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SECTION 27 MINE CLOSEOUT PLAN

August 2008

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1.0 INTRODUCTION

This Closeout Plan (Plan) for United Nuclear Corporation's (UNC's) former Section 27 Mine has been prepared in compliance with the requirements of Section 5 of the New Mexico Mining Act (NMAC 19.10.5.506, Closeout Plans). The Plan is based on available site data and topographic mapping. The Section 27 Plan was prepared using the State of New Mexico Energy, Minerals and Natural Resources Department Mining Act Reclamation Program (MARP) document *Closeout Plan Guidelines* (MARB, 1996) and describes the construction tasks that will be completed to reclaim the Site in accordance with the Guidelines.

This document is divided into six sections. Section 1 discusses the project site including soils, geology, surface and groundwater and post-mining land use. Section 2 describes components of the Closeout Plan. Section 3 provides a description of construction and verification gamma radiation level surveys. Section 4 provides a Financial Assurance Cost Estimate and a general construction schedule is provided in Section 5. References are provided in Section 6. The geotechnical stability model output is presented in Appendix A; gamma radiation surveys methods are included in Appendix B; and the Financial Assurance Cost Estimate is included in Appendix C. A drawing set for the Plan follows the text.

1.1 PROJECT DESCRIPTION AND BACKGROUND

The mine is located in Section 27, Township 14N, Range 9W of the New Mexico Principal Meridian approximately 35 miles north of Grants, New Mexico. The Section 27 mine is located approximately two miles east of the Philips Mill and Rio Algom Mill tailings impoundment in the Ambrosia Lake District in McKinley County as shown on Sheet 1 of the Drawings, *Cover Sheet and General Location Map.* Features at the Site include two shafts, three vent holes, two small piles of non-economic mine materials containing overburden rock, sands and gravels, one small ore stockpile, two topsoil stockpiles and several small piles of ball mill reject materials. The mine site is currently inactive and encompasses approximately 14 acres. Site features are shown on Sheet 2, *Section 27 Mine Existing Conditions.*

UNC produced uranium ore from the Section 27 mine during operations from 1970 to 1977. The Section 27 mineral lease covered approximately 200 acres in the south half of Section 27 and was surrendered in 1988. Surface ownership at the mine is currently held by Kent Schmitt. Ownership of the mineral estate is held by Hecla Mining Company.

1.2 SITE SOILS AND GEOLOGY

Native soils on the Site consist of well-drained silty, slightly clayey sands. Soils in the non-economic storage areas consist of fine to coarse-grained sands with gravels and cobble-sized sandstone and some shale. The ore stockpiles are comprised of gray-colored medium to coarse-grained sands with cobbles and gravels. On the outer surfaces of all the piles the cobbles and gravels have formed a natural armoring layer, greatly reducing wind and water erosion. Currently all areas support a variety of native vegetation.

The Section 27 mine is located southwest of the San Mateo Mesa and northeast of the Mesa Montanosa within the San Juan Basin. Bedrock beneath the Site consist of the following stratigraphic units, in descending sequence: alluvium/weathered Mancos shale; the Tres Hermanos-C, -B, and –A sandstones; the Dakota Formation; the Westwater Canyon Member and Recapture Member of the Morrison Formation, and the Bluff Sandstone Formation. Uranium production at the mine was from the Westwater Canyon Member, greater than 700 feet below the ground surface.

1.3 SURFACE WATER AND GROUNDWATER

The site is located within the drainage basin of the Arroyo del Puerto, an ephemeral drainage located over two miles southwest of the Site. Two surface water drainages lie to the east of the Site, with the Mulatto Canyon drainage lying immediately east of the Site and another, unnamed drainage approximately one-half mile to the east (see Sheet 2). The unnamed drainage drains into a small impoundment area known as Voght Tank, primarily used as a stock watering pond. Both drainages are intermittent, with flows occurring only after the spring runoff and during heavy thunderstorms. The non-economic mine material piles and other portions of the Site are not within the floodplain of the stream, and as such do not impede the natural flow. Surface water at the Site has not been characterized due to the intermittent nature of the flows, which occurs primarily as sheet flow, except for the small incised channel that intersects the eastern side of the site. As no surface water will be impounded at the Site, a surface water monitoring plan will not be required.

