MACTEC

September 1, 2004

Mr. William von Till
U.S. Nuclear Regulatory Commission
11545 Rockville Pike
Two White Flint North
Rockville, Maryland 20852-2738
Mail Stop T-8A33

Subject: UNC Church Rock Financial Surety Re-Baseline Estimate

Ref: Source Material License SUA-1475
Docket # 40-8907

Dear Mr. von Till:

On behalf of and at the direction of Mr. Roy Blickwedel, Remedial Project Manager, General Electric Company, MACTEC Development Corporation is submitting a revised baseline surety estimate for the Church Rock Uranium Mill and Tailings Site located in Church Rock, New Mexico. This submittal is in response to the Request for Additional Information (RAI), dated June 10, 2004, under tracking number TAC LU0036 (this tracking number may have been recently closed, as indicated in your June 10 letter).

In accordance with the RAI, a revised baseline estimate for the Church Rock financial surety has been completed in a format similar to that indicated in Appendix C of NUREG-1620, Rev. 1, "Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act." (Enclosed)

Please do not hesitate to contact Mr. Roy Blickwedel at (610) 992-7935 for questions or comments regarding this revised baseline surety estimate.

Sincerely,

Michael P. McDonald, CHP
Senior Radiological Engineer

MPM
Enclosure
cc w/ encl: Roy Blickwedel, Remedial Project Manager, GE
Larry Bush, UNC President, Church Rock, NM
Steve Cline, MACTEC

LU0155 01

MACTEC Development Corp.
751 Horizon Court, Suite 104 • Grand Junction, CO 81506
970-243-2861 • Fax: 970-256-7356

UNC Mining and Milling
Division of United Nuclear Corporation
P.O. Box 3077
Gallup, NM USA
87305

Revised Baseline Surety Estimate for the Church Rock Uranium Mill and Tailings Site

Revision 0

License No. SUA-1475
Docket No. 40-8907

Prepared by

MACTEC Development Corporation
751 Horizon Ct., Suite 104
Grand Junction, CO 81506

September 1, 2004

TABLE OF CONTENTS

APPENDIX A
COST ESTIMATE TABLES

1 PURPOSE and SCOPE

This revised baseline surety estimate for the Church Rock Uranium Mill and Tailings Site (Site) provides a cost estimate for reclamation and short-term surveillance activities performed under Nuclear Regulatory Commission (NRC) license SUA-1475. This document has been prepared in a format similar to NUREG 1620, Appendix C, at the request of the NRC through their Request for Additional Information (RAI) letter, TAC LU0036, dated June 10, 2004. It is the goal of UNC Mining and Milling (UNC) to evaluate and estimate the associated costs of decontamination, decommissioning, reclamation and short-term surveillance activities for the Site such that total financial assurance provided is appropriate to complete remedial and surveillance activities prior to the tailings material turnover to the Department of Energy (DOE) for long-term surveillance and monitoring.

The Revised Baseline Surety Estimate for the Church Rock Uranium Mill and Tailings Site excludes all expenditures for previously completed remediation activities at the site. Activities identified for the reclamation of the site have been priced in 2004 dollars.

2 SITE DESCRIPTION

2.1 Site Description and Background

The site is located approximately 17 miles northeast of Gallup, NM, located in McKinley County, and is accessed via State Highway 566 from its intersection with Old Route 66, about 10.5 miles to the south. The tailings disposal area is located in Section 2 of Township 16 North, Range 16 West.

The Site includes a former ore-processing mill and tailings disposal area, which cover approximately 25 and 100-acres, respectively. The tailings disposal area is subdivided by dikes into three cells identified as the South Cell, Central Cell, and North Cell. Pipeline Canyon runs through the Site from northeast to southwest. Site alluvium occurs along this drainage feature, including its floodplain. Upslope, Pipeline Canyon passes into Pipeline Arroyo. Pipeline Canyon is locally flanked by gentle mesas and land that has been graded in conjunction with milling and former waste-handling activities. The site alluvium groundwater flows toward the southwest (in the same direction as surface water flow).

2.2 Site Soils

The native soils within the site boundary consist of well-drained silty sands and inorganic silts and clays, characteristic of a semi-arid, pinyon-juniper region. Currently, all areas support a variety of native vegetation.

2.3 Site Characteristics

The tailings area is situated on an alluvial plain in the Pipeline Canyon at an average elevation of 7,000 feet. An ephemeral drainage channel, referred to as the Pipeline Arroyo, is situated between Highway 566 and the tailings disposal area. The Pipeline Arroyo traverses the site to a point 2.5 miles southwest of the site where it joins the Rio Puerco drainage. The surrounding terrain is varied, consisting of narrow canyons, arroyos, cliffs and mesas. Vegetation in the lowland area is sagebrush/grassland with transition to pinion/juniper in the upland area.

