haul)												
5.4.1	Pond 3 and haul route	42,840	LCY	\$ 0.28	\$ 12,159.84	\$ 1.31	\$ 56,121.66		\$ -	\$ 68,281.49		\$ 68,281.49
Sub-total					\$ 12,159.84	\$ 56,121.66	\$ -	\$ -	\$ 68,281.49	\$ -	\$ -	\$ 68,281.49

Item No.	Description	QTY	Unit	Labor Unit Cost	Total Labor	Equipment Unit Cost	Total Equipment	Materials Unit Cost	Total Materials	Total L/E/M	Other Costs	Total Field Cost
5.5	Phase 6 (35K CY Haul)											
5.5.1	Drainage East of Sandfill 1- both sides of Hwy	35,445	LCY	\$ 0.28	\$ 10,060.82	\$ 2.22	\$ 78,647.74	\$ -	\$ 88,708.56			\$ 88,708.56
	Sub-total				\$ 10,060.82	\$ 78,647.74	\$ -	\$ 88,708.56		\$ -		\$ 88,708.56
Sub-Total Section 5					\$ 252,776	\$ 1,198,860	\$ -	\$ 1,451,637	\$ -	\$ -		\$ 1,451,637

REPOSITORY COVER AND GRADING
6.0 Construct Evapotranspirative (E) Cover over the Repository

6.1 Borrow Area Development												
6.1.1	Screening for small rock - 2.0'	9,000	CY	\$ 1.36	\$ 12,233.55	\$ 2.45	\$ 22,084.00	\$ -	\$ 34,317.55			\$ 34,317.55
6.1.2	Screening for small rock - 3.0'	20,500	CY	\$ 1.36	\$ 27,865.31	\$ 2.45	\$ 50,302.44	\$ -	\$ 78,167.75			\$ 78,167.75
	Sub-total				\$ 40,098.86	\$ 72,386.44	\$ -	\$ 112,485.29	\$ -	\$ -		\$ 112,485.29
6.2 Excavate and Haul Topsoil for Cover of Repository												
6.2.1	Hauling of small rock to site	29,500	CY	\$ 0.78	\$ 23,011.11	\$ 1.04	\$ 30,821.95	\$ -	\$ 53,833.06			\$ 53,833.06
6.2.2	Hauling of recovered rock from Repository cover	19,000	CY	\$ 0.57	\$ 10,842.21	\$ 2.22	\$ 42,158.47	\$ -	\$ 53,000.68			\$ 53,000.68
6.2.3	Hauling of topsoil from Jetty Area	351,500	CY	\$ 0.57	\$ 200,580.83	\$ 2.22	\$ 779,931.72	\$ -	\$ 980,512.54			\$ 980,512.54
	Sub-total				\$ 234,434.14	\$ 852,912.14	\$ -	\$ 1,067,346.28	\$ -	\$ -		\$ 1,067,346.28
6.3 Replace erosion protection layer												
6.3.1	Placing of cover materials - 400,000 CY	400,000	CY	\$ 1.74	\$ 697,729.86	\$ 3.66	\$ 1,464,324.58	\$ -	\$ 2,162,054.44			\$ 2,162,054.44
	Sub-total				\$ 697,729.86	\$ 1,464,324.58	\$ -	\$ 2,162,054.44	\$ -	\$ -		\$ 2,162,054.44
6.4 Final Grading of the Cover												
6.4.1	Grading	91	AC	\$ 458.06	\$ 41,683.75	\$ 1,401.13	\$ 127,502.47	\$ -	\$ 169,186.22			\$ 169,186.22
6.4.2	Compaction of Cover Materials - 91 Acres	440,000	SY	\$ 0.05	\$ 22,140.09	\$ 0.14	\$ 59,601.00	\$ -	\$ 81,761.10			\$ 81,761.10
	Sub-total				\$ 63,843.84	\$ 187,103.48	\$ -	\$ 250,947.32	\$ -	\$ -		\$ 250,947.32
6.5 Seeding of the Cover												
6.5.1	Seeding of the Cover	91	AC	\$ 2,725.23	\$ 247,995.56	\$ -	\$ -	\$ -	\$ 247,995.56			\$ 247,995.56
	Sub-total				\$ 247,995.56	\$ -	\$ -	\$ -	\$ 247,995.56	\$ -		\$ 247,995.56
Sub-Total Section 6					\$ 1,284,102	\$ 2,576,727	\$ -	\$ 3,860,829	\$ -	\$ -		\$ 3,860,829

SEEDING, REVEGETATION, AND CLEAN-UP
7.0 Mill Site Final Grading and Seeding

7.1 West Apron and Southwest Re-Grading and Seeding												
7.1.1	West Apron and Southwest Final Grading	6.6	AC	\$ 458.06	\$ 3,019.21	\$ 1,401.13	\$ 9,235.18	\$ -	\$ 12,254.39			\$ 12,254.39
7.1.2	West Apron and Southwest Seeding	6.6	AC	\$ 2,725.23	\$ 17,961.96	\$ -	\$ -	\$ -	\$ 17,961.96			\$ 17,961.96
	Sub-total				\$ 20,981.18	\$ 9,235.18	\$ -	\$ 30,216.35	\$ -	\$ -		\$ 30,216.35
7.2 Final Grading												
7.2.1	Mill Site Final Grading	3.7	AC	\$ 458.06	\$ 1,682.47	\$ 1,401.13	\$ 5,146.34	\$ -	\$ 6,828.80			\$ 6,828.80
7.2.2	Repository Area Final Grading	22.0	AC	\$ 458.06	\$ 10,094.80	\$ 1,401.13	\$ 30,878.02	\$ -	\$ 40,972.81			\$ 40,972.81
	Sub-total				\$ 11,777.26	\$ 36,024.35	\$ -	\$ 47,801.61	\$ -	\$ -		\$ 47,801.61
Sub-Total Section 7					\$ 32,758	\$ -	\$ 45,260	\$ -	\$ 78,018	\$ -		\$ 78,018

PERMANENT STORMWATER CONTROLS
8.0 Mill Site Storm Water Controls

8.1 East Repository Channel												
8.1.1	Rock Check Dam - 9" Riprap	30	CY	\$ 1.72	\$ 51.64	\$ 4.59	\$ 137.84	\$ -	\$ 189.49			\$ 189.49
8.1.2	Type I and II filter material - delivered	2,416	CY	\$ -	\$ -	\$ -	\$ -	\$ 15.75	\$ 38,044.59			\$ 38,044.59
8.1.3	Drainage Channel Type I filter material - placement	1,208	CY	\$ 1.74	\$ 2,107.40	\$ 3.66	\$ 4,422.80	\$ -	\$ 6,530.21			\$ 6,530.21
8.1.4	Drainage Channel Type II filter material - placement	1,208	CY	\$ 1.74	\$ 2,107.40	\$ 3.66	\$ 4,422.80	\$ -	\$ 6,530.21			\$ 6,530.21
8.1.5	3.0" Riprap - 980 LF - Section A	481	CY	\$ 1.72	\$ 827.88	\$ 4.59	\$ 2,209.76	\$ 17.55	\$ 8,440.25			\$ 11,477.89
8.1.6	6.0" Riprap - 1309 LF - Section B and C	2,182	CY	\$ 1.72	\$ 3,755.40	\$ 4.59	\$ 10,024.32	\$ 20.25	\$ 44,178.75			\$ 57,958.67
8.1.7	Hauling materials from offsite	2,693	CY	\$ 2.01	\$ 5,420.19	\$ 2.70	\$ 7,260.01	\$ -	\$ 12,680.20			\$ 12,680.20
	Sub-total				\$ 14,270.12	\$ 28,477.53	\$ 90,663.58	\$ 133,411.24	\$ -	\$ -		\$ 133,411.24
8.2 Dilco Hill Channels												
8.2.1	Type I and II filter material - delivered	906	CY	\$ -	\$ -	\$ -	\$ -	\$ 15.75	\$ 14,270.80			\$ 14,270.80
8.2.2	Drainage Channel Type I filter material - placement	453	CY	\$ 1.74	\$ 790.50	\$ 3.66	\$ 1,659.03	\$ -	\$ 2,449.53			\$ 2,449.53
8.2.3	Drainage Channel Type II filter material - placement	453	CY	\$ 1.74	\$ 790.50	\$ 3.66	\$ 1,659.03	\$ -	\$ 2,449.53			\$ 2,449.53
8.2.4	Drainage Channel A - Section D - 750 LF - 6" Riprap	500	CY	\$ 1.72	\$ 860.72	\$ 4.59	\$ 2,297.40	\$ 17.55	\$ 8,775.00			\$ 11,933.12
8.2.5	Drainage Channel B - Section E - 844 LF - 6" Riprap	406	CY	\$ 1.72	\$ 699.54	\$ 4.59	\$ 1,867.19	\$ 17.55	\$ 7,131.80			\$ 9,698.53
8.2.6	Hauling materials from offsite	906	CY	\$ 2.01	\$ 1,824.52	\$ 2.70	\$ 2,443.84	\$ -	\$ 4,268.36			\$ 4,268.36
	Sub-total				\$ 9,265.79	\$ 9,926.48	\$ 15,906.80	\$ 30,799.06	\$ -	\$ -		\$ 30,799.06
8.3 Runoff Control Ditch												
8.3.1	Type I and II filter material - delivered	622	CY	\$ -	\$ -	\$ -	\$ -	\$ 15.75	\$ 9,796.89			\$ 9,796.89
8.3.2	Drainage Channel Type I filter material - placement	311	CY	\$ 1.74	\$ 542.68	\$ 3.66	\$ 1,138.92	\$ -	\$ 1,681.60			\$ 1,681.60
8.3.3	Drainage Channel Type II filter material - placement	311	CY	\$ 1.74	\$ 542.68	\$ 3.66	\$ 1,138.92	\$ -	\$ 1,681.60			\$ 1,681.60
8.3.4	Runoff Control Ditch - 750 LF - 3" Riprap (6" depth)	311	CY	\$ 1.72	\$ 535.56	\$ 4.59	\$ 1,429.49	\$ 17.55	\$ 5,460.00			\$ 7,425.05
8.3.5	Hauling materials from offsite	311	CY	\$ 2.01	\$ 626.27	\$ 2.70	\$ 838.85	\$ -	\$ 1,465.11			\$ 1,465.11
	Sub-total				\$ 2,247.18	\$ 4,546.18	\$ 5,460.00	\$ 12,253.36	\$ -	\$ -		\$ 12,253.36
8.4 North Diversion Channel Improvements												
8.4.1	Rock Check Dams (2) - 9" Riprap	60	CY	\$ 1.72	\$ 103.29	\$ 4.59	\$ 275.69	\$ 20.25	\$ 1,215.00			\$ 1,593.97
8.4.2	Removal of Aggraded Sediments	194	CY	\$ 0.95	\$ 183.78	\$ 2.71	\$ 527.78	\$ -	\$ 711.56			\$ 711.56
8.4.3	Diversion Berm general fill	1,444	CY	\$ 1.74	\$ 2,519.58	\$ 3.66	\$ 5,287.84	\$ -	\$ 7,807.42			\$ 7,807.42
8.4.4	Import material on-site	1,444	CY	\$ 0.57	\$ 824.26	\$ 2.22	\$ 3,203.03	\$ -	\$ 4,029.29			\$ 4,029.29
8.4.5	Hauling materials from offsite	60	CY	\$ 2.01	\$ 120.78	\$ 2.70	\$ 161.78	\$ -	\$ 282.56			\$ 282.56
	Sub-total				\$ 3,751.69	\$ 9,458.12	\$ 1,215.00	\$ 14,424.80	\$ -	\$ -		\$ 14,424.80
8.5 North Cell Drainage Channel												
8.5.1	North Cell Raised Earthen Berm	36,800	LCY	\$ 0.95	\$ 34,781.20	\$ 2.71	\$ 99,886.48	\$ -	\$ 134,667.68			\$ 134,667.68
8.5.2	Import material on-site	36,800	LCY	\$ 0.57	\$ 20,999.64	\$ 2.22	\$ 81,654.30	\$ -	\$ 102,653.94			\$ 102,653.94
	Sub-total				\$ 55,780.84	\$ 181,540.78	\$ -	\$ 237,321.62	\$ -	\$ -		\$ 237,321.62
8.6 Jetty - Pipeline Arroyo - Riprap Chute												
8.6.1	Excavation of Rock Jetty - remaining material	120,900	CY	\$ 0.95	\$ 114,267.57	\$ 2.71	\$ 328,159.67	\$ -	\$ 442,427.24			\$ 442,427.24
8.6.2	Type I and II filter material - delivered	45,500	CY	\$ -	\$ -	\$ -	\$ -	\$ 15.75	\$ 716,397.50			\$ 716,397.50
8.6.3	Type I filter material - placement	13,000	CY	\$ 1.74	\$ 22,676.22	\$ 3.66	\$ 47,590.55	\$ -	\$ 70,266.77			\$ 70,266.77
8.6.4	Type II filter material - placement	32,500	CY	\$ 1.74	\$ 56,690.55	\$ 3.66	\$ 118,976.37	\$ -	\$ 175,666.92			\$ 175,666.92
8.6.5	27" Riprap - material cost	86,000	CY	\$ -	\$ -	\$ -	\$ -	\$ 25.65	\$ 2,205,900.00			\$ 2,205,900.00
8.6.6	27" Riprap - placement	86,000	CY	\$ 1.72	\$ 148,043.57	\$ 4.59	\$ 395,152.66	\$ -	\$ 543,196.24			\$ 543,196.24
8.6.7	Hauling materials from offsite	86,000	CY	\$ 2.01	\$ 173,118.00	\$ 2.70	\$ 231,880.85	\$ -	\$ 404,998.85			\$ 404,998.85
8.6.8	Traffic control management	9	MO	\$ 15,700.70	\$ 141,306.29	\$ -	\$ -	\$ -	\$ 141,306.29			\$ 141,306.29
	Sub-total				\$ 656,102.21	\$ 1,121,760.10	\$ 2,922,297.50	\$ 4,700,159.81	\$ -	\$ -		\$ 4,700,159.81
Sub-Total Section 8					\$ 737,118	\$ -	\$ 1,355,709	\$ -	\$ 3,035,543	\$ 5,128,370	\$ -	\$ 5,128,370