Current groundwater quality at the Section 27 Mine was evaluated during the Phase 1 Groundwater Abatement Study, which is described in detail in the report *Stage I Abatement Plain Investigation Report* (Intera, 2007). Intera found that the mine cannot be viewed as the source of a release of contaminants that can be removed or stabilized. Instead, the act of dewatering the basin to enable mining allowed for the introduction of air, which can promote the dissolution of ore minerals. Water quality, both locally and regionally, is expected to naturally improve as water levels recover from mining. Intera suggested that the State consider the water quality at the site to be within the regional background and/or that technical infeasibility and alternate abatement standards be applied to fulfill the ground water abatement process. As such, groundwater quality issues within the formations that lie several hundreds of feet below the ground surface sampling will be conducted during are independent of the mine closeout activities.

1.4 POST-MINING LAND USE

Reclamation of the Section 27 mine is intended to achieve a post-mining land use of livestock grazing, similar to surrounding areas. Mine reclamation will also be consistent with the potential for future mining. A vegetation and wildlife survey was (see Section 1.5) conducted to determine the native species, corresponding plant densities and current range conditions for the Site and adjacent range areas. The topsoil stockpiles and surrounding native soils were sampled for agronomic parameters to determine the suitability of the soil as a growth medium. The results of the agronomic analyses are presented in the document *Materials Characterization Report* (MWH, 2007).

1.5 VEGETATION AND WILDLIFE

A vegetation and wildlife survey was conducted that provided recommendations for revegetation of the Site during closeout construction (Cedar Creek, 2006). The survey was conducted in accordance with Title 19, Chapter 10, Part 5 of the New Mexico Administrative Code (NMAC) and the MARP. The purpose of the survey was to facilitate a determination of: 1) current floral and faunal conditions extant in the vicinity of the permit area, 2) quality of habitat for indigenous wildlife, and 3) revegetation potential along with a revegetation plan and recommendations to optimize the ability of reclamation to meet post-mining land use considerations. The results of the survey are presented in detail in the document *Vegetation and Wildlife Evaluations/Revegetation Recommendations* (Cedar Creek, 2006). The document includes site-specific protocols for monitoring and eventual success evaluation to be used at the Site.

The results of the survey indicated that a single plant community exists in the Section 27 study area: grassland steppe. The grassland steppe community was sampled with 45 sets of co-located samples for ground cover, woody plant density, and current annual production (Cedar Creek, 2006). The grassland community occupies the entirety of the study area. Statistically adequate ground cover data

were collected from both baseline and reference areas adjacent to the Site. Floristic surveys of the baseline and reference areas resulted in the identification of a total of 34 taxa including 10 grass or grass-like species, 13 forbs, and 11 trees, shrubs, or succulents. None of these were determined to be sensitive species or otherwise protected by statute. Similarly, only one was identified as a noxious weed (tamarisk) that was found within the disturbance area.

According to the New Mexico Rare Plants database, none of the identified seven species of concern exist in the immediate project area and no rare, threatened or endangered plant species were found on or near the project area during the survey.