2.4 Surface and Groundwater

The site is located west of the Continental Divide in the Rio Puerco Basin on the Colorado Plateau. This region is characterized by numerous mesas, buttes and plateaus, interspersed with steep gullies and arroyos. The smaller drainages flow only as a result of intense rainfall events. Only the larger drainage basins have either intermittent or perennial flow.

The San Juan Hydrologic Basin, located beneath the site, contains sandstone formations such as the Dakota and the Morrison Formations, which are regional aquifers to the area. The Dakota and Morrison formations are approximately 1,400 to 1,800 feet below the surface with several natural aquatards between these aquifers and the ground surface. Formations that consist of sandstone and shale, such as the Dilco Member of the Crevasse Canyon Formation, transmit water in the predominantly sandy zones but are not considered important aquifers in the region.

The Church Rock Mill well was completed into the Westwater Canyon Member and was originally used as a domestic supply for the mill during operations. The well is currently used as a non-potable supply for the offices and to supplement the water in the tailings impoundment evaporation ponds to prevent the pond liners from drying.

The ground water operable unit (OU) consists of the three uppermost water-bearing units or aquifers. From the geologically youngest to the oldest, these units are referred to as: (1) Southwest Alluvium (Quaternary age unconsolidated materials along Pipeline Canyon, having a maximum thickness of approximately 150 feet and a maximum width of approximately 4,000 feet); (2) Zone 3 (uppermost stratigraphic unit of the Cretaceous age Upper Gallup Sandstone, having a thickness of 70 to 90 feet in the former tailings disposal area); and (3) Zone 1 (lowest stratigraphic unit of the Cretaceous age Upper Gallup Sandstone, having a thickness of 80 to 90 feet in the former tailings deposit area) (Canonie Environmental, 1987).

3 DECOMMISSIONING/RECLAMATION APPROACH and COST ESTIMATE

The decommissioning/reclamation methodology planned at the site, and used during this evaluation, is to decommission and cap the two 5-acre evaporative ponds, grade affected and required areas including the installation of swales in those areas, and complete the Environmental Protection Agency (EPA) mandated ground water corrective action program.

3.1 Salvageable Building and Equipment Decontamination

This phase of work normally includes dismantling and decontamination, or disposal of all structures and equipment. This work is usually performed in two phases. In the first phase, only the equipment not used for ground-water cleanup (including the stability monitoring period) is removed. Removal of the remaining equipment would be performed in a second phase, after the approved completion of ground-water cleanup.

The vast majority of work for this phase has already been completed. All mine and mill buildings have been previously released for unrestricted use by the NRC.

Any contaminated non-salvageable equipment identified during the cleanup of the contaminated areas will be disposed of in the evaporative ponds prior to their closure. Heavy equipment (salvageable) used for evaporative pond decommissioning will be decontaminated and released. The price estimates for the decontamination of heavy equipment to be used are identified and captured in Section 3.5.2 as a subset of the Radiological Surveying and Monitoring scope.

Salvageable Building and Equipment Decontamination Cost Estimate - $0

3.2 Non-Salvageable Building and Equipment Demolition and Disposal

This phase of work normally includes demolition and disposal of non-salvageable equipment and buildings. Major categories of building and equipment to be disposed of include: building materials, non-building structure materials, foundation concrete, process equipment, piping and insulation, electrical and instrumentation, and the disposal of chemical solutions within the facility.

Any non-salvageable equipment will be buried in the evaporative ponds prior to closure, resulting in zero cost (excluding labor - identified herein).

Non-Salvageable Building and Equipment Demolition and Disposal Cost Estimate - $0

3.3 Cleanup of Contaminated Areas

Cleanup of contaminated areas encompasses the closure of the evaporation ponds, re-contouring the affected area, revegetation, and installation of required drainage systems in the remediated area(s). Cleanup of windblown materials has previously been completed and is not included as part of the scope of work.

3.3.1 Decommission and Cap Two 5-Acre Evaporative Ponds

Conventional methods were integrated in the evaluation for the decommissioning and closure of the two 5-acre evaporative ponds. Heavy earth-moving equipment will be used to close the ponds and grade the surrounding areas to required specifications. Pond closure methodology includes backfilling the ponds with both borrowed soils and the soils used as the pond's bermed material, then capping. Cap material and protective layering will be installed in accordance with the requirements identified in the site's Tailings Reclamation Plan (Ref. 2).