Item No.	Description	QTY	Unit	Labor Unit Cost	Total Labor	Equipment Unit Cost	Total Equipment	Materials Unit Cost	Total Materials	Total L/E/M	Other Costs	Total Field Cost
9.0 Final Revegetation												
9.1 Reclaim Haul Roads												
9.1.1	Removal of imported gravel surfacing	3,115	CY	\$ 0.95	\$ 2,944.11	\$ 2.71	\$ 8,455.06	\$ -	\$ 11,399.18	\$ -	\$ -	\$ 11,399.18
9.1.2	Excavation of road embankment	4,100	CY	\$ 0.95	\$ 3,875.10	\$ 2.71	\$ 11,128.71	\$ -	\$ 15,003.81	\$ -	\$ -	\$ 15,003.81
9.1.3	Removal of road embankment materials	4,100	CY	\$ 0.57	\$ 2,339.65	\$ 2.22	\$ 9,097.40	\$ -	\$ 11,437.04	\$ -	\$ -	\$ 11,437.04
9.1.4	Final Grading	3.86	AC	\$ 458.06	\$ 1,748.57	\$ 1,401.13	\$ 5,409.70	\$ -	\$ 7,178.27	\$ -	\$ -	\$ 7,178.27
9.1.5	Traffic control management	2	MO	\$ 15,700.70	\$ 31,401.40	\$ -	\$ -	\$ -	\$ 31,401.40	\$ -	\$ -	\$ 31,401.40
				Sub-total	\$ 42,328.82	\$ 34,090.88	\$ -	\$ 76,419.70	\$ -	\$ -	\$ -	\$ 76,419.70
9.2 Reclamation of Facility areas												
9.2.1	Reclaim Repository Yard and Access Roads	4.2	AC	\$ 458.06	\$ 2,839.99	\$ 1,401.13	\$ 8,486.98	\$ -	\$ 11,526.97	\$ -	\$ -	\$ 11,526.97
9.2.2	Reclaim Former Mill Site Yard	16.5	AC	\$ 458.06	\$ 7,558.04	\$ 1,401.13	\$ 23,118.58	\$ -	\$ 30,676.62	\$ -	\$ -	\$ 30,676.62
				Sub-total	\$ 10,398.03	\$ 31,805.56	\$ -	\$ 42,203.40	\$ -	\$ -	\$ -	\$ 42,203.40
9.3 Seeding of Remaining Areas												
9.3.1	Seeding of Remaining Areas	26.6	AC	\$ 2,725.23	\$ 72,384.64	\$ -	\$ -	\$ -	\$ 72,384.64	\$ -	\$ -	\$ 72,384.64
				Sub-total	\$ 72,384.64	\$ -	\$ -	\$ 72,384.64	\$ -	\$ -	\$ -	\$ 72,384.64
				Sub-Total Section 9	\$ -	\$ 125,111	\$ -	\$ 65,896	\$ -	\$ 191,008	\$ -	\$ 191,008
10.0 Monitoring, Testing, and Verification Controls												
10.1 Quality Assurance and Quality Control												
10.1.1	Labor Personnel and administration	34	MN	\$ 51,179.41	\$ 870,050.00	\$ -	\$ -	\$ -	\$ 870,050.00	\$ -	\$ -	\$ 870,050.00
10.1.2	Lab Testing costs - Soil Testing	1	LS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 10,846.00	\$ -	\$ 10,846.00
10.1.3	Lab Testing costs - Rock Testing	1	LS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,480.00	\$ -	\$ 1,480.00
10.1.4	Monthly Lodging & Expenses	1	LS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 52,991.55	\$ -	\$ 52,991.55
				Sub-total	\$ 870,050.00	\$ -	\$ -	\$ 870,050.00	\$ 65,517.55	\$ -	\$ -	\$ 935,567.55
10.2 Remedial Action Radiologic Support												
10.2.1	Labor Personnel and administration	34	MN	\$ 62,339	\$ 1,059,755	\$ -	\$ -	\$ -	\$ 1,059,755	\$ -	\$ -	\$ 1,059,755
10.2.2	Project Management	34	MN	\$ 1,449	\$ 24,640	\$ -	\$ -	\$ -	\$ 24,640	\$ -	\$ -	\$ 24,640
10.2.3	Equipment, Supplies, Fees and Expenses	34	MN	\$ -	\$ -	\$ 10,989	\$ 186,808	\$ -	\$ 186,808	\$ -	\$ -	\$ 186,808
10.2.4	Monthly Lodging & Expenses	1	LS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 62,044	\$ -	\$ 62,044
				Sub-total	\$ 1,084,395	\$ 186,808	\$ -	\$ 1,271,203	\$ 62,044	\$ -	\$ -	\$ 1,333,247
10.3 Radiation Protection & Perimeter Radiologic Air Monitoring Plan												
10.3.1	Labor Personnel and administration	34	MN	\$ 33,331	\$ 566,629	\$ -	\$ -	\$ -	\$ 566,629	\$ -	\$ -	\$ 566,629
10.3.2	Equipment, Supplies, Fees and Expenses	34	MN	\$ -	\$ -	\$ 9,044	\$ 153,748	\$ -	\$ 153,748	\$ -	\$ -	\$ 153,748
10.3.3	Monthly Lodging & Expenses	1	LS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 37,000	\$ -	\$ 37,000
				Sub-total	\$ 566,629	\$ 153,748	\$ -	\$ 720,376	\$ 37,000	\$ -	\$ -	\$ 757,376
				Sub-Total Section 10	\$ 2,521,073.77	\$ -	\$ 340,555.06	\$ -	\$ 2,861,628.83	\$ 164,561.64	\$ -	\$ 3,026,190
EVAPORATION POND CLOSURE												
11.0 Mill Site Debris Excavation and Disposal												
11.1 Evaporation Pond Preparation for Waste												
11.1.1	Removal of existing cover materials	13,000	LCY	\$ 0.95	\$ 12,286.84	\$ 2.71	\$ 35,285.99	\$ -	\$ 47,572.82	\$ -	\$ -	\$ 47,573
11.1.2	Compaction of Subgrade	77,440	SY	\$ 0.05	\$ 3,900.18	\$ 0.14	\$ 10,489.78	\$ -	\$ 14,389.95	\$ -	\$ -	\$ 14,390
				Sub-total	\$ 16,187	\$ 45,776	\$ -	\$ 61,963	\$ -	\$ -	\$ -	\$ 61,963
11.2 Mill Site Debris Excavation and Disposal												
11.2.1	Debris-concrete, metal, wood, rubber, plastic	6,870	LCY	\$ 2.02	\$ 13,886.44	\$ 6.51	\$ 44,738.58	\$ -	\$ 58,625.03	\$ -	\$ -	\$ 58,625
11.2.2	Soil	44,099	LCY	\$ 1.42	\$ 62,547.93	\$ 5.74	\$ 252,968.88	\$ -	\$ 315,506.82	\$ -	\$ -	\$ 315,507
11.2.3	Final Grading	16.0	AC	\$ 458.06	\$ 7,329.01	\$ 1,401.13	\$ 22,418.02	\$ -	\$ 29,747.03	\$ -	\$ -	\$ 29,747
				Sub-total	\$ 83,763	\$ 320,115	\$ -	\$ 403,879	\$ -	\$ -	\$ -	\$ 403,879
				Sub-Total Section 11	\$ 99,950	\$ 365,891	\$ -	\$ 465,842	\$ -	\$ -	\$ -	\$ 465,842
12.0 Construct Existing Cover over the Evaporation Ponds												
12.1 Borrow Area Development												
12.1.1	Screening for small rock - 1.5"	4,409	CY	\$ 1.36	\$ 5,993.08	\$ 2.45	\$ 26,317.29	\$ -	\$ 38,336.79	\$ -	\$ -	\$ 38,337
				Sub-total	\$ 5,993	\$ 26,317	\$ -	\$ 38,337	\$ -	\$ -	\$ -	\$ 38,337
12.2 Excavate and Haul Material to Pond Location												
12.2.1	Hauling of small rock to site	4,409	CY	\$ 0.57	\$ 2,515.96	\$ 2.22	\$ 9,782.98	\$ -	\$ 12,298.95	\$ -	\$ -	\$ 12,299
12.2.2	Hauling of topsoil from Jetty Area	13,230	CY	\$ 0.57	\$ 7,549.60	\$ 2.22	\$ 29,355.61	\$ -	\$ 36,905.21	\$ -	\$ -	\$ 36,905
				Sub-total	\$ 10,066	\$ 39,139	\$ -	\$ 49,204	\$ -	\$ -	\$ -	\$ 49,204
12.3 Material Placement												
12.3.1	Placing of materials	17,639	CY	\$ 1.74	\$ 30,768.14	\$ 3.66	\$ 64,573.05	\$ -	\$ 95,341.20	\$ -	\$ -	\$ 95,341
				Sub-total	\$ 30,768	\$ 64,573	\$ -	\$ 95,341	\$ -	\$ -	\$ -	\$ 95,341
12.4 Branch Swale H												
12.4.1	Type I Land II filter material - delivered	1,550	CY	\$ -	\$ -	\$ -	\$ -	\$ 15.75	\$ 24,404.75	\$ 24,404.75	\$ -	\$ 24,405
12.4.2	Drainage Channel Type I filter material - placement	775	CY	\$ 1.74	\$ 1,351.85	\$ 3.66	\$ 2,837.13	\$ -	\$ 4,188.98	\$ -	\$ -	\$ 4,189
12.4.3	Drainage Channel Type II filter material - placement	775	CY	\$ 1.74	\$ 1,351.85	\$ 3.66	\$ 2,837.13	\$ -	\$ 4,188.98	\$ -	\$ -	\$ 4,189
12.4.4	3.0" Riprap - 2550 LF	1,550	CY	\$ 1.72	\$ 2,668.23	\$ 4.59	\$ 7,121.94	\$ 17.55	\$ 27,202.50	\$ 36,992.66	\$ -	\$ 36,993
12.4.5	Hauling materials from offsite	1,550	CY	\$ 2.01	\$ 3,120.15	\$ 2.70	\$ 4,179.25	\$ -	\$ 7,299.40	\$ -	\$ -	\$ 7,299
				Sub-total	\$ 8,492	\$ 16,975	\$ 51,607	\$ 77,075	\$ -	\$ -	\$ -	\$ 77,075
12.5 Final Grading of the Cover												
12.5.1	Grading	16	AC	\$ 458.06	\$ 7,329.01	\$ 1,401.13	\$ 22,418.02	\$ -	\$ 29,747.03	\$ -	\$ -	\$ 29,747
12.5.2	Compaction of Cover Materials - 16 Acres	77,440	SY	\$ 0.05	\$ 3,900.18	\$ 0.14	\$ 10,489.78	\$ -	\$ 14,389.95	\$ -	\$ -	\$ 14,390
				Sub-total	\$ 11,229	\$ 32,908	\$ -	\$ 44,137	\$ -	\$ -	\$ -	\$ 44,137
12.6 Seeding of the Cover												
12.6.1	Seeding of the Cover	16	AC	\$ 2,725.23	\$ 43,603.62	\$ -	\$ -	\$ -	\$ 43,603.62	\$ -	\$ -	\$ 43,604
				Sub-total	\$ 43,604	\$ -	\$ -	\$ 43,604	\$ -	\$ -	\$ -	\$ 43,604
				Sub-Total Section 12	\$ 101,660	\$ 162,937	\$ -	\$ 347,698	\$ -	\$ -	\$ -	\$ 347,698
13.0 Mill Site Well Decommissioning												
13.1 Well Decommissioning												
13.1.1	Mill Site Well Decommissioning	130	EA	\$ 4,147.54	\$ 539,179.64	\$ -	\$ -	\$ -	\$ 539,179.64	\$ -	\$ -	\$ 539,180
				Sub-total	\$ 539,180	\$ -	\$ -	\$ -	\$ 539,180	\$ -	\$ -	\$ 539,180
				Sub-Total Section 13	\$ 539,180	\$ -	\$ -	\$ 539,180	\$ -	\$ -	\$ -	\$ 539,180

Item No.	Description	QTY	Unit	Labor Unit Cost	Total Labor	Equipment Unit Cost	Total Equipment	Materials Unit Cost	Total Materials	Total L/E/M	Other Costs	Total Field Cost
INDIRECT COSTS												
14.0 Short-Term Surveillance												
14.1 Annual Observation and Maintenance												
14.1.1	Observation and Maintenance	120	MO	\$ 4,255.37	\$ 510,644.67	\$ -	\$ -	\$ -	\$ -	\$ 510,644.67	\$ -	\$ 510,645
14.1.2	Maintenance of Access Roads	120	MO	\$ 583.29	\$ 69,994.35	\$ 861.99	\$ 103,439.02	\$ -	\$ -	\$ 173,433.36	\$ -	\$ 173,433
14.1.3	Grading of Repository and Surrounding Areas	10	YR	\$ 13,741.90	\$ 137,418.96	\$ 42,033.78	\$ 420,337.81	\$ -	\$ -	\$ 557,756.78	\$ -	\$ 557,757
Sub-total					\$ 718,058	\$ 42,896	\$ 523,777	\$ -	\$ -	\$ 1,241,835	\$ -	\$ 1,241,835
Sub-Total Section 14					\$ 718,058	\$ 523,777	\$ -	\$ -	\$ 1,241,835	\$ -	\$ 1,241,835	
15.0 Groundwater Monitoring and Sampling												
15.1 Well Sampling and Groundwater Monitoring												
15.1.1	Monitoring Well Sampling	1	LS							\$ -	\$ 1,171,137.00	\$ 1,171,137
15.1.2	Short-Term Surveillance for groundwater monitoring	1	LS							\$ -	\$ 991,258.00	\$ 991,258
15.1.3	Short-Term Surveillance for Mill License area	1	LS							\$ -	\$ 656,800.00	\$ 656,800
Sub-total					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,819,195.00	\$ 2,819,195
Sub-Total Section 15					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,819,195	\$ 2,819,195
16.0 Land Surveying												
16.1 Survey Tracking of Monthly Volumes												
16.1.1	Construction Staking and Land Surveying	14	MO	\$ 90,780.37	\$ 635,462.59	\$ 5,470.29	\$ 38,292.03	\$ -	\$ -	\$ 673,754.62	\$ -	\$ 673,754.62
Sub-total					\$ 635,462.59	\$ 5,470.29	\$ 38,292.03	\$ -	\$ -	\$ 673,754.62	\$ -	\$ 673,754.62
Sub-Total Section 16					\$ 635,463	\$ -	\$ 38,292	\$ -	\$ -	\$ 673,755	\$ -	\$ 673,755
17.0 Engineering, Fees, Contingency												
17.1 Allowances for Indirect Costs												
17.1.1	Engineering/Permitting - 2%	2%	LS							\$323,054	\$	323,054
17.1.2	Contractor management and administration	5.3%	LS							\$848,017	\$	848,017
17.1.3	Contingency	15.00%	LS							\$2,422,906	\$	2,422,906
17.1.4	Long-Term Surveillance Fee	1	LS							\$991,871	\$	991,871
Sub-total										\$4,585,848	\$	4,585,847.90
Sub-Total Section 17					\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,585,848	\$	4,585,848
Sub-Total Indirect Costs					\$ 1,353,521	\$ 562,069	\$ -	\$ -	\$ 1,915,589	\$ 7,427,543	\$	9,343,132
Sub-Total Direct Costs					\$ 6,011,848	\$ 6,702,083	\$ 3,154,156	\$ 15,951,187	\$ 201,517	\$	\$	16,152,704
Total Project Cost					\$ 7,365,368	\$ 7,264,152	\$ 3,154,156	\$ 17,866,777	\$ 7,629,060	\$	\$	25,495,837
											Total Project Cost - 15%	\$ 21,671,461
											Total Project Cost +30%	\$ 33,144,588

UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Appendix A **Tailings Reclamation Modification and Mill Site Decommissioning Cost Estimate**

A.3 WORK CREW CALCULATIONS





United Nuclear Corporation
UNC Mill Site
Budget Authorization - Surety Cost Estimate - Rev K - 25 March 2020
Crew Groups

Crew A	Haul Road, Access Road, Borrow Road Building	SY	3.0
Crew B	Haul Road Building	SY	2.0
Crew C	Miscellaneous Excavations	LCY	4.0
Crew D	PTW Excavation, Loading, Hauling to Staging Area	LCY	N/A
Crew E	Stockpiling and Maintaining PTW Staging Area	LCY	N/A
Crew F	PTW Loading Trucks	LCY	N/A
Crew G	Screening Operation	LCY / TON	4.0
Crew H	Support	Hour / Month	N/A
Crew I	Shredding Operation	Hour	N/A
Crew J	Mine Waste Excavation and Hauling	LCY	N/A
Crew K	Removal of Debris - wood, metal, concrete	LCY / TON	11.0
Crew L	Loading and Hauling Material	LCY	6.0
Crew M	Compaction	SY	6.0
Crew N	Grading	Acres / Hour	7.0
Crew O	Placing Riprap	CY	8.0
Crew P	Embankment fill and compaction	CY	8.0
Crew Q	Permanent Storm Water Earthmoving	CY	8.0
Crew R	Mine Waste Hauling within Mill License Area	LCY	5.0

Crew A		Haul Road, Access Road, Borrow Road Building				Units	SY	Units/Hr	486		
Asset	Qty	Cost each per hour	Cost per hour	MU %	Total cost per hour	Units per asset	Units per hour	Labor cost per unit	Equip cost per unit	total cost per unit	
Grader Operator	1	\$ 74.21	\$ 74.21	20%	\$ 89.06	486	486	\$ 0.18	\$	\$ 0.18	
Loader Operator	1	\$ 68.09	\$ 68.09	20%	\$ 81.70	486	486	\$ 0.17	\$	\$ 0.17	
Mechanic	0.25	\$ 58.40	\$ 14.60	20%	\$ 17.52	486	486	\$ 0.04	\$	\$ 0.036	
Laborer	1	\$ 46.71	\$ 46.71	20%	\$ 56.06	486	486	\$ 0.12	\$	\$ 0.12	
Motor Grader 14M	1	\$ 153.26	\$ 153.26	20%	\$ 183.91	486	486	\$	\$ 0.38	\$ 0.38	
Loader 980	1	\$ 181.50	\$ 181.50	20%	\$ 217.80	486	486	\$	\$ 0.45	\$ 0.45	
Service Truck	0.25	\$ 17.22	\$ 4.30	20%	\$ 5.17	486	486	\$	\$ 0.01	\$ -	
TOTAL COST PER HOUR						\$ 651.21	TOTAL COST PER UNIT	\$ 0.50	\$ 0.84	\$ 1.33	

Crew B		Mine Waste Road Building				Units	SY	Units/Hr	518		
Asset	Qty	Cost each per hour	Cost per hour	MU %	Total cost per hour	Units per asset	Units per hour	Labor cost per unit	Equip cost per unit	total cost per unit	
Grader Operator	1	\$ 74.21	\$ 74.21	20%	\$ 89.06	518	518	\$ 0.17	\$	\$ 0.17	
Dozer Operator	1	\$ 74.21	\$ 74.21	20%	\$ 89.06	518	518	\$ 0.17	\$	\$ 0.17	
Mechanic	0.25	\$ 58.40	\$ 14.60	20%	\$ 17.52	518	518	\$ 0.03	\$	\$ 0.03	
Laborer	1	\$ 46.71	\$ 46.71	20%	\$ 56.06	518	518	\$ 0.11	\$	\$ 0.11	
Motor Grader 14M	1	\$ 153.26	\$ 153.26	20%	\$ 183.91	518	518	\$	\$ 0.35	\$ 0.35	
Dozer D6	1	\$ 153.51	\$ 153.51	20%	\$ 184.21	518	518	\$	\$ 0.36	\$ 0.36	
Service Truck	0.25	\$ 17.22	\$ 4.30	20%	\$ 5.17	518	518	\$	\$ 0.01	\$ -	
TOTAL COST PER HOUR						\$ 624.97	TOTAL COST PER UNIT	\$ 0.49	\$ 0.72	\$ 1.20	

Crew C		Miscellaneous Excavations				Units	LCY	Units/Hr	390		
Asset	Qty	Cost each per hour	Cost per hour	MU %	Total cost per hour	Units / Asset / Hour	Units per hour	Labor cost per unit	Equip cost per unit	total cost per unit	
Loader Operator	1	\$ 68.09	\$ 68.09	20%	\$ 81.70	390	390	\$ 0.21	\$	\$ 0.21	
Dozer Operator	1	\$ 74.21	\$ 74.21	20%	\$ 89.06	390	390	\$ 0.23	\$	\$ 0.23	
Truck Driver	2.0	\$ 47.38	\$ 94.75	20%	\$ 113.70	195	390	\$ 0.29	\$	\$ 0.29	
Laborer	1	\$ 46.71	\$ 46.71	20%	\$ 56.06	390	390	\$ 0.14	\$	\$ 0.14	
Water Truck Driver	0.5	\$ 47.38	\$ 23.69	20%	\$ 28.43	781	390	\$ 0.07	\$	\$ 0.07	
Loader 980	1	\$ 181.50	\$ 181.50	20%	\$ 217.80	390	390	\$	\$ 0.56	\$ 0.56	
Dozer D6	1	\$ 153.51	\$ 153.51	20%	\$ 184.21	390	390	\$	\$ 0.47	\$ 0.47	
CAT Truck 740	2.0	\$ 218.66	\$ 438.63	20%	\$ 526.36	195	390	\$	\$ 1.35	\$ 1.35	
CAT Water Truck 740	0.5	\$ 218.66	\$ 109.33	20%	\$ 131.20	781	390	\$	\$ 0.34	\$ 0.34	
TOTAL COST PER HOUR						\$ 1,428.51	TOTAL COST PER UNIT	\$ 0.95	\$ 2.71	\$ 3.66	

Crew D		PTW Excavation, Loading, and Hauling to Staging Area				Units	LCY	Units/Hr	187		
Asset	Qty	Cost each per hour	Cost per hour	MU %	Total cost per hour	Units per asset	Units per hour	Labor cost per unit	Equip cost per unit	total cost per unit	
Excavator Operator	1	\$ 74.21	\$ 74.21	20%	\$ 89.06	187	187	\$ 0.48	\$	\$ 0.48	
Loader Operator	1	\$ 68.09	\$ 68.09	20%	\$ 81.70	187	187	\$ 0.44	\$	\$ 0.44	
Truck Driver	2.4	\$ 47.38	\$ 111.61	20%	\$ 133.93	79	187	\$ 0.72	\$	\$ 0.72	
Excavator 390	1	\$ 308.58	\$ 308.58	20%	\$ 370.30	187	187	\$	\$ 1.98	\$ 1.98	
Loader 980	1	\$ 181.50	\$ 181.50	20%	\$ 217.80	187	187	\$	\$ 1.16	\$ 1.16	
CAT Truck 740	2.4	\$ 215.05	\$ 506.60	20%	\$ 607.92	79	187	\$	\$ 3.25	\$ 3.25	
TOTAL COST PER HOUR						\$ 1,500.71	TOTAL COST PER UNIT	\$ 1.63	\$ 6.39	\$ 8.02	

Crew E		Stockpiling and Maintaining PTW Staging Area				Hours per Month	259.8		
Asset	Qty	Cost each per hour	Cost per hour	MU %	Total cost per hour	Hours per Month	Monthly Labor Equip.	Monthly Total	
Loader Operator	1	\$ 68.09	\$ 68.09	20%	\$ 81.70	259.8	\$ 21,226.94	\$ 21,226.94	
Water Truck Driver	0.5	\$ 47.38	\$ 23.69	20%	\$ 28.43	259.8	\$ 7,385.08	\$ 7,385.08	
Loader 980	1	\$ 181.50	\$ 181.50	20%	\$ 217.80	259.8	\$ 56,583.98	\$ 56,583.98	
Water Truck 740	0.5	\$ 218.66	\$ 109.33	20%	\$ 131.20	259.8	\$ 34,084.57	\$ 34,084.57	
TOTAL COST PER HOUR						\$ 459.12	\$ 28,612.02	\$ 90,668.55	\$ 119,280.57

Crew F		PTW Loading trucks				Units	LCY	Units/Hr	62		
Asset	Qty	Cost each per hour	Cost per hour	MU %	Total cost per hour	Units / asset / Hour	Units per hour	Labor cost per unit	Equip cost per unit	total cost per unit	
Loader Operator	1	\$ 68.09	\$ 68.09	20%	\$ 81.70	62	62	\$ 1.32	\$	\$ 1.32	
Mechanic	0.1	\$ 58.40	\$ 5.84	20%	\$ 7.01	62	62	\$ 0.11	\$	\$ 0.11	
Laborer	4	\$ 46.71	\$ 186.85	20%	\$ 224.22	15	62	\$ 3.62	\$	\$ 3.62	
Loader 980	1	\$ 181.50	\$ 181.50	20%	\$ 217.80	62	62	\$	\$ 3.52	\$ 3.52	
Service Truck	0.1	\$ 17.22	\$ 1.72	20%	\$ 2.07	62	62	\$	\$ 0.03	\$ 0.03	
TOTAL COST PER HOUR						\$ 532.80	TOTAL COST PER UNIT	\$ 5.05	\$ 3.55	\$ 8.60	

Crew G		Screening Operation						Units	TON	Units/Hr	400
	Qty	Cost each per hour	Cost per hour	MU %	Total cost per hour	Units / asset / Hour	Units per hour	Labor cost per unit	Equip cost per unit	total cost per unit	
General Machinery Operator	2	\$ 53.35	\$ 106.70	20%	\$ 213.40	128.04	200	\$ 0.32		\$ 0.32	
Loader Operator	2	\$ 68.09	\$ 136.17	20%	\$ 272.34	163.41	200	\$ 0.41		\$ 0.41	
Mechanic	2	\$ 58.40	\$ 116.79	20%	\$ 233.58	140.15	400	\$ 0.35		\$ 0.35	
Laborer	2	\$ 46.71	\$ 93.43	20%	\$ 186.86	112.11	400	\$ 0.28		\$ 0.28	
Screen Plant	1	\$ 437.71	\$ 437.71	20%	\$ 875.42	525.25	400		\$ 1.31	\$ 1.31	
Loader 980	2	\$ 181.50	\$ 363.00	20%	\$ 726.00	435.60	200		\$ 1.09	\$ 1.09	
Service Truck	1	\$ 17.22	\$ 17.22	20%	\$ 34.44	20.66	400		\$ 0.05	\$ 0.05	
TOTAL COST PER HOUR						\$ 1,525.22	TOTAL COST PER UNIT	\$ 1.36	\$ 2.45	\$ 3.81	

Crew H		Support						Unit	Hour	Units/Hr	1
	Qty	Cost each per hour	Cost per hour	MU %	Total cost per hour	Hours per Month	Monthly Labor Equip.	Monthly Total			
Dozer Operator	1	\$ 74.21	\$ 74.21	20%	\$ 148.42	89.06	1	\$ 89.06		\$ 89.06	
Grader Operator	1	\$ 74.21	\$ 74.21	20%	\$ 148.42	89.06	1	\$ 89.06		\$ 89.06	
Water Truck Driver	1	\$ 47.38	\$ 47.38	20%	\$ 94.76	56.85	1	\$ 56.85		\$ 56.85	
Mechanic	0.25	\$ 58.40	\$ 14.60	20%	\$ 29.20	17.52	1	\$ 17.52		\$ 17.52	
Dozer D6	1	\$ 153.51	\$ 153.51	20%	\$ 307.02	184.21	1	\$ 184.21		\$ 184.21	
Grader 14M	1	\$ 153.26	\$ 153.26	20%	\$ 306.52	183.91	1	\$ 183.91		\$ 183.91	
Water Truck 740	1	\$ 218.66	\$ 218.66	20%	\$ 437.32	262.39	1	\$ 262.39		\$ 262.39	
Service Truck	0.25	\$ 17.22	\$ 4.30	20%	\$ 8.60	5.17	1	\$ 5.17		\$ 5.17	
TOTAL COST PER HOUR						\$ 888.16		\$ 252.48	\$ 635.68	\$ 888.16	