The presence of wildlife or wildlife habitat was evaluated with four transects extended radially from the Section 27 disturbance footprint over two separate days (Cedar Creek, 2006). Over the course of these transects, only a single habitat type for indigenous fauna was observed within 0.5 mile of the Site. This was the grassland steppe community described above. The project area and immediate environs do exhibit ruderal vegetation (a plant species that is first to colonize disturbed lands) amidst the disturbances and the local drainage that transects the Site is incised five to ten feet. Based on the extent of the grassland steppe habitat type, it appears that the entire disturbance due to the Section 27 operation occurred within this habitat type. To the north and east of the Site at a distance of more than 4,000 feet exists another community, Juniper Scrub, at the base of rim rock cliffs. These cliffs and Juniper Scrub are the only other wildlife habitat readily observable within a mile of the project area. The only physical habitat feature within the project area is artificial in nature. This feature consists of the remnant power poles that can be utilized by indigenous avifauna as perch sites for resting, loafing, or hunting. Given the relative proximity of the rim rock to the north and east, it is unlikely that these power poles would normally be used for nesting by raptors. However, it was agreed at a site-meeting between MMD, NMGFD, UNC that four of these power poles should be left post-closure for raptor perches or nesting platforms.

Observations made during the survey were positive regarding: 1) the quality of area habitats, 2) use of those habitats by indigenous fauna, 3) more distant mine-related impacts, or 4) any continuing hazards to wildlife. Other than access roads, there was little evidence of mining activity external to the permit area. A high quality of area habitats and their utilization by indigenous wildlife can be inferred given the observed sightings of tracks, scat, nests, and burrows (Cedar Creek, 2006).

1.6 ADDITIONAL MATERIALS CHARACTERIZATION RESULTS

The results of the materials characterization (MWH, 2007) indicated that radium-226 (Ra-226) was elevated above background at one location within the western topsoil stockpile. Given that the material is topsoil, it was not expected to contain constituents above background, and so was re-sampled to verify the previous results. Six samples were collected around the previous sampling location TW-TP2. All samples were collected at approximately two to three feet bgs. One sample was located at the same location as TW-TP2, four were located 25 feet north, south, east and west of TW-TP2, and a fifth was located south of where TW-TP1 was located at the end of that lobe of the pile (see Sheet 1 of the Drawing set). All results for Ra-226 were from non-detect (<1.0 pCi/g) to 1.1 pCi/g and uranium ranged from 0.96 to 1.53 mg/kg, similar to results obtained from the background reference area (MWH, 2007). The results of the verification analyses indicated that the previous result was anomalous, and that soils within the topsoil stockpiles contain concentrations of radium and uranium within to the range of background concentrations.

The borrow area selected for use during closeout of the Site is located to the west of the western topsoil stockpile within UNC-owned land. Soil samples were collected for laboratory analysis from the area in accordance with the *Materials Characterization Plan* (MWH, 2007). A total of 10 samples were collected from five locations, as shown on Sheet 2. The samples were composite-sampled from 0-2 and 2-4 feet bgs, and were analyzed for Ra-226 and total uranium. Two representative samples

were also collected for agronomic parameters. Results pending …

2.0 CLOSEOUT PLAN COMPONENTS

This Closeout Plan was prepared following the guidelines presented in the document *Closeout Plan Guidelines for Existing Mines* (MARB, 1996) that are part of the MARP. Components of the Plan are intended to reclaim the Section 27 Mine to post-mining land use of livestock grazing that would also be consistent with future mining. The general components of the Plan include the following:

- Regrading of non-economic storage areas
- Removal and on-site burial of the ore stockpile and ball mill reject pile materials
- Removal and on-site burial of the remaining foundations on site
- Sealing the shafts and vent holes
- Revegetating all disturbed areas.

Closeout plan components are discussed in the following sections.

2.1 EROSION CONTROL

Erosion from the Site will be controlled by regrading surfaces to promote non-erosive runoff and to reduce run-on from the adjacent hillside. Temporary sediment control structures such as sediment control basins, straw bales, and silt fences will be installed prior to reclamation. The structures will be maintained for the duration of reclamation activities and will be removed once reclamation is complete. Typical placement locations for these structures are shown on Sheet 4, *Reclamation Topography 1*.

2.2 REGRADING AND COVERS

Regrading at the non-economic storage areas will consist of flattening the existing embankment slopes to promote sheet flow runoff and revegetating the surfaces to reduce erosion. As shown on Sheets 4 and 6, side slopes of the piles will be recontoured to slopes ranging from approximately 3H:1V to 4H:1V. Regrading will be performed to balance cuts and fills.