3.3.2 Grade and Install Swales in Evaporative Ponds Area

Conventional methods were integrated in the evaluation for the grading of soils in the area of the evaporative ponds and the construction of swales. Heavy earth-moving equipment will be used to grade the surrounding areas to required specifications. Grading will use existing site soils (from soils removed during swale construction and from borrowed soils at the site) and will be performed in accordance with the requirements identified in the site's Tailings Reclamation Plan (Ref. 2).

Decommission and Cap Two 5-acre Evaporative Ponds and Grade and Install Swales in Evaporative Ponds Area Cost Estimate – Estimates for these two tasks are presented as a part of Project Management and Equipment (Sections 3.6 and 3.7).

3.4 Groundwater Cleanup

The current and approved cleanup remedy (method) includes extraction and evaporation of contaminated groundwater from three saturated zones, as detailed in the EPA Record of Decision (ROD), signed September 30, 1988 (using evaporative ponds and 28 water cannons for additional evaporation). Contingencies of the selected remedy, as described in the ROD, are stated in the following manner: "...However, operational results may demonstrate that it is technically impracticable to achieve cleanup levels in a reasonable time period, and a waiver to meeting certain contaminant-specific *Applicable or Relevant and Appropriate Requirements (*ARARs*)* may require re-evaluation as a result..."

The following assumptions have been made to be consistent with the EPA:

- Zone 1 has been decommissioned via the NRC licensing decommissioning criteria. Though all of the cleanup goals were not completely achieved, it is anticipated that Zone 1 decommissioning goals will be revised according to a technical practicability determination that is consistent with environmental As Low As Reasonably Achievable (ALARA) principles.

- The Southwest Alluvium is currently being managed via monitoring and natural attenuation. It is envisioned that active remediation of the southwest Alluvium has been completed to a satisfactory level.

- Zone 3 seepage-impacted groundwater is under current consideration for prospective alternative remediation remedies. One solution currently under consideration is the dewatering of Zone 3 seepage impacted groundwater plume over an extended period (approximately 7 years). This particular approach is considerably lengthy, and was used during the evaluation and costing process (providing conservatism in the cost estimate).

Under a 1988 Memorandum of Understanding (MOU) between the EPA and the NRC (53 Federal Register 37887 [Sept. 28, 1988]), the NRC is the lead federal agency regulating the reclamation and closure activities at the site. The NRC-regulated reclamation and source control actions are subject to the EPA monitoring and review to ensure that such actions will allow attainment of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) requirements. Further, the EPA is the lead federal agency responsible for remediation of groundwater contamination outside of the tailings disposal site.

As identified in the site's NRC license (SUA-1475, item 30), UNC has been directed to maintain financial assurance in favor of the EPA in an amount no less that $2,000,000 for groundwater restoration.

3.4.1 Monitoring of the Alluvium and Zone 3 Seepage-Impacted Groundwater

Monitoring of the Alluvium and Zone 3 seepage-impacted groundwater is currently accomplished through sampling and analysis of installed and active wells on site. Each sample is sent for required analysis to the selected laboratory with the results being evaluated and tracked.

In its 2003 Five-Year Review Report for the United Nuclear Corporation Groundwater Operable Unit, the EPA proposed recommendations and follow-up actions that support the function of continued well monitoring and sampling.

"Recommended and Follow-up Actions:

- A Supplemental Feasibility Study (SFS) should be performed to identify further remedial alternative(s) in support of possible future Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response action decision-making. The SFS would consider potential new site ARARs.

- Attenuation with technical impracticability waivers should be evaluated and considered as part of the SFS. Institutional controls should be evaluated and considered in accordance with the NCP as part of the SFS for the seepage-impacted areas in the Southwest Alluvium in Section 3 and Section 10, and in Zone 1 of the Gallup Formation in Section 1.

- Further plume characterization should be conducted for the Southwest Alluvium (*characterization activities have previously been completed with verification samples to be obtained in September 2004. No further data collection for the Southwest Alluvium is anticipated after that time*).

- Analysis of proposal for changing the Southwest Alluvium and Zone 1 remedial actions to monitored natural attenuation with technical impracticability waivers should be evaluated and considered.