Crew I		Shredding Operation						Unit	Month	173.3
	Qty	Cost each per hour	Cost per hour	MU %	Total cost per hour	Hours per Month	Monthly Labor Equip.	Monthly Total		
General Machinery Operator	1	\$ 53.35	\$ 53.35	20%	\$ 106.70	64.02	173.3	\$ 11,094.87		\$ 11,094.87
Loader Operator	1	\$ 68.09	\$ 68.09	20%	\$ 136.17	81.70	173.3	\$ 14,159.46		\$ 14,159.46
Truck Driver	1	\$ 47.38	\$ 47.38	20%	\$ 94.76	56.85	173.3	\$ 9,852.46		\$ 9,852.46
Mechanic	1	\$ 58.40	\$ 58.40	20%	\$ 116.79	70.08	173.3	\$ 12,144.01		\$ 12,144.01
Laborer	4	\$ 46.71	\$ 186.85	20%	\$ 373.70	224.22	173.3	\$ 38,857.67		\$ 38,857.67
Shredding Plant	1	\$ 30.37	\$ 30.37	20%	\$ 60.74	36.45	173.3	\$ 6,316.50		\$ 6,316.50
Loader 980	1	\$ 181.50	\$ 181.50	20%	\$ 363.00	217.80	173.3	\$ 37,744.43		\$ 37,744.43
CAT Truck 740	1	\$ 218.66	\$ 218.66	20%	\$ 437.32	262.39	173.3	\$ 45,472.36		\$ 45,472.36
Service Truck	1	\$ 17.22	\$ 17.22	20%	\$ 34.44	20.66	173.3	\$ 3,580.40		\$ 3,580.40
TOTAL COST PER HOUR						\$ 1,034.17		\$ 86,108.48	\$ 93,113.70	\$ 179,222.17

Crew J		Mine Waste Excavation and Hauling						Units	LCY	Units/Hr	369
	Qty	Cost each per hour	Cost per hour	MU %	Total cost per hour	Units / asset / Hour	Units per hour	Labor cost per unit	Equip cost per unit	total cost per unit	
Excavator Operator	1	\$ 74.21	\$ 74.21	20%	\$ 148.42	89.06	369	\$ 0.24		\$ 0.24	
Loader Operator	1	\$ 68.09	\$ 68.09	20%	\$ 136.17	81.70	369	\$ 0.22		\$ 0.22	
Truck Driver	5.4	\$ 47.38	\$ 255.83	20%	\$ 511.66	306.99	68	\$ 0.83		\$ 0.83	
Mechanic	0.25	\$ 58.40	\$ 14.60	20%	\$ 29.20	17.52	369	\$ 0.05		\$ 0.05	
Water Truck Driver	0.5	\$ 47.38	\$ 23.69	20%	\$ 47.38	28.43	738	\$ 0.08		\$ 0.08	
Excavator 390	1	\$ 308.58	\$ 308.58	20%	\$ 617.16	370.30	369		\$ 1.00	\$ 1.00	
Loader 980	1	\$ 181.50	\$ 181.50	20%	\$ 363.00	217.80	369		\$ 0.59	\$ 0.59	
CAT Truck 740	5.4	\$ 215.05	\$ 1,161.26	20%	\$ 2,322.52	1,393.51	68		\$ 3.77	\$ 3.77	
Service Truck	0.25	\$ 17.22	\$ 4.30	20%	\$ 8.60	5.17	369		\$ 0.01	\$ 0.01	
CAT Water Truck 740	0.5	\$ 218.66	\$ 109.33	20%	\$ 218.66	131.20	738		\$ 0.36	\$ 0.36	
TOTAL COST PER HOUR						\$ 2,641.67	TOTAL COST PER UNIT	\$ 1.42	\$ 5.74	\$ 7.15	

Crew K		Removal of Debris - wood, metal, concrete						Units	LCY	Units/Hr	192
	Qty	Cost each per hour	Cost per hour	MU %	Total cost per hour	Units / asset / Hr	Units per hour	Labor cost per unit	Equip cost per unit	total cost per unit	
Excavator Operator	1.0	\$ 74.21	\$ 74.21	20%	\$ 148.42	89.06	192	\$ 0.46		\$ 0.46	
Truck Driver	3.3	\$ 47.38	\$ 155.77	20%	\$ 311.54	186.93	58	\$ 0.97		\$ 0.97	
Laborer	2.0	\$ 46.71	\$ 93.43	20%	\$ 186.86	112.11	192	\$ 0.58		\$ 0.58	
Excavator 390 W Thumb	1.0	\$ 323.01	\$ 323.01	20%	\$ 646.02	387.61	192		\$ 2.02	\$ 2.02	
CAT Truck 740	3.3	\$ 218.66	\$ 718.94	20%	\$ 1,437.88	862.72	58		\$ 4.49	\$ 4.49	
TOTAL COST PER HOUR						\$ 1,638.43	TOTAL COST PER UNIT	\$ 2.02	\$ 6.51	\$ 8.53	

Crew L		Loading and Hauling Material						Units	LCY	Units/Hr	384.00
	Qty	Cost each per hour	Cost per hour	MU %	Total cost per hour	Units / Asset / Hour	Units per hour	Labor cost per unit	Equip cost per unit	total cost per unit	
Loader Operator	1	\$ 68.09	\$ 68.09	20%	\$ 136.17	81.70	384	\$ 0.21		\$ 0.21	
Truck Driver	1.9	\$ 47.38	\$ 90.83	20%	\$ 181.66	109.00	200.3	\$ 0.28		\$ 0.28	
Water Truck Driver	0.5	\$ 47.38	\$ 23.69	20%	\$ 47.38	28.43	768	\$ 0.07		\$ 0.07	
Loader 980	1	\$ 181.50	\$ 181.50	20%	\$ 363.00	217.80	384		\$ 0.57	\$ 0.57	
CAT Truck 740	1.9	\$ 218.66	\$ 415.25	20%	\$ 830.50	503.05	200.3		\$ 1.31	\$ 1.31	
CAT Water Truck 740	0.5	\$ 218.66	\$ 109.33	20%	\$ 218.66	131.20	768		\$ 0.34	\$ 0.34	
TOTAL COST PER HOUR						\$ 1,071.17	TOTAL COST PER UNIT	\$ 0.57	\$ 2.22	\$ 2.79	

Crew M		Compaction						Units	SY	Units/Hr	2,400
	Qty	Cost each per hour	Cost per hour	MU %	Total cost per hour	Units per asset	Units per hour	Labor cost per unit	Equip cost per unit	total cost per unit	
Asset											
General Machinery Operator	1	\$ 53.35	\$ 53.35	20%	\$ 106.70	64.02	2400	\$ 0.03		\$ 0.03	
Water Truck Driver	1	\$ 47.38	\$ 47.38	20%	\$ 94.76	56.85	2400	\$ 0.02		\$ 0.02	
Roller CS56B	1	\$ 52.25	\$ 52.25	20%	\$ 104.50	62.71	2400		\$ 0.03	\$ 0.03	
Water truck 745	1	\$ 218.66	\$ 218.66	20%	\$ 437.32	262.39	2400		\$ 0.11	\$ 0.11	
TOTAL COST PER HOUR						\$ 445.97	TOTAL COST PER UNIT	\$ 0.05	\$ 0.14	\$ 0.19	

Crew N		Grading						Unit	Acres / Hour	3.14
	Qty	Cost each per hour	Cost per hour	MU %	Total cost per hour	Hours per Month	Monthly Labor Equip.	Monthly Total		
Motor Grader Operator	1	\$ 74.21	\$ 74.21	20%	\$ 148.42	89.06	3.14	\$ 279.58		\$ 279.58
Truck Driver	1	\$ 47.38	\$ 47.38	20%	\$ 94.76	56.85	3.14	\$ 178.48		\$ 178.48
CAT 14M Grader	1	\$ 153.26	\$ 153.26	20%	\$ 306.52	183.91	3.14	\$ 577.38		\$ 577.38
CAT 740 Water Truck	1	\$ 218.66	\$ 218.66	20%	\$ 437.32	262.39	3.14	\$ 823.75		\$ 823.75
TOTAL COST PER HOUR						\$ 592.21		\$ 458.06	\$ 1,401.13	\$ 1,859.19

Crew O		Placing Riprap						Units		CY	Units/Hr			132
	Qty	Cost each per hour	Cost per hour	MU %	Total cost per hour	Units / asset / Hour	Units per hour			Labor cost per unit	Equip cost per unit	total cost per unit		
Excavator Operator	1	\$ 74.21	\$ 74.21	20%	\$ 89.06	131.76	131.76			\$ 0.68		\$ 0.68		
Loader Operator	1	\$ 68.09	\$ 68.09	20%	\$ 81.70	131.76	131.76			\$ 0.62		\$ 0.62		
Laborer	1	\$ 46.71	\$ 46.71	20%	\$ 56.06	131.76	131.76			\$ 0.43		\$ 0.43		
Excavator 390	1	\$ 323.01	\$ 323.01	20%	\$ 387.61	131.76	131.76			\$ 2.94		\$ 2.94		
Loader 980	1	\$ 181.50	\$ 181.50	20%	\$ 217.80	132	131.76			\$ 1.65		\$ 1.65		
TOTAL COST PER HOUR					\$	832.23	TOTAL COST PER UNIT	\$	1.72	\$	4.59	\$	6.32	

Crew P		Embankment fill and compaction						Units		CY	Units/Hr			161
	Qty	Cost each per hour	Cost per hour	MU %	Total cost per hour	Units / asset / Hour	Units per hour			Labor cost per unit	Equip cost per unit	total cost per unit		
Dozer Operator	1	\$ 74.21	\$ 74.21	20%	\$ 89.06	161	161			\$ 0.55		\$ 0.55		
Loader Operator	1	\$ 68.09	\$ 68.09	20%	\$ 81.70	161	161			\$ 0.51		\$ 0.51		
General Machinery Operator	1	\$ 53.35	\$ 53.35	20%	\$ 64.02	161	161			\$ 0.40		\$ 0.40		
Mechanic	0.25	\$ 58.40	\$ 14.60	20%	\$ 17.52	160.93735	160.9373502			\$ 0.11		\$ 0.11		
Water Truck Driver	0.5	\$ 47.38	\$ 23.69	20%	\$ 28.43	322	161			\$ 0.18		\$ 0.18		
Dozer D6	1	\$ 153.51	\$ 153.51	20%	\$ 184.21	161	161			\$ 1.14		\$ 1.14		
Loader 980	1	\$ 181.50	\$ 181.50	20%	\$ 217.80	161	161			\$ 1.35		\$ 1.35		
Roller CS54B	1	\$ 42.33	\$ 42.33	20%	\$ 50.79	161	161			\$ 0.32		\$ 0.32		
Service Truck	0.25	\$ 17.22	\$ 4.30	20%	\$ 5.17	161	161			\$ 0.03		\$ 0.03		
CAT Water Truck 740	0.5	\$ 218.66	\$ 109.33	20%	\$ 131.20	322	161			\$ 0.82		\$ 0.82		
TOTAL COST PER HOUR					\$	738.69	TOTAL COST PER UNIT	\$	1.74	\$	3.66	\$	5.41	

Crew Q		Permanent Storm Water Earthmoving						Units		CY	Units/Hr			244
	Qty	Cost each per hour	Cost per hour	MU %	Total cost per hour	Units / asset / Hour	Units per hour			Labor cost per unit	Equip cost per unit	total cost per unit		
Excavator Operator	1	\$ 74.21	\$ 74.21	20%	\$ 89.06	244	244			\$ 0.36		\$ 0.36		
Loader Operator	1	\$ 68.09	\$ 68.09	20%	\$ 81.70	244	244			\$ 0.33		\$ 0.33		
Mechanic	0.25	\$ 58.40	\$ 14.60	20%	\$ 17.52	244	244			\$ 0.07		\$ 0.07		
Water Truck Driver	0.5	\$ 47.38	\$ 23.69	20%	\$ 28.43	488	244			\$ 0.12		\$ 0.12		
Excavator 390	1	\$ 308.58	\$ 308.58	20%	\$ 370.30	244	244			\$ 1.52		\$ 1.52		
Loader 980	1	\$ 181.50	\$ 181.50	20%	\$ 217.80	244	244			\$ 0.89		\$ 0.89		
Service Truck	0.25	\$ 17.22	\$ 4.30	20%	\$ 5.17	244	244			\$ 0.02		\$ 0.02		
CAT Water Truck 740	0.5	\$ 218.66	\$ 109.33	20%	\$ 131.20	488	244			\$ 0.54		\$ 0.54		
TOTAL COST PER HOUR					\$	809.97	TOTAL COST PER UNIT	\$	0.89	\$	2.97	\$	3.86	

Crew R		Hauling Waste Material Within License Area						Units		LCY	Units/Hr			384.00
	Qty	Cost each per hour	Cost per hour	MU %	Total cost per hour	Units / Asset / Hour	Units per hour			Labor cost per unit	Equip cost per unit	total cost per unit		
Loader Operator	0	\$ 68.09	\$ -	-	\$ -	0	384.00			\$ -		\$ -		
Truck Driver	1.9	\$ 47.38	\$ 90.83	20%	\$ 109.00	200.3	384.00			\$ 0.28		\$ 0.28		
Water Truck Driver	0	\$ 47.38	\$ -	-	\$ -	0	384			\$ -		\$ -		
Loader 980	0	\$ 181.50	\$ -	-	\$ -	0	384.00			\$ -		\$ -		
CAT Truck 740	1.9	\$ 218.66	\$ 419.21	20%	\$ 503.05	200.3	384.00			\$ 1.31		\$ 1.31		
CAT Water Truck 740	0	\$ 218.66	\$ -	-	\$ -	0	384			\$ -		\$ -		
TOTAL COST PER HOUR					\$	612.05	TOTAL COST PER UNIT	\$	0.28	\$	1.31	\$	1.59	



United Nuclear Corporation
UNC Mill Site
Budget Authorization - Surety Cost Estimate - Rev K - 25 March 2020
Calculations