2.2.1 Non-economic Storage Area 1

Non-economic Storage Area 1 will be regraded to have side slopes 3H:1V or flatter. The top of the pile will be regraded to slope slightly toward the regraded embankment at a slope of less than two percent. Prior to regrading, concrete foundations for the entire site will be demolished and placed in the designated disposal areas adjacent to the pile as shown on Drawing 3. During regrading, material in the pile will be used as cover for the buried debris.

Once the final contouring has been completed, a 36 inch cover will be constructed over the whole of the Non-economic Storage Area 1. The cover will consist of 26 to 28 inches of material from the on-site borrow area plus approximately 8 to 10 inches of topsoil from the topsoil stockpiles. The cover material will be placed uniformly on the regraded areas prior to the placement of fertilizer and seed for revegetation.

The reclaimed configuration of the pile was analyzed for geotechnical slope stability using the Slope/W model. Circular failures were analyzed by the model at one cross-section location using Bishop's method. Input parameters for the model were estimated using typical properties for waste rock, and included a unit weight of 110 pounds per cubic foot, an internal friction angle of 33 degrees and a cohesion of zero. Typically acceptable factors of safety for long-term stability range from 1.3 to 1.5, and flattening of the side slopes through regrading will result in a factor of safety greater than 2.5.

The location of the analyzed cross-section and output from the Slope/W model are contained in Appendix A. A more detailed cross-section is shown on Sheet 6 of the Drawings.

2.2.2 Non-economic Storage Area 2

Non-economic Storage Area 2 will be regraded in place, balancing cut and fill quantities. The sides of the pile will be regraded to slopes of 3H:1V or flatter to blend in with the surrounding topography, especially on the north end of the pile. To the extent possible the salt brush at the toe of the south end of the pile will be left in place to provide erosional stability. At the north end of the pile the small material piles will be regraded to blend them into the surrounding topography.

Once the final contouring has been completed, a 36 inch cover will be constructed over the whole of the Non-economic Storage Area 2. The cover will consist of 26 to 28 inches of material from the on-site borrow area plus approximately 8 to 10 inches of topsoil from the topsoil stockpiles. The cover material will be placed uniformly on the regraded areas prior to the placement of fertilizer and seed for revegetation.

A geotechnical stability analysis was performed for the regraded configuration using the same approach, methods and material properties that were used for Non-economic Storage Area 1. Regrading of the pile will result in a long-term stability of greater than 2.5. Stability modeling output is contained in Appendix A. A more detailed cross-section is shown on Sheet 6 of the Drawings.

2.2.3 Topsoil Stockpiles 1 and 2

Soil from the topsoil stockpiles will be placed over the regraded non-economic storage areas prior to placement of fertilizer and seed. The stockpiles currently contain approximately 9,200 cubic yards of soil, sufficient to cover the regraded piles and other disturbed areas with a topsoil thickness of approximately 8 to 10 inches.

2.2.4 Ball Mill Reject Pile

The material in the Ball Mill Reject Piles (see Sheet 2) consists of coarse sands, gravels, cobbles and mill ball debris. The pile will be relocated to the trenches at the base and middle of the non-economic storage area, which is included in the regrade surface shown on Sheet 5[shown where?]. During excavation, all soils with levels of radiation above the range of values we detected in the background reference area will be relocated, which will be controlled by the use of gamma surveying, as explained in Section 3.0. Subsequent to excavation of the areas, the area will be revegetated.

2.2.5 Ore Stockpiles

Two stockpiles of ore are currently located to the southwest of Non-economic Storage Area 2 (see Sheet 2). The stockpiles consist of gray-colored medium to coarse-grained sands with cobbles and gravels. The stockpiles will be relocated to the trenches at the base and middle of the non-economic storage area. During excavation, all soils with levels of radiation above the range of values detected in the background reference area will be relocated, which will be controlled by the use of gamma surveying, as explained in Section 3.0. Subsequent to excavation of the areas, the area will be revegetated.