Using a conservative approach in the costing evaluation for the continuous monitoring of the Alluvium and Zone 3 seepage-impacted groundwater, the assumption is made that active wells currently being sampled (33 total), be continually sampled and analyzed on a quarterly basis for a nominal period of 7 years. This time frame was selected for two reasons: 1) it allows for adequate decision-making time at all decision levels (allowing for the completion of the SFS with consideration of potential new site ARARs), and 2) it is a conservative assumption that allows for adequate time to dewater the Zone 3 seepage-impacted groundwater plume to the extent practicable.

Monitoring of the Alluvium and Zone 3 Seepage-Impacted Groundwater Cost Estimate - $433,154

3.4.2 Dewater Zone 3 Seepage-Impacted Groundwater

Multiple remediation options for Zone 3 seepage-impacted groundwater have been evaluated for practicality and costs[1], with impacted groundwater remedies including groundwater containment to dewatering of the plume. Dewatering of the

[1] Fax from Montgomery Watson Harza, Appendix C, Cost Evaluation Data, from Pam Anderson, August 27, 2004.

Zone 3 seepage-impacted groundwater plume is considered an acceptable method to remove contaminates present in Zone 3 impacted groundwater and is currently considered one of the most plausible remedies available. Pumping from multiple (~70) hydraulically fractured wells within the boundary of the impacted plume area is intended to stop plume movement completely. Without a recharge mechanism available, pumping from the impacted groundwater plume is expected to virtually dewater the plume in 7 years.

Multiple dewatering options were evaluated previously, with pumping of impacted groundwater taking place over a 3-year, 5-year, or 10-year time frame using anywhere from 70 to 140 conventional wells. It was decided to use a conservative estimate of pumping over a nominal 7-year time frame from 70 hydraulically fractured wells providing the source of effluent in this costing evaluation.

The costs and calculations to dewater Zone 3 seepage-impacted groundwater and operate evaporative equipment are identified in Appendix A, Table 5-5.

Dewater Zone 3 Seepage-impacted Groundwater Cost Estimate - $1,692,966

3.4.3 Well Decommissioning

Well decommissioning will be performed in accordance with the Tailings and Reclamation Plan (Ref. 2). A bid was obtained from a local drilling company for closure of the 33 active wells currently on site. Well identification and characteristics are identified in Appendix A, Table 5-6.

Well decommissioning of the hydraulically fractured wells, identified in Section 3.4.2, is not included in the well decommissioning estimate. Costing for the decommissioning of the hydraulically fractured wells is included in Section 3.4.2

Current Active Well Decommissioning Cost Estimate - $23,128

3.5 Radiological Surveying and Monitoring

This phase of work normally includes radiological survey and soil samples for radium in areas to be released for restricted use. Soils around the tailings disposal cell, evaporation ponds, and process buildings should be analyzed for radium content. A gamma survey of all areas should be made before release for unrestricted use. All equipment released for unrestricted use should be surveyed and records maintained.

Radiological survey and monitoring calculations are identified in Appendix A, Table 5-7.

3.5.1 Volumetric Soil Samples

Volumetric soil sampling will not be performed in the closeout of the evaporative ponds. Previous soil sampling and analyses have provided adequate information for the pond closeout.

Volumetric Soil Sampling Cost Estimate - $0

3.5.2 Decommissioning Surveys

Heavy Equipment Surveys – Heavy equipment will be surveyed for free release (for both loose and fixed contamination) from radiologically controlled areas (RCA) upon completion of work scope. Contaminated heavy equipment will be decontaminated prior to release. Estimate does not include labor (identified below).

Heavy Equipment Survey Cost Estimate - $1,500

Other Small Equipment Surveys – Other small equipment will be surveyed (for both loose and fixed contamination) on a periodic basis and released at the completion of the work scope. Contaminated other small equipment will be disposed of or decontaminated prior to release. Estimate does not include labor (identified below).

Small Equipment Survey Cost Estimate - $1,500

Environmental Monitoring Surveys – Low volume air sampling will be performed during pond closure work activities. Once evaporative pond closure work and grading of the area are completed, a radon flux survey will be conducted at the site. Estimate does not include labor (identified below).

Environmental Monitoring Survey Cost Estimate - $6,025

3.5.3 Personnel Monitoring

Lapel air sampling will be used to monitor for internal exposures for workers working inside an RCA where there is a potential for exposure to airborne radioactive material. Personnel frisk surveys will be performed by workers when leaving any work area where the work has been performed inside an RCA.

Personnel Monitoring Survey Cost Estimate - $6,000

3.6 Project Management, Labor, and Miscellaneous

Itemized costs associated with project management; engineering design, review, and change; mobilization; legal expenses; power during reclamation; quality control; radiological safety; preparation of completion report and license termination activities, and any costs not included in other estimation categories are included in the project management cost and miscellaneous.