2.0 Early Works and Construction Support

2.1 Mobilization		Equipment Pc Hours RT	20%							
2.1.1	Tractor & Trailer / lowboy	\$ 82.29	44	2	88	\$ 7,241.85	\$ 8,690.22	Trucks	14 Loader	3
	Operator	\$ 45.29				\$ 3,985.74	\$ 4,782.89	Excavator	3 Water Truck	3
	Labor	\$ 58.40				\$ 5,138.84	\$ 6,166.61	Dozer	3 Compactor	2
2.1.2	Labor	\$ 58.40	8 workers X 4 weeks			\$ 256	\$ 14,949.35	Motor Grader	2 Tractor	2
	Service Truck	\$ 17.22	2 service trucks X4 weeks			\$ 64	\$ 1,101.87	Screen Plant	1 Shredder	1
								Site Trailers	4 Misc.	6

2.2 Portable Construction Units								
2.2.1	Security shack - 40' containers	Mobile Modular quote \$32,068.31 each						delivery and set up in mobilization
2.2.2	LDR - 8 units, service 1X per week	\$ 1,540.40	month	Rental \$192.55 per month including delivery and 1 service per week.	+/- 40 worker			
2.2.3	Office facilities 3 units	Mobile Modular quote \$32,068.31 each						
2.3.3	(2) Klein KPT120 - 12,000 gallon Porto Tower	\$ 2,200.00			4,400.00	\$ 2,500.00	\$ 5,000.00	Machinery Trader
2.3.4	Fencing repair - used the same labor rate for installing fencing for repairing.	\$22.71 / LF						
			Month / each					freight / each
2.3.5	Site fencing	8' commercial-grade chain link fence \$28.75 LF labor and materials.						Chain link material \$6.04 LF - Gates \$350 each
2.3.6	Construction fencing 4'X100' - orange barrier fence \$28.97 roll - 4'X50' wood snow fence \$49.99 roll							\$22.71 Labor

3.0 Road Distances and Quantities

3.1 Crew A - Haul Road, Access Road, Borrow Road Building - Square Yard

Effective blade width - FT	Road width - FT	Passes to cover road	Actual passes	Distance of Road - LF	Traveled distance - Mile	Working speed - MPH	Time - Hours	Turning / Repositioning	passes	Hours
10.5	22.5	2.14	3.00	500	0.284	0.50	0.568	0.075	4	2.57
						Minutes	34	4.5		

Gravel per Hour - CY	Distance per Hour - LF	Production per Hour - SY
54	194	486

CAT14M Motor Grader based crew with a CAT980 Loader assisting with shuttling road gravel and fill material
 Spreading and grading imported gravel and fill material
 A service truck is available 25% of the time for fueling and normal maintenance.
 One laborer is to assist with grade checking and spotting gravel import

3.1 Construct Access Roads		Length LF	Width Ft.	Area SY	4" Gravel - CY	Exc - CY	Fill - CY	Balance - CY (imported materials)
3.1.1	Access Road to Former Mill Site/Spur	0+00 to 13+25	1325	22.5	3313	368	1573	1013 -560
3.1.2	Clean Access Road to Repository Yard	0+00 to 16+00	1600	22.5	4000	444	40	3155 3115
3.1.3	Access Ramp	0+00 to 5+00	500	22.5	1250	139	26	122 96
3.1.4	Pipeline Canyon Road Improvement	0+00 to 5+00	100	22.5	1250	139	195	202 7
			3925		9813	1089	1834	4492 2658

3.2 Crew B - Mine Waste Road Building - Square Yards

Effective blade width - FT	Road width - FT	Passes to cover road	Actual passes	Distance of Road - LF	Traveled distance - Mile	Working speed - MPH	Time - Hours	Turning / Repositioning	passes	Hours
10.5	40	3.81	4.00	500	0.379	0.50	0.758	0.100	5	4.29
						Minutes	45	6.0		

Distance per Hour - LF	Production per Hour - SY
117	518

CAT14M Motor Grader based crew with a CATD6 Dozer cutting and filling material to grade
 Cutting road ways from high points to low points using native materials
 A service truck is available 25% of the time for fueling and normal maintenance.
 One laborer is available to assist with grade checking

3.3 Construct Haul Roads

Segment	Sheet	Station	Length - FT	Width - FT	Area - SY	4" Gravel - CY	Total embankment	Cut	Fill	Balance
3.3.1	1	4-03	0+00 to 12+00	1200	39.4	5,250	583	20%	1373	1662 -288
	1	4-04	12+00 to 21+00	900	39.4	3,938	437			
	1	4-04	21+00 to 22+00	100	31.0	344	38	Transition 2 to 1 lane		
			2200		9,531	1058				
3.3.1.2	Transition signs	Quote from Highway Supply	\$ 2.81	per day - each	249	days	\$ 700.31			
3.3.1.3	Security Berms	SF = 2'H 2:1	LF	CY						
	Ponds		10	400	148					
	Slopes		10	800	296					
					444					
3.3.2	2	4-04	22+00 to 24+00	200	22.5	500	56	50%	3433	4154 -721
	2	4-05	24+00 to 35+50	1150	22.5	2,875	319			
	2	4-05	35+50 to 36+00	50	31.0	172	19	Transition 2 to 1 lane		

2	4-05	36+00 to 37+00	100	39.4	438	49
Total			1500		3,984	394

3.3.3	3	4-06	37+00 to 48+82	1182	39.4	5,171	574	30%	Cut	2060	Fill	2493	Balance	-433
Total Haul Road			4,882		18,687.08	2026								

3.3.4	Gravel hauled from off-site	\$ /TON	18.87	TN/CY	2.65	\$ /CY	50.00	Michele's Ready Mix - Gallup, NM
	4" gravel at 30% compaction			CY/SY	0.14	\$ /SY	7.22	

3.4	Construct Borrow Access Roads			Length - FT	Width - FT	Area - SY	4" Gravel - CY
	Jetty Borrow Area	sheet 4-17	0+00 to 5+85	585		22.5	1,463
	West Borrow	sheet 4-14	0+00 to 23+44	2344		22.5	not necessary to build
	East Borrow	sheet 4-15	0+00 to 5+38	538		22.5	not necessary to build
	North Borrow	sheet 4-16	0+00 to 13+51	1351		22.5	not necessary to build
	South Borrow	sheet 4-16	0+00 to 24+99	2499		22.5	not necessary to build

3.5	Mud grates	Allowance	4000	labor	\$ 1,000.00	materials
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Crew C - Miscellaneous Excavations - LCY per Hour

	Loading time Minute	Loads per Hour	LCY per load	LCY / Hour		Truck Match
	4.15	14.5	27	390		2.0
	Dumping time Minute	Average Haul Distance	Haul Distance	Miles round Trip	MPH	Enroute Min
	2.12	585	500	0.41	12	2.1

CAT980 Loader based crew - loading trucks - misc earthmoving. CATD6 Dozer piling materials. CAT740 trucks matched by average haul distances. Removing cover material to screening area, stormwater berms, and other miscellaneous earthmoving.

Cycle Time	Load Bucket	Travel Loaded	Dump Bucket	Travel Empty	total Cycle Time	Passes	Truck Spot	Time - Minutes
	0.25	0.25	0.10	0.25	0.85	4.0	0.75	4.15
Dump	Truck Spot	Eject	Retract	Pullout	Time Minutes	Bucket CY	% of Capacity	LCY per Load
	0.75	0.27	0.35	0.75	2.12	7.1	95%	27

4.0 Prepare the Repository for Waste Material

4.2	Screening of materials	total tons	tons per hour
		84650	400

Crew G - Screening Operation - Tons per Hour

Two deck screen plant separating 400 tons per hours.
Two screening plant operators, two laborers, and two mechanics with a service truck to operate and maintain the screen plant
Two loaders and operators available full time to load the hopper, remove screened materials, shuttle materials, and load trucks
Materials are stockpiled and hauled to final location in other items

4.2	Rock, gravel, soil, bank run, small gabion rock, screening		Needed Mat.	% usable rock				
	Material from cover 41,000 CY is 42% rock or 17,000 CY		240,000	42%	100,800	CY		
	Rock needs of various sizes up to 6" - CY	98,500	Table H-4-5					
	Type I and Type II filter materials							
							Cost per ton	\$ 3.81
								322,774.38

4.3	Compact 95% Radon barrier	Drum width FT (84")	MPH	SF/HR	SY/HR	Productivity	SY per Hour
	CS56B Roller	7	2	73,920	8,213	33%	2,710

4.4	Perimeter Berms around repository	Length FT	Avg Width FT	Height FT	3' high 3:1 slopes	CF	CY
		7200	18	3	27	Section SF	194,400
							7,200

7.5.1	Miscellaneous stormwater controls - Allowance of 10,000 CY	
7.5.2	Check dams	12' X 3' X 50' (X3) = 200 CY
7.5.3	Swale D	3200 LF 24'X3' = 8,533 CY

5.0 MINE WASTE MATERIAL REMOVAL

Crew K - Removal of debris - metal, wood, concrete - LCY per Hour

	Loading time Minute	Loads per Hour	LCY per load	LCY / Hour		Truck Match
	7.5	8.0	24	192		3.3
	Dumping time Minute	Avg Distance to Haul Road	Distance to Repository	Miles round Trip	MPH	Enroute Min
	2.12	2958	4983	3.01	12	15.0

CAT390 Excavator with thumb based crew. CAT740 trucks matched by average haul distances.

2 laborers for spotting and assisting with loading activities

Excavation and removal of scrap materials at the TPH stockpile to the repository

Cycle Time	Load Bucket	Swing Loaded	Dump Bucket	Swing Empty	total Cycle Time	Passes	Truck Spot*	Time - Minutes
	0.30	0.25	0.10	0.1	0.75	8.0	1.50	7.5
Dump	Truck Spot	Eject	Retract	Pullout	Time Minutes	Bucket CY	% of Capacity	LCY per Load
	0.75	0.27	0.35	0.75	2.12	6.1	50%	24

*Truck spot includes multiple spots per load

Crew J - Mine Waste Excavation and Hauling

	Loading time Minute	Loads per Hour	LCY per load	LCY / Hour		Truck Match
	3.9	15.4	24.0	369		5.4
	Dumping time Minute	Avg Distance to Haul Road	Distance to Repository	Miles round Trip	MPH	Enroute Min
	2.12	2958	4983	3.01	12	15.0

CAT390 Excavator based crew, with CAT980 Loader assisting to dig and pile materials. CAT740 trucks matched by average haul distances.

A service truck is available 25% of the time for fueling and normal maintenance.

Loading and hauling of mine waste material from removal areas to the repository

Used 2.25 times the estimated cycle time for loading to compensate for care in loading waste materials. CAT Performance Handbook edition 44

	Load Bucket	Swing Loaded	Dump Bucket	Swing Empty	Total Cycle Time	Passes	Truck Spot	Time - Minutes
Load	0.43	0.135	0.07	0.1575	0.79	4.0	0.75	3.9
	Truck Spot	Eject	Retract	Pullout	Time Minutes	Bucket CY	% of Capacity	LCY per Load
Dump	0.75	0.27	0.35	0.75	2.12	6.1	98%	24

Note: cost is approximately #REF! per cubic yard - not including support activities (traffic control, brush shredding, road maintenance, final grading)

6.0 Construct Evapotranspirative (ET) Cover over the Repository

6.1 Borrow Available Table H.4-3		Location	Material Type	Estimated Volume (CY)	Revegetation SF	Material Type	Estimated Total Volume (CY)
North Borrow Area			Soil	71,000	384,636.00	Soil	916,500
South Borrow Area			Soil	160,000	522,528.00	Rock	26,000
East Borrow Area			Soil	55,000	349,008.00		
West Borrow Area			Soil	89,000	326,935.00		
Jetty Excavation Cover			Soil	497,500			
Jetty Excavation			Rock	49,000 (waste)			
Topsoil Stockpile			Soil	20,000			
Stripped Tailings Impoundment Cover			Soil	24,000			
Stripped Tailings Impoundment Cover			Rock	17,000			
Tailings Impoundment Swales			Rock	2,000			
Two 1-inch Rock Stockpiles			Rock	6,000			
Various Rock Sizes Stockpiles (6" - 15")			Rock	1,000			
Crusher Fines			Gravel	1,300			
Road Base			Gravel	700			

Sufficient for Repository Cover

Location of soils and rock	Material	Available	Needed	Balance
Rock from stripped tailings	Rock	17,000	17,000	1.5"
Rock from existing swales	Rock	2,000		
Rock from off-site	Rock	9,000	11,000	2.0"
Rock from off-site	Rock	20,500	20,500	3.0"
Sandstone for fill from Jetty Area	Rock	49,000		
Topsoil from Jetty Area	Rock	478,000	351,000	
			399,500	
	To fill swales	(176,000)	11,000	grading around filler material
			12,000	Remaining
			32,100	(120,900)

6.2 Crew L - Loading and Hauling Materials - LCY per Hour

Loading time Minute	Loads per Hour	LCY per load	LCY / Hour	Truck Match
5	12.0	32	384	1.9
Dumping time Minute	Average Haul Distance	Haul Distance	Miles round Trip	MPH
2.12	585	500	0.41	10
				Enroute Min
				2.5
				Truck time per load - Minute
				9.6

CAT980 Loader based crew - loading trucks - misc earthmoving. CAT740 trucks matched by average haul distances.