2.2.6 Borrow Source

As indicated in Section 1.0, the borrow source that will be used during construction is located to the west of the western topsoil stockpile, as shown on Sheet 4 of the Drawings. The area is approximately 400 by 400 feet and will be excavated from three to four feet bgs. In the proposed configuration,

there is up to 10,000 cubic yards of material available. Additional material could be made available by expanding the borrow area, to the west, south, or beneath the western topsoil stockpile. Prior to use of the borrow material, the top layer of topsoil (approximately six to eight inches) will be stripped off and placed to the side of the borrow area. Once construction is complete, the topsoil will be placed back onto the borrow area, and the area will be minimally regraded, as necessary, to reclaim the area, ensure revegetation success, and ensure positive drainage.

2.3 FOUNDATION DEMOLITION AND REMOVAL

Closure of the mine was completed in 1988, leaving several foundations in place, as shown on sheet 2 of the Drawings. With the exception of the ore loading pull-through at Shaft #2, all structures will be demolished and placed in the designated disposal area shown on Sheet 4. At the request of the landowner, the Shaft #2 pull-through will remain on site for use as a livestock watering trough. The remaining on-site power lines and all but four power poles will be removed and salvaged.

2.4 SHAFT AND VENT HOLE RECLAMATION

The two shafts and three vent holes will be reclaimed by plugging and capping with a system consisting of polyurethane foam, concrete and steel. A conceptual drawing of the vent hole and shaft plugs is shown on Sheet 7, *Typical Vent and Shaft Plug Detail.*

Shaft #1 has a diameter of approximately 5 feet and Shaft #2 has a diameter of approximately 12 feet. Vent Holes #1, #2 and #3 all have diameters of approximately five feet. All five features have above-ground access hatches consisting of steel and concrete. Prior to plugging, the above-ground features will be demolished to grade. The areas around each shaft and vent will be regraded as necessary to match the adjacent topography.

Once the final contouring has been completed, the vents and shafts will be covered with two feet of material consisting of 14 to 16 inches of cover material from the on-site borrow area plus approximately 8 to 10 inches of topsoil. The material will be placed uniformly on the regraded areas prior to the placement of fertilizer and seed for revegetation.

2.5 ROAD RECLAMATION

Currently the only road remaining within the mine permit area is the main access road that connects Shafts #1 and #2. This road will be left in place for landowner access. Any other temporary haul roads will be reclaimed by ripping and regrading the surface at the completion of reclamation activities and seeding with the native seed mix used in other revegetated areas.

2.6 REVEGETATION

Areas impacted by regrading, material removal, shaft and vent hole reclamation and foundation removal will be revegetated. Revegetation is intended to provide stability against wind and water erosion by establishing a self-sustaining plant community. Soils in the revegetated areas were sampled for agronomic analysis as part of the Materials Characterization (MWH, 2007) to determine suitability as a growth medium, and were shown to be suitable for plant growth. A crimped mulch with seed mixture prescribed below will be applied to conserve soil moisture and protect the soil from erosion. Revegetation will take place between June and September. Approximately eight acres will be revegetated as part of this Plan.

Revegetated areas will be seeded with a mixture that contains native grasses and forbs and will produce a self-sustaining plant community that does not depend on external inputs of water or fertilizer. Specific species, composition percentages, seeding rates and amendments will be based on

the results of the *Vegetation and Wildlife Evaluation/Revegetation Recommendations Report* (Cedar Creek, 2006). The evaluation was performed in the areas around the Site that currently have a similar land use of cattle grazing, consistent with the planned land use for the Section 27 site. Based on the results of the vegetation survey (see Table 12 of Cedar Creek, 2006) and revegetation activities previously performed at the adjacent Philips Mill Site, the species listed in Table 2.1, *Revegetation Species and Percent Composition* will be used in the seed mix for the Section 27 site.