Labor rates for heavy equipment operators were obtained from the U.S. Department of Labor, Bureau of Labor Statistics, May 2003, corrected for inflation to 2004.

Overhead costs for labor and contractor profit are included in the various bid quotes and labor rates (adjusted, see Labor Rates section below). Project management, labor and miscellaneous cost and calculations are identified in Appendix A, Table 5-4.

Project Management, Labor and Miscellaneous Cost Estimate - $ 663,509

3.7 Equipment

Equipment identified to complete the pond closure and grading was priced from a local heavy equipment rental dealer, which includes dealer mark-up.

Equipment Cost Estimate - $ 534,625

3.8 Long-Term Surveillance Fee

The Long-Term Surveillance Fee was calculated based on current Consumer Price Index (CPI) values using all cities, all items, not seasonally adjusted, from the average 1978 value to mid-2004 average. The CPI values are listed below:

1978 CPI Value - 65.2
2004 CPI Value - 187.6
Percent increase from 1978 to mid 2004 – 288%
$250,000 (1978 dollars) to 2004 dollars = $719,325

Long-Term Surveillance Fee Cost Estimate - $719,325

3.9 Contingency

A 15 percent (15%) contingency amount is added to the total cost estimate for the final site closure.

Contingency Cost Estimate - $612,260

3.10 Total Cost Estimate

UNC estimates $4,693,991 is needed for decommissioning and reclamation of the Church Rock Uranium Mill and Tailings Site (in current 2004 dollars).

$2,000,000 is currently being maintained as financial assurance in favor of the EPA for groundwater restoration pursuant to NRC license SUA-1475.

Groundwater restoration costs have been estimated in this evaluation to be $2,149,248.

Restoration/Remediation Task	Cost Estimate
Monitoring of the Alluvium and Zone 3 Seepage-Impacted Groundwater	$433,154
Dewater Zone 3 Seepage-Impacted Groundwater	$1,692,966
Current Active Well Decommissioning	$23,128
Total Groundwater Restoration Cost	**$2,149,248**

The difference between the total site restoration cost and groundwater restoration cost ($4,693,991 - $2,149,248) is $2,544,743 (in 2004 dollars). However, financial assurance, in favor of the EPA for groundwater restoration, is less than the estimated amount in this evaluation by $149,248, and will need to be included in the remaining surety value of $2,544,743, for a total of surety value of $2,693,991.

This estimate is based on the approaches described in Section 3, the assumptions described in Section 4, and the detailed cost tables presented in Appendix A of this estimate.

4 DECOMMISSIONING/RECLAMATION COST ASSUMPTIONS

4.1 Key Assumptions

Key assumptions made during the evaluation:

- Conservative scenarios were selected during the evaluation process (e.g., 7 years to pump down Zone 3 seepage-impacted groundwater, 6 months

to complete evaporative pond closure and area grading, use of weekly rates vs. monthly rates for heavy equipment rental).

- Well closeout based on current number of operable active wells (33 monitoring wells in place as of August 2004).
- All hand-held, portable radiological instruments quoted at $250/month for rent/lease.
- Heavy equipment work scheduled to be performed on a 4-day, 10-hour day work week schedule with no overtime.
- No time was scheduled/allotted for required personnel training for personnel working on site.
- Evaluations and calculations were made based on no other radiological hazards on site besides those associated with the naturally occurring radionuclides normally found or associated with mining and milling operations.
- Normal site operations (maintaining normal utilities and associated costs) are kept in place for the duration of the reclamation period.

4.2 Labor Rates

The labor rates for this estimate show a combination of home office and field rates for various project management, crafts and laborers, and are identified in Appendix A, Table 5-1.

Both rates shown are reflective of labor rates identified by the U.S. Department of Labor, Bureau of Labor Statistics, May 2003 (italicized), corrected for inflation to 2004 or rates identified through price quotes from local area vendors and suppliers. The field rates have been determined by addition of a daily per diem of $85 distributed over 40 hours (where applicable) or have been increased by a multiplier of 1.5 to account for customary per-diem and travel expenses. Overtime rates have not been calculated, nor were overtime rates used in any of the calculations.

4.3 Monitoring of the Alluvium and the Zone 3 Seepage-Impacted Groundwater

Sample analysis performed by an off-site laboratory is the current method for measuring contaminate levels in the groundwater. Seepage-impacted groundwater monitoring and sample analysis was selected and used in the evaluation for measuring contaminate levels for the duration of the project (7 years).