Loading and hauling from the Jetty borrow area on the Jetty borrow road and into the repository area, and earthen diversion berm

	Load Bucket	Travel Loaded	Dump Bucket	Travel Empty	Total Cycle Time	Passes	Truck Spot	Time - Minutes
Load	0.25	0.25	0.10	0.25	0.85	5.0	0.75	5
	Truck Spot	Eject	Retract	Pullout	Time Minutes	Bucket CY	% of Capacity	LCY per Load
Dump	0.75	0.27	0.35	0.75	2.12	7.1	90%	32

Crews	Days	Weeks	Months
2	65.02	13.00	3.00

Estimated schedule based on CY/Hr by total number of crews

6.2 Hauling Rock from off-site - up to 4 miles one way		CY/Load	Loads	Miles RT	MPH	Drive Time Hrs	Load/Unload	Load Time Hrs	Total time	Operator	Truck	Labor	Truck
		20	1,475.00	8	45	262.2	10	246	508.06	\$ 45.29	\$ 60.67	\$ 23,011.11	\$ 30,821.95
			29,500	CY								\$ 0.78	\$ 1.04

6.2 Hauling Material on-site from Jetty		CY	CY/Load	Loads	Miles RT	MPH	Drive Time Hrs	CY/Hr	Total hrs	Weeks	Months
		370,500	30	12,350	0.443	13.29	411.7	240	1,543.75	38.59	8.98
				# of Trucks	Time to load Min	Each Trk/Hr					
				4	7.50	0.50					
				Loads per Truck	Loads per hour	Trucks per hr					
				3,087.50	8.00	8.00					
				Hours per Truck	Loading hours						
				1,543.75	1543.75						

6.3 Cover Area		Approx. Width	Approx. Length	SF	SY	Acre
		1,800	2,200	3,960,000	440,000	91

6.3 Crew M - Compaction - Square Yards per Hour

Drum width - FT	Area Width - FT	Area Length - FT	Passes to cover	Actual passes	Traveled distance - Mile	Working speed - MPH	Time - Hours	Turning / Repositioning	Passes for % of compaction	Hours	SF in Area	Production* per Hour - SY
6.5	100	100	15.38	16.00	0.303	2.00	0.152	0.080	2	0.46	10,000.00	2,400

CATCS56B Roller based crew with a CAT740 water trucks assisting for compaction and dust control
Compacting of repository cover and roadways

250 Cubic Meters per hour at 6" depth = 1,965 SY per Hour - 95-98% compaction
250 Cubic Meters per hour at 4" depth = 2,947 SY per Hour - 95-98% compaction

*CAT CS56 specifications - publication HEHG3672 (10/2007)

7.1 SEEDING REVEGETATION AND CLEANUP

Area of repository	2,640,000 SF	*excluding west apron and southwest regrade
West apron and south regrade	287,115	
Area of rock lined swales (K. Reed email 04/13/18)	198,795 SF	
Area of repository w/ west apron & south regrade	2,927,115 SF	
Cover Volume	356,628.00 CY	
Waste Volume	1,117,626 CY	
Area of cover (less swales)	2,441,205 SF	
Removal of existing cover mix	6 IN	
	0.5 FT	

Volume of cover material (soil and rock) to reuse 1,220,603 CF
 45,208 CY
 56509 LCY
 Volume of 1.5-inch rock from existing swales 2,000 CY
 -59,815 CY clean fill beneath 5:1 slope

7.2.1 Remove existing stormwater controls Excavate and replace approx. 1 CY of material for each LF of culvert removed(1865+55.5). Plus removal of Riprap (50)

7.4	Tree Planting	seedling 2/0 stock	Double for loss rate	Trees per hour	Hours	Cost per tree	2 Laborers	Bobcat with Auger	Total per hour	Cost per final living tree
	Junipers	551	1102	15	73.5	\$ 15.00	\$ 93.43	\$ 34.62	\$ 127.95	#REF!
	Pinons	315	630	15	42.0	\$ 15.00				
		866	1732		115.5					

7.5 Crew N - Grading - Acres per hour

Blade Width - FT	Speed - MPH	Factor	Acres / Hour	Efficiency	Acres / Hour
14	3.7	8.25	6.28	50.0%	3.14

CAT MG 14M based crew, final grading of repository, stormwater areas, and other large areas
 One CAT740 8000 gallon water truck for soil amending and dust control
 CAT Handbook 416C - tillage performance (factor formula for acres per hour)

7.6 Final Grading of Mill Site and Repository 7 areas of approx. 400' x 400' 25.71 acres

8.0 Permanent Stormwater Controls

Table H.4-5

Qty Required CY

Type I Filter	9,900	East Repository Drainage Channel, Dilco Hill Channels A and B, Jetty/Pipeline Arroyo
Type II Filter	22,200	East Repository Drainage Channel, Dilco Hill Channels A and B, Jetty/Pipeline Arroyo
D50 - 1.5 in.	17,000	Repository Cover System
D50 - 2.0 in.	11,000	Repository Cover System
D50 - 3.0 in.	20,500	Repository Cover System
D50 - 3.0 in.	17,200	East Repository Drainage Channel, Jetty/Pipeline Arroyo, Erosion Protection for West Apron, 5H:1V Cover Slope Erosion Protection
D50 - 6.0 in.	700	Dilco Hill Channels A and B, Mine Site Outlet Channel
D50 - 9.0 in.	1,700	East Repository Drainage Channel, Dilco Hill Channels A and B, Mine Site Outlet Channel
D50 - 15.0 in.	581	Mine Site Outlet Channel improved channel section (detail A sheet 6-08 15' Riprap)
D50 - 18.0 in.	700	Mine Site Outlet Channel - Stepped Gabion Outlet Structure
D50 - 27.0 in.	78,000	Jetty/Pipeline Arroyo

8.1 Crew O - Placing Riprap - CY per Hour

Minute per pass	CY per pass	CY / Hour
1.25	2.7	132

CAT390 Excavator with thumb based crew, with CAT980 Loader assisting to move and pile materials.
 Placing various sizes of riprap in various locations. Riprap delivered by truck and loaded as needed by loader
 Laborer for spotting trucks

Cycle Time	Load Bucket	Swing Loaded	Place	Swing Empty	total Cycle Time	Bucket CY	% of Capacity	LCY per Load
	0.50	0.25	0.25	0.25	1.25	6.1	45%	2.7

8.1.3 Crew P - Embankment fill and compaction

Cycle time - minute	Cycles per hour	LCY per load	LCY / Hour
1.60	37.4	4	161

CATD6 Dozer based crew - placing fill materials imported or cut by other crew.
 CAT980 Loader assisting in movement of materials being dumped by trucks.
 CATCS54B Roller compacting placed materials
 Placing spreading and compacting materials for haul roads and access roads and permanent structures
 Service truck and mechanic available 25% of the time

Cycle Time	Load time - minute	Carry speed - mph	Carry distance - ft	Spread time - min	Prod. Time - min	Return speed - mph	Return time	Efficiency %	Time - Minutes
	0.25	2.5	150	0.1	1.03	6.80	0.25	80.0	1.60
	Blade width - in	Blade height - in	Capacity - CY						
	126.00	44.5	4.30						

Cost of Riprap Materials

	Size	approximate - CY	Cost per Ton	Tons per CY	Cost per CY
Dilco Hill Channels A and B, Mine Site Outlet Channel	D50 = 3.0 in.	37,700	\$ 13.00	1.35	\$ 17.55
East Repository Drainage Channel, Dilco Hill Channels A and B, Mine Site Outlet Channel	D50 = 6.0 in.	700	\$ 13.00		\$ 17.55
Mine Site Outlet Channel	D50 = 9.0 in.	1,700	\$ 15.00		\$ 20.25
Jetty/Pipeline Arroyo	D50 = 15.0 in.	581	\$ 15.00		\$ 20.25
Jetty/Pipeline Arroyo	D50 = 18.0 in.	700	\$ 18.00		\$ 24.30
Jetty/Pipeline Arroyo	D50 = 27.0 in.	86,000	\$ 19.00		\$ 25.65

Riprap quote from CLM Rocks Buckeye, AZ

Cost of filter materials

Type I Filter	Fine granular filter minimum % passing 3/8" 100, #4 10, #16 70, #50 25, #100 2, #200 0	Cost per CY
Type II Filter	Coarse granular filter minimum % passing 3" 100, 1.5" 70, 3/4" 50, 3/8" 25, #4 5, #16 0	\$ 15.75
		\$ 15.75

Hauling of Materials - Riprap, filter materials - Page or Tampico Pit 20 miles from site.

11.1.7	OTR Truck - Hr	OTR Driver - Hr	Total Cost - Hr	Miles RT Site	Avg MPH	Load/Unload	Loads per Hour	Capacity - CY
11.2.6	\$ 60.67	\$ 45.29	\$ 105.96	40		55	0.25	1.125
11.3.5								20
11.4.5	Operator \$/CY	Equipment \$/CY	Total \$/CY					
11.6.7	\$ 2.01	\$ 2.70	\$ 4.71					
11.7.9								

8.1

	Length LF	Width FT	SY	Type I filter CY	Type II filter CY	3" Riprap CY	6" Riprap CY	9" Riprap CY	Earth Fill
East Repository Channel Sec A	980	26.5	2886	481	481	481			
East Repository Channel Sec B	630	30	2100	350	350			1050	
East Repository Channel Sec C	679	30	2263	377	377			1132	
				1208	1208	481		2182	

8.2

	Length LF	Width FT	SY	Type I filter CY	Type II filter CY	3" Riprap CY	6" Riprap CY	9" Riprap CY	Earth Fill
Dilco Hill Channel A - Section D	750	18	1500	250	250		500		
Dilco Hill Channel B - Section E	844	13	1219	203	203		406		

8.3	Runoff Control ditch	750	22.4	1867	311	311	311		
	Runoff Control ditch compacted fill	750	30	2500					
					311	311	311		1667

8.4	North diversion Channel	Length LF	Width LF	LCY	CY	
	Remove Sediment	525	20	194		excavate aggraded sediments - assume 6" surface layer
	General Compacted fill	400	26	1156	1444	Add 25% for compaction of diversion berm - 3 feet high

8.5	Raised earthen berm	Length	Width	Section SF	F#1 SF	Fill CY
	25' top 3:1 slopes	1380	90	720	993,600	36,800

8.6	Jetty / Pipeline Arroyo Materials			type I filter - 6"	type II filter - 8"	type II filter - 6"	27" Riprap - 54"	3" Riprap - 6"
		Width	Length	0.5	0.75	0.5	4.5	0.5
	Section B	430	1200	9556	14333	9556	86000	9556
	Riprap Basin	400	150	1111	1667	1111	0	0
	Section C	315	400	2333	3500	2333	0	2333
	Total CY			13,000	19,500	13,000	86,000	11,889

typical upper side slope - detail 3 9-11

8.9.5 Crew Q - Permanent Stormwater Earthmoving - CY per Hour

Minute per pass	Passes per hour	CY per pass	CY per hour
1.35	44.44	5.49	244

Excavator and loader based crew for general excavation of materials
 Materials that are excavated, moved a short distance, spread over an area to be placed by other crew
 Excavation of materials for stormwater features

Cycle Time	Load Bucket	Swing Loaded	Dump Bucket	Swing Empty	Total Cycle Tim	Passes	Truck Spot*	Time - Minutes	Bucket CY	% of Capacity	LCY per Load
Excavator	0.75	0.25	0.10	0.25	1.35	0.0	0.00	0	6.1	90%	5.49
	Load Bucket	Travel Loaded	Dump Bucket	Travel Empty	Total Cycle Tim	Passes	Truck Spot	Time - Minutes	Bucket CY	% of Capacity	LCY per Load
Loader	0.25	0.5	0.10	0.5	1.35	0.0	0.00	0	7.1	90%	6.39

10.0 Monitoring, Testing, and Verification Controls

10.1 Quality Assurance and Quality Control - including field volume admix and nuke gauge testing

10.1.1	Labor Personnel	Hourly Rate	Total Hours	Total duration - MN	Monthly Cost	Total Cost
	QC Subcontractor field testing (2)	\$ 70.00	4,000	34	\$ 8,235.29	\$ 280,000.00
	QA Stantec personnel A	\$ 125.00	1,000	34	\$ 3,678.47	\$ 125,000.00
	QA Stantec personnel B (2)	\$ 99.00	12,000	34	\$ 34,941.18	\$ 1,188,000.00
	QA Stantec personnel C	\$ 125.00	1,000	34	\$ 3,676.47	\$ 125,000.00
	Administration	\$ 65.00	340	34	\$ 650.00	\$ 22,100.00
			18,340		\$ 51,179.41	\$ 1,740,100.00
	Soil Testing Fees					\$ 21,692.00
	Rock Testing Fees					\$ 3,360.00
	Monthly Lodging & expenses			34	\$ 3,117.15	\$ 105,983.10
						\$ 1,871,135.10

10.2 Cost Estimate to Implement Remedial Action Radiologic Support (Excavation Control, Final Status Survey and Verification Survey and radon cover survey & emission Testing Program) for NECR Removal Action

10.2.1	Labor Personnel	Hourly Rate	Total Hours	Total duration - MN	Monthly Cost	Total Cost
	Rad Consultant/Project Manager (1)	\$ 140.00	1,686	34	\$ 6,942.35	\$ 236,040.00
	RA Rad Site Manager/GIS (1)	\$ 110.00	4,475	34	\$ 14,477.94	\$ 492,250.00
	Site Field Office/lab GIS Tech (1)	\$ 85.00	4,304	34	\$ 10,760.00	\$ 365,840.00
	Rad Technicians (3)	\$ 80.00	12,736	34	\$ 29,967.06	\$ 1,018,880.00
	Admn Clerk/Typist (1)	\$ 65.00	100	34	\$ 191.18	\$ 6,500.00
			23,301		\$ 62,338.53	\$ 2,119,510.00
10.2.2	Project Management			34	\$ 1,449.41	\$ 49,279.94
10.2.3	Supplies, Fees and Expenses			34	\$ 10,988.68	\$ 373,615.12
10.2.4	Monthly Lodging & expenses			34	\$ 3,649.65	\$ 124,088.18
						\$ 2,666,493.24

10.3 Cost Estimate to Implement Radiation Protection & Perimeter Radiologic Air Monitoring Plan for NECR Removal Action

10.3.1	Labor Personnel	Hourly Rate	Total Hours	Total duration - MN	Monthly Cost	Total Cost
	RSO/Site Safety Manager (1)	\$ 110	2,743	34	\$ 8,875.58	\$ 301,769.60
	Rad (OHP) Technicians (2)	\$ 80	10,394	34	\$ 24,455.53	\$ 831,488.00
					\$ 33,331.11	\$ 1,133,257.60
10.3.2	Supplies, Fees and Expenses			34	\$ 9,043.97	\$ 307,495.00
10.3.3	Employee Lodging & Misc expenses			34	\$ 2,176.47	\$ 74,000.00
						\$ 1,514,752.60

17.0 Contractor management and administration

Duration at site = 34 months (693 hrs, 21.6 working days per month @ 8hrs per day, 173.3 hours per month).