TABLE 2.1
REVEGETATION SPECIES AND PERCENT COMPOSITION

Species	Seeding Rate (lbs PLS/ac)
65 Percent	
Western wheatgrass	1.50
Alkali Sacaton	0.75
Blue Grama	0.50
Galleta	0.50
Thickspike Wheatgrass	1.00
Indian Ricegrass	1.00
Sideoats Grama	1.00
Bottlebrush Squirreltail	0.25
29 Percent	
Desert Globemallow	0.75
Palmer Penstemon	0.50
Rocky Mountain	0.25
Lewis Flax	1.00
6 Percent	
Fourwing Saltbush	2.00
Winterfat	2.00

Revegetation success will depend in part on landowner activities and livestock use at the Site. Revegetation will be considered complete based on documentation that the quantities of seed and any applicable amendments applied to revegetated areas met or exceeded the recommendations in the *Vegetation and Wildlife Evaluations/Revegetation Recommendations* document (Cedar Creek, 2006). Revegetation success will be assessed by monitoring and eventual testing including sampling of ground cover and where appropriate, production and woody plant density, within the permit area and in the Grassland reference area to provide comparison parameters. Monitoring and evaluation of revegetation success will be conducted in accordance with the recommendations presented in the document *Vegetation and Wildlife Evaluation/Revegetation Recommendations Report* (Cedar Creek, 2006), and will include the calculation of species diversity from ground cover data using systematic ground cover sampling (Cedar Creek, 2006).

2.7 REGULATORY COMPLIANCE

A stormwater discharge permit (NPDES) for construction activities will be obtained as required prior to implementation of this Plan. Temporary erosion control measures such as straw bales, silt fences and sediment basins will be placed as needed prior to the start of construction and will be removed once construction has been completed. Erosion control measures will be maintained for the duration of construction. Dust will be controlled by periodically watering haul roads and any disturbed areas producing dust.[water source?]

Comments on the Section 27 Site Assessment were received from the Historic Preservation Division (HPD) of the New Mexico Department of Cultural Affairs pertaining to two archeological sites that are located to the north of Non-economic Storage Area #1 (letter dated April 13, 2004) in which HPD requested that an archeologist assess the condition of the sites and any impacts from the

proposed closeout operations. Lone Mountain Archeological Services, Inc. (April 2005) issued an assessment that indicated no concern with respect to the Closeout Plan. Both sites are outside of the permit boundary and any area that will be affected by the closeout activities

2.8 SITE ACCESS CONTROL AND FENCING

The Section 27 Mine is located entirely on privately-owned land. Access gates are currently in place and prevent public access to the Site. The gates will remain in place as part of the final reclamation of the Site. Fences that are currently in place will be demolished as part of the Closeout Plan and replaced with a new fence along the permit boundary. The new fence will be constructed as per Bureau of Land Management guidelines (BLM 1986). As per the BLM guidelines (BLM, 1986) and the site-specific conditions, the fencing specifications will be based on the multiple use standard for "cattle and sheep (requires extreme restriction of livestock movements)" with deer being the predominant game species. These specifications include the following:

- No. of wires: 4
- Maximum height.: 40"
- Wire spacing: 16, 6, 6 & 12 inches
- Wire type: top smooth, others barbed
- Post spacing: 16.5 to 30 ft
- No. of stays between line posts: 1-4

UNC executed an Access Agreement with the property owner on December 16, 2003 to perform the activities described in this Plan.

3.0 RADIOLOGICAL SURVEYS

Gamma radiation scan and static surveys will be conducted during the closeout: construction and post-reclamation phases of work. The construction survey will be used to guide excavation and ensure that all soils with radionuclide levels greater than the range of background concentrations have been removed and placed in the non-economic storage areas. The post-reclamation survey will be conducted after the completion of the construction and final grading activities to verify that soils with elevated gamma levels have been removed from the excavated areas and that the cover systems over the non-economic storage areas attenuate gamma radiation levels equivalent to the range of background levels. Standard Operating Procedures for the gamma radiation surveying are included in Appendix B. Radiological surveying will be conducted during construction at the Ball Mill Reject Piles and the Ore Stockpiles to ensure that all soils with elevated gamma radiation levels are excavated and removed from those areas. The post-reclamation verification survey will be conducted at these areas, and over the non-economic storage area covers.