During the evaluation, conservative assumptions were made and used to calculate the cost of quarterly sampling and analysis at the site. It was assumed that 33 wells would remain active and be sampled on a quarterly basis for the duration of the 7-year estimated time and that the analysis cost would not decrease as the wells showed recovery from contaminates or dried up.

Costs for this task are identified Appendix A, Table 5-2.

4.4 Decommission and Capping Two 5-Acre Evaporative Ponds with Grading and Installation of Swales in Evaporative Ponds Area

Decommissioning and capping of the two evaporative ponds requires the use of heavy earth-moving equipment. This task was calculated to take approximately 8 weeks using the several different pieces of heavy equipment identified, not including mobilization (mob) and demobilization (demob) costs that were tracked separately. This time frame demonstrated to be the optimal time to complete the work with the greatest efficiency of equipment, operators, and the time to perform the task. The equipment is identified in Appendix A, Table 5-3.

The task of grading soils near the evaporative pond area and the construction of swales were calculated using a logical assessment of the time necessary to complete the work. Because a finite quantity of soil (cubic yards) was not available and cannot be accurately defined until after grading of the pond area, and because swale placement in the area has not been previously identified, an estimate of 6 weeks was made to perform this task. This time estimate appears to be appropriately conservative when compared to the time calculated for the evaporative ponds closure and capping work.

The calculations and assumptions for the evaporative pond closures are presented below:

- The two evaporative ponds total 32,666 (non-compacted) cubic yards x .35% fluff factor for handling material = 44,099 cubic yards (assumed embankment makes up 50% of fill material).
- 1.5 feet of attenuation soil cover = 13,230 cubic yards (assumed to be transported from the borrow area).
- 0.5 feet of soil & rock matrix = 4,409 cubic yards (assumed to be transported from storage location onsite).
- Total cubic yards to be installed = 61,738 (non-compacted) cubic yards.
- A lower than normal production rate, as compared to non-radiological contaminated work locations, was used because work will be conducted in a radiologically controlled area.

Calculations:

- 50% of fill material assumed to be in embankment of ponds = 30,719 cubic yards @ 8 hours of production for 12.7 days @ 2400 cubic yards per day.
- 50% of fill material assumed to be transported = 30,719 cubic yards @ 8 hours of production based on 30 minutes turn around time per truck x 4 trucks @ 16 cubic yards each, 2 trips per hour = 1024 cubic yards per day x 30 days=30,720 cubic yards.

The calculated soil volume estimate in the 1991 Tailings Reclamation Plan (Ref. 2) for the evaporative pond closure is 49,000 cubic yards. The 1991 estimate agrees favorably with the estimate provided herein. After soil compaction, the volume of soil calculated in this evaluation is 45,732 cubic yards.

Heavy equipment rental was quoted "on a weekly basis" from a local heavy equipment rental dealer. Fuel and lubes for the vehicles were estimated to be $5,423 per week based on a daily estimated fuel usage of 670 gallons per day x 4 days x $2.00 per gallon = $5,360 per week plus $63 per week for lubricants.

The cost estimate for decommissioning and capping the two 5-acre evaporative ponds, grading and installing the swales in the area is identified in Appendix A, Table 5-3.

4.5 Dewatering Zone 3 Seepage-Impacted Groundwater Plume

The capital costs portion ($1,484,050) of the total costs identified in Section 3.4.2, Dewater Zone 3 Seepage-Impacted Groundwater and in Table 5.5, were obtained from Appendix C, Cost Evaluation Data, via facsimile from the office of Montgomery Watson Harza (MWH), located in Tempe AZ. This office provided UNC with a broad range of current technical and cost evaluation data for the dewatering of Zone 3 seepage-impacted groundwater plume. In the document provided to UNC, Appendix C, *Cost Evaluation Data*, MWH offers six alternatives for dewatering the plume, Alternative 3 through Alternative 8.

Alternative 5, the installation and operation of approximately 70 hydraulically fractured wells, was chosen to be used during the evaluation and costing for this revised baseline report. Alternative 5, while not the most expensive alternative in the cost evaluation data set, was the most logical selection of the set for the Church Rock site. Due to the physical location of the Zone 3 seepage-impacted groundwater plume, several alternatives methods offered could not be easily implemented, while others left undesirable side-effects such as tunnels and open pits.

5 REFERENCES

1. U.S. EPA, Region 6, "Five-Year Review Report for the United Nuclear Corporation Groundwater Operable Unit", Church Rock, McKinley County, NM, September 2003.