Labor Personnel	Hourly Rate	Monthly Hours	Monthly cost	Total duration - M	Total Cost
Project Manager (1)	\$ 70.86	173	\$ 12,281.30	34	\$ 417,564.10
Site Superintendent (2)	\$ 66.07	347	\$ 22,902.96	34	\$ 778,700.62
Site Field Engineer (1)	\$ 43.57	173	\$ 7,551.34	34	\$ 256,745.50
Site Field Office Controller (1)	\$ 38.30	173	\$ 6,638.54	34	\$ 225,710.33

Administration Clerk (1)	\$	13.98	173	\$	2,423.07	34	\$	82,384.27
Office Supplies, and Expenses					125	34	\$	4,250.00
					51,922			1,765,355 +/- 10%

EQUIPMENT

Selected Equipment

CAT390 F Excavator	Tooth Bucket Capacity Range, Heaped: 2.69-6.1 cu yd. Sand Bucket Capacity, Struck: 7-8 cu yd.	365	
CAT740 EJ Articulated Truck	Capacity Heaped 30.1 cu yd, Struck 23.5 cu yd Blade eject 16.0 seconds, retract 21.0 seconds	52	4.33333333 weeks per month
CAT980 Wheel Loader	Bucket - 7.1 CY (5.25 - 16.0 CY)	12	21.66666667 days per month
CAT14M Motor Grader	Moldboard width 14'	34	736.6666667 days
CATD6 Track-Type Tractor(Dozer)	Blade width (6 VPAT-XL) 12.8 ft Carry capacity 6.07 CY	8	5893.333333 Total hours 173.3333333 monthly hours

Equipment Match Options

CAT articulated 740 EJ dump truck	HP	TON	CY Heap	CY Struck	MPH	Fuel	Match
CAT articulated 745 dump truck	504	42 (US)	30.1	23.5	34.0 9th	145.3 gal	
	504	45.2	32.7	24.2	34.0 9th	145.3 gal	Hyd Excavator 374 - 5 passes Hyd Excavator 390 - 4 passes Wheel Loader 972 - 4-5 passes Wheel Loader 980 - 4-5 passes
CAT excavator 374F L	HP	Weight lb	Depth ft	Reach ft		Fuel	
CAT excavator 390F L	472	157,655.00	31.67	46.67		247 gal	
	524	192,680.00	35.08	53.25		328 gal	
CAT Wheel Loader 972M XE	311	54,871.00	Capacity CY		24.5 4th	79.8 gal	
CAT Wheel Loader 980M	373	66,337.00	4.19-13.0		24.5 4th	112.5 gal	
CAT Wheel Loader 982M	398	78,402.00	5.25-16.0		23.3 4th	112.5 gal	
			6.0-15.75				
CAT Dozer D6N	166	36,943.00	Capacity CY	Blade w ft			
CAT Dozer D8T	354	87,600.00	5.6	10.33	6.1 3rd	73.2 gal	
CAT Dozer D9T	436	106,618.00			7.0 3rd	165 gal	
CAT Dozer D11T	862	235,453.00			8.9 3rd	217 gal	
CAT Motor Grader 140	250	42,325.00		Moldboard		100 gal	
CAT Motor Grader 160	290	71,454.00		14.0		131 gal	
				16.0			

Weights of Materials

Material lbs of material / CY	Concrete	Dry Clay	Loose Topsoil	Dry Gravel	Dry Sand	Water	TOTAL	Weight LCY/ Ton
Percent found in mixed material	4050	2300	2050	2565	2750	1700	100%	
Total pounds in one cubic yard	10%	8%	7%	32%	37%	6%	2672.80	1.34
	405.00	184.00	143.50	820.80	1017.50	102.00		
Eros Prot Rock	Cover (soil)	Mine Spoils	Radon barrier	Existing fill	Coarse tailing	Fine tailings	Alluvium	dam
	122.9	114.7	116.4	122.3	113.8	108.1	107.6	114.8
								119.1
								124.4
								Average
								116.41
Lbs / Ton	Weight LCY/ Ton							
	3143.07	1.57						

Conversions

1	Acre	4840.0 SY
1	Acre	43560.0 SF
1	CY	27.0 CF
1	SY	9.0 SF
1	Mile	1760.0 SY
1	Mile	5280.0 FT
1	Square Mile	640.0 Acre
1	Square Mile	259.0 Hectare
1	MPH	1.5 FT / Second
1	US Ton	2000.0 lbs
1	Metric Ton	2204.6 lbs
1	Cubic Meter	35.4 CF
1	Cubic Meter	1.30795 CY
1	Cubic Yard	0.7646 CM
1	Meter	3.28084 FT
1	Foot	0.3048 Meter
1	Month	4.33 Weeks

14.0 Monthly Monitoring and Maintenance

14.1.1 Monthly Site Inspection

	Hours	Rate	Labor
Senior Engineer	2	\$ 136.30	\$ 272.60
Engineer	16	\$ 116.83	\$ 1,869.23
Project Manager	16	\$ 114.88	\$ 1,838.08
Vehicle	16	\$ 17.22	\$ 275.47
			\$ 4,255.37

Two site visits with two people per month

14.1.2 Maintenance of Access Roads

	Hours	Rate	Labor	Equipment	Area	Miles	LF
Supervisor	1.95	\$ 129.73	\$ 252.45	\$ -	Access Road to Former Mill Site/Spur	0.25	1325
Labor	1.95	\$ 46.81	\$ 91.10	\$ -	Clean Access Road to Repository Yard	0.30	1600

Motor Grader Operat	1.95	\$	75.42	\$	146.77	\$	-	Access Ramp	0.09	500
Cat 14M Grader	1.95	\$	224.31	\$	-	\$	436.49	Pipeline Canyon Road Improvement	0.09	500
Truck Driver - Off Hw	1.95	\$	47.78	\$	92.97	\$	-	Jetty Borrow Area	0.11	585
CAT 740 8000 gal wat	1.95	\$	218.66	\$	-	\$	425.50			
					\$	\$	583.29		\$	861.99
Grader Blade Width	Road Width	Passes	Speed - MPH	Efficiency	MPH	Work Hours				
9	20	3.00	3.70	71%	0.88	1.95				

CAT MG 14M, grading of rural roadway

Grading of all sections of roadway two times per month.

Assumption that water is available near site and accessible to water truck

14.1.3 Maintenance of Repository Cover and surrounding areas

	Quantity (AC)	Labor Unit Cost	Equipment Unit Cost
Grading	30	\$ 458.06	\$ 1,401.13
			\$ 55,775.68

Assumes costs of Crew N

Grading includes repairs of 30 acres per year (approx. 1/3 of repository surface)

O&M Costs

Monthly Cost of Inspections - Labor	\$	4,255.37
Monthly Cost of Road Maintenance - Labor	\$	583.29
Monthly Cost of Road Maintenance - Equipment	\$	861.99
Annual Cost of Repository Maintenance-Labor	\$	13,741.90
Annual Cost of Repository Maintenance-Equipment	\$	42,033.78
Years Required to inspect		10
Total Cost	\$	1,241,834.81

Requires inspections and road maintenance to all areas of site for an undetermined amount of time. Assuming 10 years for this estimate.

17.1.4 Long-Term Surveillance Fees

Year	Cost	CPI	Inflation
1978	\$ 250,000.00	65.2	
2020	\$ 991,871.17	258.68	296.75%

UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Appendix A **Tailings Reclamation Modification and Mill Site Decommissioning Cost Estimate**

A.4 UNITARY COSTS AND COST ASSUMPTIONS





United Nuclear Corporation
UNC Mill Site
Budget Authorization - Surety Cost Estimate - Rev K - 25 March 2020
Unitary Cost

LABOR										
Description	Unit	Base Rate	Fringe	Apprenticeship	Cost	35%	With Burden	Efficiency Factor	Total	New Mexico Department of Workforce - Prevailing Wage Type H - January 2020 Base Rate + Fringe Rate + Apprenticeship
Supervisor	Hour	\$ 66.07			\$ 66.07	\$ 23.12	\$ 89.19		1.405	\$ 125.30
Excavator Operator	Hour	\$ 32.19	\$ 6.34	\$ 0.60	\$ 39.13	\$ 13.70	\$ 52.83		1.405	\$ 74.21
Dozer Operator	Hour	\$ 32.19	\$ 6.34	\$ 0.60	\$ 39.13	\$ 13.70	\$ 52.83		1.405	\$ 74.21
Loader Operator	Hour	\$ 28.96	\$ 6.34	\$ 0.60	\$ 35.90	\$ 12.57	\$ 48.47		1.405	\$ 68.09
General Machinery Operator	Hour	\$ 21.19	\$ 6.34	\$ 0.60	\$ 28.13	\$ 9.85	\$ 37.98		1.405	\$ 53.35
Motor Grader Operator	Hour	\$ 32.19	\$ 6.34	\$ 0.60	\$ 39.13	\$ 13.70	\$ 52.83		1.405	\$ 74.21
Truck Driver - On-Site	Hour	\$ 16.51	\$ 7.87	\$ 0.60	\$ 24.98	\$ 8.74	\$ 33.72		1.405	\$ 47.38
Truck Driver - OTR	Hour	\$ 33.55			\$ 33.55	\$ 11.74	\$ 45.29		1.000	\$ 45.29
Mechanic	Hour	\$ 30.79			\$ 30.79	\$ 10.78	\$ 41.57		1.405	\$ 58.40
Laborer	Hour	\$ 17.81	\$ 6.22	\$ 0.60	\$ 24.63	\$ 8.62	\$ 33.25		1.405	\$ 46.71
Flagger	Hour	\$ 17.06	\$ 6.22	\$ 0.60	\$ 23.88	\$ 8.36	\$ 32.24		1.405	\$ 45.29
										From trade off studies \$ 45.29
										Laborer Group II
										Laborer Group I
	Hours of Work	Start of Shift	Travel (2)	Inspection of Equipment	Lunch	Break (2)	Available Hours	Labor efficiency - minutes	Shift Hours	Efficiency factor
Efficiency of work hours	12	0.25	0.25	0.25	0.5	0.5	10.25	50/60	8.542	1.40

EQUIPMENT	Unit	Total Hourly Rate	CONSEQUENTIAL COSTS							DEPRECIATION COSTS				
			Routine & Maintenance	Fuel	Lubrication	Tires & Chains	GET/ Wear	No Fuel (\$/hr)	All in	Market Value	Rental Rate (Monthly)	Replacement value	Hrs/Mo	Hourly Rate
Cat 390 Excavator	Hour	\$ 308.58	\$ 26.55	\$ 70.50	\$ 3.66		\$ 4.47	\$ 34.68	\$ 105.18	\$ 1,410,000.00	\$ 35,250	2.5%	173.3	\$ 203.40
CAT Excavator 390F L W/thumb	Hour	\$ 323.01	\$ 26.55	\$ 70.50	\$ 3.66		\$ 4.47	\$ 34.68	\$ 105.18	\$ 1,510,000.00	\$ 37,750	2.5%	173.3	\$ 217.83
Cat 14M Grader	Hour	\$ 153.26	\$ 44.79	\$ 35.37	\$ 1.88	\$ 1.99	\$ 1.43	\$ 50.09	\$ 85.46	\$ 470,000.00	\$ 11,750	2.5%	173.3	\$ 67.80
Cat 980H Wheel Loader	Hour	\$ 181.50	\$ 45.60	\$ 31.85	\$ 1.73	\$ 6.91	\$ 7.64	\$ 61.88	\$ 93.73	\$ 608,446.00	\$ 15,211	2.5%	173.3	\$ 87.77
Cat D6T Dozer	Hour	\$ 153.51	\$ 56.05	\$ 30.39	\$ 1.20	\$ -	\$ 2.41	\$ 59.66	\$ 90.05	\$ 439,900.00	\$ 10,998	2.5%	173.3	\$ 63.46
Western Star 4900SA	Hour	\$ 60.67	\$ 3.56	\$ 21.15	\$ 1.15	\$ 1.44	\$ -	\$ 6.16	\$ 27.31	\$ 231,250.00	\$ 5,781	2.5%	173.3	\$ 33.36
Western Star WT6900 - Water Truck	Hour	\$ 208.29	\$ 58.28	\$ 69.77	\$ 3.65	\$ 10.52	\$ -	\$ 72.44	\$ 142.22	\$ 458,000.00	\$ 11,450	2.5%	173.3	\$ 66.07
Cat 730 Articulated Truck	Hour	\$ 215.05	\$ 56.08	\$ 30.27	\$ 2.40	\$ 3.69	\$ -	\$ 62.16	\$ 92.43	\$ 850,000.00	\$ 21,250	2.5%	173.3	\$ 122.62
CAT Articulated 740 EJ Dump Truck	Hour	\$ 218.66	\$ 56.08	\$ 30.27	\$ 2.40	\$ 3.69	\$ -	\$ 62.16	\$ 92.43	\$ 875,001.00	\$ 21,875	2.5%	173.3	\$ 126.23
CAT 740 8000 gal water truck	Hour	\$ 218.66	\$ 56.08	\$ 30.27	\$ 2.40	\$ 3.69	\$ -	\$ 62.16	\$ 92.43	\$ 875,000.00	\$ 21,875	2.5%	173.3	\$ 126.23
Tri-axle Single Drop Gooseneck Trailer	Hour	\$ 21.63	\$ 1.25	\$ -	\$ -	\$ 1.44	\$ -	\$ 2.69	\$ 2.69	\$ 131,250.00	\$ 3,281	2.5%	173.3	\$ 18.93
Western Star 4900SB - Vacuum tank	Hour	\$ 69.68	\$ 3.56	\$ 21.15	\$ 1.15	\$ 1.44	\$ -	\$ 6.16	\$ 27.31	\$ 293,750.00	\$ 7,344	2.5%	173.3	\$ 42.38
Cat CS56B Roller	Hour	\$ 52.25	\$ 3.33	\$ 20.66	\$ 1.13	\$ 0.46	\$ -	\$ 4.91	\$ 25.58	\$ 184,927.00	\$ 4,623	2.5%	173.3	\$ 26.68
Cat CS54B Roller	Hour	\$ 42.33	\$ 3.33	\$ 20.66	\$ 1.13	\$ 0.46	\$ -	\$ 4.91	\$ 25.58	\$ 116,115.00	\$ 2,903	2.5%	173.3	\$ 16.75
Mobile Crushing/Screening Plant	Hour	\$ 437.71	\$ 136.63	\$ 138.58	\$ 9.24	\$ -	\$ -	\$ 145.86	\$ 284.44	\$ 1,062,500.00	\$ 26,563	2.5%	173.3	\$ 153.27
Ford F350 Service Truck	Hour	\$ 17.22	\$ 1.13	\$ 5.11	\$ 0.28	\$ 1.33	\$ -	\$ 2.73	\$ 7.84	\$ 65,000.00	\$ 1,625	2.5%	173.3	\$ 9.38
Grove 65t Rough Terrain Crane	Hour	\$ 183.05	\$ 4.75	\$ 48.62	\$ 2.27	\$ 5.69	\$ -	\$ 12.71	\$ 61.33	\$ 843,750.00	\$ 21,094	2.5%	173.3	\$ 121.72
Klein KPT120 12,000 gal Porto Tower water tank	Hour	\$ 6.35	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 44,000.00	\$ 1,100	2.5%	173.3	\$ 6.35
Vermeer BC1000XL Wood Chipper	Hour	\$ 30.37	\$ 3.33	\$ 14.95	\$ 1.13	\$ -	\$ -	\$ 4.46	\$ 19.41	\$ 38,000.00	\$ 1,900	5.0%	173.3	\$ 10.96
Bobcat T595 tracked skid steer with auger	Hour	\$ 34.52	\$ 3.33	\$ 20.66	\$ 1.13	\$ 0.46	\$ -	\$ 4.91	\$ 25.58	\$ 61,995.00	\$ 1,550	2.5%	173.3	\$ 8.94