2. Canonie Environmental, "Tailings Reclamation Plan As Approved by the NRC March 1, 1991", Church Rock Site, Gallup, NM, Volumes 1-3, August 1991.

3. NUREG-1620, "Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act of 1978", Final Report, U.S. NRC, June 2003.

4. U.S. Department of Labor, Bureau of Labor Statistics, May 2003, via Internet.

5. Facsimile from Montgomery Watson Harza, Appendix C, Cost Evaluation Data, Alternative 5 with 70 wells, from Pam Anderson, Tempe AZ Office, 4 sheets, August 27, 2004.

APPENDIX A

Cost Estimate Tables

Table 5.1 - Unit Cost for Workers

Classification	Home Office ($/h)	Field ($/h)
Project Manager	$69.92	$69.92
Corporate Health Physicist/ Health & Safety Specialist	$76.68	$76.68
Civil Engineer	*$31.69*	$47.54
Field Engineer	*$31.78*	$47.67
Field Health & Safety Supervisor	$49.63	$74.45
Senior HP/H&S Technician	$34.00	$49.75
Site Supervisor	*$25.56*	$25.56
General Maintenance	*$21.26*	$21.26
Surveyor	*$15.70*	$15.70
Construction Laborer	--	*$13.91*
Equipment Operator	--	*$18.76*
Heavy Equipment Operator	--	*$18.76*
Clerical	$21.61	--
Procurement Spec	$43.33	--

NOTE: Wage rates are from cognizant service companies or from U.S. Department of Labor, Bureau of Labor Statistics, May 2003 corrected for inflation to mid-2004 rates (italicized).

Table 5.2 - Sampling and Monitoring of the Alluvium and Zone 3 Seepage-Impacted Groundwater

Task	Zone 3	Number of Samples	Unit Cost	Cost
Verification Sample Analysis (continuous monitoring quarterly)	Currently installed and active monitoring wells in all areas	1064	$407	**$433,154**

NOTE: Number of samples and analysis cost are based on 7 years of quarterly sampling of 33 wells (+ 5 dups and blanks).

Table 5.3 - Pond Closure/Grading Heavy Equipment Costs

Heavy Equipment	Unit Cost ($/week)	Units Required	Duration (weeks)	Equipment Cost Only	% Operator Used	Operator Cost	Total Heavy Equipment Cost
D6 LGP CAT With 15.5 Finish Blade	$3,605	1	8	$28,840	100%	$6,002	$34,842
815 CAT Padded Drum Compactor	$3,230	1	10	$32,300	80%	$6,002	$38,302
C563 CAT Smooth Drum Compactor (84" roller)	$1,500	1	10	$15,000	80%	$6,002	$21,002
613 CAT 6000 Gal Water Wagon w Water Cannon/Front & Rear Spray Headers	$2,890	1	14	$40,460	100%	$10,504	$50,964
B972 CAT Front-end Loader (6 Yrd Bucket)	$3,255	1	8	$26,040	100%	$6,002	$32,042
325 CAT Excavator (Track Hoe)	$7,310	1	6	$43,860	100%	$4,502	$48,362
740 CAT Haul Trucks, All Terrain 40 Ton Capacity	$4,925	4	10	$197,000	100%	$ 30,012	$227,012
Fuel Oil And Gas Truck With Oils/ Lubes / Greases (local)	$5,423 *	1	14	$75,922	NA	NA	$75,922
4 Wheel Drive Pickups For Managing Field Activities	$63	2	14	$1,764	NA	NA	$1,764
Mechanic Truck For Minor Repairs (local)	$63	1	14	$882	NA	NA	$882

* 670 gal/day x 4 days x $2.00/gal = $5,360/week fuel and $63 for lube.

Table 5.4 - Project Management and Miscellaneous Costs (Itemized)

	Evaporative Pond Closure	General Grading/ Swale Construction	Well Decommissioning	Seepage Area Monitoring/ Remediation	Report and License Termination Activities	Cost
Project Duration	8 weeks	6 weeks	4 weeks	7 yrs		
Project Management	$22,374	$16,781	$11,187	$0		$50,342
(estimated PM hours)	320	240	160	0		
Engineering Design, Review, and Change	$1,907	$953	$477	$0		$3,337
(estimated hours)	40	20	10	0		
Site Maintenance	$0	$0	$0	$148,798		$148,798
(estimated hours)	0	0	0	7,000		
Mobilization	$10,000	Included as part of Pond Closure	Included in Well Decommissioning section	$0		$10,000
Demobilization	$4,000	Included as part of Pond Closure	Included in Well Decommissioning section	$0		$4,000
Heavy Equipment, Operators, and Supplies	$534,625		Included in Well Decommissioning section	$0		$534,625
Utilities During Reclamation (elec - $2,079/month) (gas - $1,463/month) (water - $55/month) (portolet - $100/month) (phone - $354/month) $3951/month avg.	$7,902	$5,927	$3,951	$331,884		$349,664
Quality Control Expenditures	$3,814	$953	$0	$0		$4,767
(estimated hours)	80	20	0 (contracted)	0 (contracted)		
Radiological Safety ($49.75/hr)	$15,920	$0	$0	$0		$15,920
(estimated hours)	320	0	0	0		
License Termination Consulting ($76.68)					$76,680	$76,680
(estimated hours)					1,000	

Table 5.5 - Dewater Zone 3 Seepage-Impacted Groundwater Costs

Operation	Units	Unit Cost	Cost	Comments
Water Treatment Equipment	NA	NA	$0*	No equipment except pumps, piping, sprinkler cannons, and pond misters (currently on site)
Hydraulic Fracture Wells	Option 5 (70 wells)	NA	$1,484,050	Option 5 - Cost is inclusive (equipment, installation, collection system, and engineering) (Ref. 5)
Operation	84 months	$2,820	$118,430	Cost of electricity to run pumps for 7 years at 50% operability required. $2,450 average monthly utility cost for both systems running in summer of 1998. CPI adjusted rate = $2,820/month
Maintenance	32 hrs./month	$21.26	$57,138	7- year time frame for contract maintenance person at 32 hours/month
Component Replacement	7	$1,084	$7,585	1 water cannon replaced every year for 7 years
	2	$12,881	$25,763	Two water pumps and motors replaced over 7 years. pump - $11,750.94; motor - $1,130.53

*Equipment currently in place (water cannons and associated equipment)

Table 5.6 - Well Identification and Characteristics

Well ID	Material Used for Plugging (including acquisition and transportation)	Depth of Each Drill Hole (in feet)	Diameter of Each Drill Hole (in inches)
GW-1	bentonite	60	6
GW-2	bentonite	95	6
GW-3	bentonite	80	6
509-D	bentonite	110	5
624	bentonite	85	11.25
627	bentonite	78	11.25
632	bentonite	80	6.25
801	bentonite	56	11
802	bentonite	81	11
803	bentonite	118	11
EPA-23	bentonite	123	11
EPA-25	bentonite	70	11
EPA-28	bentonite	87	11
808	bentonite	125	11
420	bentonite	170	6.25
504-B	bentonite	170	5
517	bentonite	115	5.125
EPA-13	bentonite	180	10
EPA-14	bentonite	145	10
708	bentonite	172	10
711	bentonite	206	11.25
613	bentonite	93	11.25
NBL-1	bentonite	204	9.825
719	bentonite	174	11
717	bentonite	148	11
TWQ-142	bentonite	320	5
515-A	bentonite	115	5
604	bentonite	121	11.25
614	bentonite	126	11
EPA-2	bentonite	200	7.625
EPA-4	bentonite	240	7.875
EPA-5	bentonite	142	12
EPA-7	bentonite	165	12

* Envirotech Inc. (Farmington firm) quoted $23,128 for closeout and cap of all 33 wells (average depth of 150 feet.) on site.

Table 5.7 - Decommissioning Radiological Surveys

Contamination Surveys

	Number of Smear Samples	Number of Static Surveys	Unit Cost	Cost
Heavy Equipment	300	300	NA	$3,000
Other Small Equipment	NA*	NA	NA	$0

*All contaminated equipment (excluding heavy machinery) will be buried in the ponds prior to closure.

Environmental Monitoring

	Environmental Monitoring Frequency	Technique (type, number, etc)	Unit Cost	Cost	Comment
During Evaporative Pond Closure	2 months	low volume air monitoring	$250	$2,000	Air sampler and analysis cost @ 2 months x 4 samplers
Flux Survey (post pond closure and grading)	Once	115 Large Area Activated Charcoal Collectors	$35.00	$4,025	Canister and analysis cost

Personnel Monitoring

	Monitoring Frequency	Technique (type, number, etc)	Unit Cost	Cost	Comment
During Pond Closure	2 months	Personnel monitoring during ponds closure	$2,500	$5,000	Lapel sampling and bioassay monitoring
During Pond Closure	2 months	Controlled Area exit monitoring during Pond closure	$250	$1,000	Instrument cost for 2 months X 2 friskers