Description	Unit	QTY	Price	
Jobsite 40' Office Containers	Each	6	\$ 32,068.38	Mobile Modular quote
Jobsite trailers	Each	83300		
Security trailers	Each/Month	2		
Sanitation facilities	Each/Month	4		
Decontamination Station	Month			
Jersey barriers	Each	5	\$ 621.12	12 ft
Traffic control signage	Month	12	\$ 1,369.00	Traffic Control Quote
Traffic control signals	Month	12	\$ 5,000.00	Traffic Control Quote
Gates - 40' wide	Each	2	\$ 3,000.00	
Mud grates - 40' wide	Each	3	\$ 5,000.00	
Fencing	LF	500	\$ 150.00	
Snow fencing	LF	1000		Cost of Pipe Labor 19% Equipment 81%
24" corrugated culverts	LF	2200	\$ 843.22	219.99 \$ 118.41 \$ 504.82 Menards.com For these it says each but doesn't give a length, I suspect 10ft?
12" corrugated culverts	LF	333	\$ 434.12	
Box culvert 3' X 10'	LF	40		

Gabion basket materials	S.Y.		\$ 138.26						
Gabion basket labor and materials	CY	600	\$ 216.84	per cubic yard	egov.usda / ref / public / 400s				
Guard Rails	LF	40							
Geotextile fabric incl mat, equip, labor	SY		\$ 3.10		egov.usda / ref / public / 400s				
Road Gravel - 1" minus	TON	8745	\$ 18.87	delivery	2.65	\$ 50.00	CY	Michele's Ready Mix Gallup, NM	2.65 tons per cubic yard
Concrete - 3,000 lb mix	CY		\$ 142.50	\$ 10.00		\$ 152.50	CY	Michele's Ready Mix Gallup, NM	
Type I filter material	TON		\$ 8.75	\$ 3.00	\$ 11.75	1.34	\$ 15.75	CY	Michele's Ready Mix Gallup, NM
Type II filter material	TON		\$ 8.75	\$ 3.00	\$ 11.75	1.34	\$ 15.75	CY	Michele's Ready Mix Gallup, NM
Riprap				Cost per Ton	Tons per CY		Cost per CY		
D50 = 3.0 in.	CY	37,700		\$ 13.00	1.35		\$ 17.55		
D50 = 6.0 in.	CY	700		\$ 13.00	1.35		\$ 17.55		
D50 = 9.0 in.	CY	1,700		\$ 15.00	1.35		\$ 20.25	Riprap quote from CLM Rocks Buckeye, AZ	
D50 = 15.0 in.	CY	581		\$ 15.00	1.35		\$ 20.25	Riprap quote from CLM Rocks Buckeye, AZ	
D50 = 18.0 in.	CY	700		\$ 18.00	1.35		\$ 24.30	Riprap quote from CLM Rocks Buckeye, AZ	
D50 = 27.0 in.	CY	86,000		\$ 19.00	1.35		\$ 25.65	Riprap quote from CLM Rocks Buckeye, AZ	
Seeding	M.S.F.		\$ 62.56	\$ 2,725.23	Acre	Seeding rye, fine textured, with mulch and fertilizer, 10 lb. per M.S.F., hydro or air seeding			
Tree planting	Each	1732							

OTHER									
Concrete culvert, headwall concrete, precast, 30 degree skewed wingwall, 30" diameter pipe					1 Ea.	\$	2,881.32		
Rip-rap and rock lining, random, broken stone, 18" minimum thickness, machine placed for slope protection, not grouted					1 S.Y.	\$	82.74		
Synthetic erosion control, polyethylene, 3 dimensional geomatrix, 50 mil thick					1 S.Y.	\$	5.16		
Soil preparation, structural soil mixing, remove topsoil & stock pile on site, 12" deep, 50' haul, 75 HP dozer					1 M.S.F.	\$	72.19		
					1 M.S.F.	\$	62.56		
Gabion boxes, galvanized steel mesh mats or boxes, stone filled, 36" deep					1 S.Y.	\$	138.26		
Fencing Supply & Install					1 LF	\$	150.00		
Traffic signals, vertical mast and foundation, mast sized for single arm up to 40'; no lighting or transmission function					1 Signal	\$	20,439.69		
Traffic signals, horizontal arm, per linear foot of arm					1 Signal	\$	320.69		
Traffic signal, traffic signals, includes signal, bracket, sensor, and wiring					1 Signal	\$	2,919.41		
Traffic signals, pedestrian signals and callers, includes four signals with brackets and two call buttons					1 Signal	\$	5,246.38		
Traffic signals, controller, design, and underground conduit, includes miscellaneous signage and adjacent surface work					1 Signal	\$	40,945.97		
Field personnel, clerk, average		1 Week	\$ 559.18	Hour	\$ 13.98				
Field personnel, field engineer, average		1 Week	\$ 1,742.65	Hour	\$ 43.57				
Field personnel, project manager, average		1 Week	\$ 2,834.20	Hour	\$ 70.86				
Field personnel, superintendent, average		1 Week	\$ 2,642.70	Hour	\$ 66.07				
Field personnel, timekeeper, average		1 Week	\$ 1,532.00	Hour	\$ 38.30				
Office Containers - 40' One-trip conex	\$ 30,500.00	delivery	\$ 1,800.00	\$ 32,300.00	Mobile Modular Portable Storage - Pasadena, TX				



United Nuclear Corporation
UNC Mill Site
Budget Authorization - Surety Cost Estimate - Rev K - 25 March 2020
Assumptions

<u>Description</u>	<u>Value</u>	<u>Comment</u>
Contractor Markup	20%	Contractor overhead and profit
Contingency	15.00%	Minimum based on NUREG-1620 App C
AACE Cost Estimate - Class	3	See footnote
Maturity Level of Project Definition	10% to 40%	Funding authorization
Estimate Accuracy: Low	-15%	
Estimate Accuracy: High	+30%	
12 hour work day results in efficiency factor of	1.4	
12 hour work day results in available hours	8,542	Effective work hours
Work Days Per Week	5.00	
Work Hours - 12 hour days, 5 days per week	60.00	Hours per week
Wage rate burden	35%	burden including taxes and labor overhead
Equipment Replacement Value	2.5%	Used to calculate the hourly rate of contractors equipment
Swell factor of Bank Material to Loose Cubic Yards	25%	Percent
Average weight of one cubic yard of material	3077	lbs. 1.54 TN/LCY. 2 TN/BCY, 30% swell. In Calculations

Note: AACE International CLASS 3 Cost Estimate - Class 3 estimates are typically prepared to support full project funding requests, and become the first of the project phase "control estimates" against which all actual costs and resources will be monitored for variations to the budget. They are used as the project budget until replaced by more detailed estimates. Typical accuracy ranges for Class 3 estimates are -10% to -20% on the low side, and +10% to +30% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.

UNITED NUCLEAR CORPORATION CHURCH ROCK MILL SITE FINANCIAL SURETY COST ESTIMATE

Appendix B **Cost Estimate from Wood PLC**

Appendix B **COST ESTIMATE FROM WOOD PLC**



Wood costs related to 2020 Surety Re-Baselining Estimate				
Monitoring Well Sampling, April - December, 2020				\$152,757
Monitoring Well Sampling, 2021 - 2025				\$1,018,380
Monitoring & Maintenance for Groundwater Corrective Action Program Activities to 2025				\$991,258
Monitoring & Maintenance Activities for Mill Tailings License Area to 2038				\$656,800
Well Abandonment for 130 Wells (including State and Local Taxes)				\$539,180
Monitor Well Sampling to 2025				
TASK	DESCRIPTION	Hours/yr	Effort Amount	DIRECT COSTS
Lab Work	Onsite Preparation/ Analysis	160	\$8,956.60	
Monthly Sampling	Field, Packing, Shipping	80	\$3,705.54	
Quarterly Water Sampling	Analysis by Energy Labs	950	\$39,723.32	\$131,557.00
Sub-total		1190	\$52,385.46	\$131,557.00
Direct Costs Contingency			+15%	\$151,290.55
			Category Total (Annual)	\$203,676.01
Groundwater Corrective Action Program to 2025				
TASK	DESCRIPTION	Hours/yr	Effort Amount	DIRECT COSTS
Evaporation pond monitoring	NRC Report	52	\$2,120.63	
Ground Water Corrective Action Program Rev/Rpt	NRC License Condition 30 C	120	\$8,461.15	\$80,000.00
Ground Water Monitoring Report	NRC License Condition 30 C	214	\$11,297.70	\$91.24
Meter Readings & Water Levels	Report Data	284	\$9,260.45	
Monitor Domestic Well	12M gallons/yr to ponds	152	\$6,489.26	\$4,484.53
Plume Data	To Roy & ABQ for review	140	\$7,155.28	
Pulling and replacing pump / motor	Report Data	224	\$7,397.56	
Submersible pump maintenance	Ongoing Maintenance	224	\$9,117.15	
Troubleshoot/repair wells	Ongoing Maintenance	134	\$7,254.13	
Water meter maintenance	Ongoing Maintenance	22	\$708.95	
Well Data	Report Data	60	\$2,676.98	
Zone 3 monitoring wells	Solinst measurements to Alb.	72	\$3,191.28	
Sub-total		1698	\$75,130.48	\$84,575.77
Direct Costs Contingency			+15%	\$97,262.14
			Category Total (Annual)	\$172,392.61
Monitoring & Maintenance of License Area to 2038				
TASK	DESCRIPTION	Hours/yr	Effort Amount	DIRECT COSTS
ALARA Audit & Report	review/update SOPs	100	\$4,916.13	
Form 10: Annual report - Uranium Milling Operations	State of NM	8	\$510.43	
Instrument function tests and calibration	Rad, Air, Groundwater	213	\$11,981.44	\$836.80
Integrity inspection of tailings area	implement corrective actions	30	\$1,679.36	
Jetty monitoring with pictures	Pictures to STANTEC	8	\$326.25	
Land Use Survey	NRC License Condition 31	100	\$4,916.13	
RSO refresher	NRC License Condition	20	\$1,119.58	\$3,000.00
Surety Assessment Re-Baselining	NRC License Condition 25	15	\$887.21	
Surety Update Calculation	NRC CPI based update	23	\$950.57	
Uranium Report - form EIA-851A	US Energy Information Agency	50	\$3,329.91	
Sub-total		567	\$30,617.00	\$3,836.80
Direct Costs Contingency			+15%	\$4,412.32
			Category Total (Annual)	\$35,029.32
Grand Total (Annual)		3455	\$158,132.94	\$252,965.01

Well Abandonment Costs based on Yellow Jacket Drilling Bid with Wood Assumption of 30% Cost Adjustment				
Task 1 Costs	Quantity	Unit	Cost	Price
Mobilization/Demobilization of one BK-81 Drill & Equipment	2	LS	13850	27700
Daily Crew Travel / Per Diem (5) Man Crew	40	EA	700	28000
Remove & Dispose of Submersible Pump & Column Pipe	2	EA	2250	4500
Attempt to Pull & Remove PVC Casing	38	EA	500	19000
Attempt to Pull & Remove LCS Casing	38	HR	400	15200
Over Drill / Casing Removal: PVC Well Casing up to 5' bgs	610	FT	40	24400
Abandonment of 2", 4" wells up to 325' bgs - Bentonite Grout	7689	FT	12	92268
Abandonment of 5", 6" wells up to 225' bgs - Bentonite Grout	9876	FT	16	158016
Abandonment of 7" wells up to 225' bgs - Bentonite Grout	1165	FT	22	25630
Additional Bentonite Grout (When exceeds 20% well volume)	650	BG	35	22750
Additional Time - As required (When exceeds 20% well volume)	100	HR	400	40000
Standard 2'X 2' Surface Completion Removal & Restoration - Concrete	38	EA	150	5700
Ancillary Equipment: Bobcat, 2000 gallon Water Truck	40	DY	550	22000
55 gal DOT Drums - Estimate Charge for actual usage	5	EA	75	375
BK - 81 Rig Standby per Rig (Client Directed Work Stoppage)	52	HR	375	19500
State & Local Taxes: As Applicable (6.76)	7%	EA		34141
			Total Before Tax	505039
			Total after Tax	539180
Wood Assumptions				
Seventy six of the (130) well casings will be attempted to be pulled.				
Will need about 30% more bentonite than estimated.				
100 hours will be required to go back to wells and top them off after grout drop.				
An additional 13% of the estimated field time will be required to assure safety tailgate meetings and to manage unforeseen logistics issues.				