The construction control gamma radiation survey will consist of a scan radiation survey in combination with static measurements to guide excavation in lifts until the soil with elevated gamma radiation levels has been removed. The scan survey will be performed with the detector at approximately 12 inches from the ground surface in a serpentine pattern along a transect or within subdivided areas at a rate of about one to two feet per second with the audio speaker set to 'on' to identify any locations with an elevated level count rate by audio response and digital count rate display. The excavation will be repeated in lifts as necessary until the scan radiation survey indicates that all soil with elevated gamma radiation levels has removed. One-minute static gamma radiation level measurements will be performed within the excavation areas following the final excavation lift and scan radiation survey. The static radiation level measurements will be recorded in the appropriate field form. When the radiation scan and static measurement levels at all points are equivalent to concentrations in the background reference area, excavation in the area will be considered complete and ready for the verification survey. The static radiation level measurements may be used as a part of the final status survey.

The post-reclamation verification survey will be conducted on the constructed non-economic storage areas covers, as well as over the excavated areas (Ball Mill Reject Piles and Ore Stockpiles). The survey will consist of static direct gamma radiation level measurements on a regular square grid with 80-foot spacing between grid nodes in each area. The grid nodes will be field located using a GPS and recorded on field forms. A daily function check of the instruments will be performed. The minimum detectable concentration (MDC) for the static radiation survey will be calculated using the daily background count rate. A one-minute static direct gamma radiation level measurement with the collimated detector held approximately 12 inches above the ground surface will be performed at each 80-foot grid node. In the unlikely event that any of the readings are elevated, the location will be investigated using a scan radiation survey and marked for addressing residual impacts.

All gamma ray exposure rate measurements will be collected by a certified Radiation Safety Officer (RSO) using a Ludlum Model 19 Micro R Meter. The meter will have a calibration within the past year to a Cesium-137 source. A visual inspection of the instrument and a function check using a Cesium-137 source will be conducted daily prior to usage. An equivalent meter may be substituted for all or portions of the radiological survey.

4.0 FINANCIAL ASSURANCE COST ESTIMATE

4.1 INTRODUCTION

This section provides an estimate of reclamation costs and supporting documentation for executing this Plan. UNC will use the reclamation cost estimate to provide a basis for the financial assurance to close the Section 27 Mine in accordance with the financial assurance requirements for non-coal mining contained in NMAC Title 19, Chapter 10, Part 12. The reclamation cost estimate reflects the cost of engaging a third-party contractor to complete the Section 27 Mine Closeout Plan as described here.

4.2 COST ESTIMATING METHODOLOGY

The cost estimate was prepared in general accordance with the *Handbook for Calculation of Reclamation Bond Amounts* produced by the U. S. Department of the Interior Office of Surface Mining (OSM, 2000), as well as Attachment 4 of the *Closeout Plan Guidelines* (MARB, 1996). Costs were determined for each reclamation item using the "bottom-up" method. This robust method of estimating uses equipment productivity and project specific wage and equipment rates to compute a unit cost. Unit costs were based on productivity parameters and rental equipment rates to provide a reasonably conservative cost estimate.

The cost estimate includes direct and indirect construction costs for reclamation. Direct costs are for the equipment, labor, and permanent materials directly involved in the physical construction of specific reclamation items. Indirect costs are for those items not directly involved in the physical construction but are needed for the orderly and safe completion of the work.

Direct cost construction items were categorized into the seven main reclamation components listed below:

- Site preparation
- Hauling materials for disposal and to provide cover
- Regrading
- Foundation and portal demolition
- Vent and shaft plugging
- Reclamation of disturbed areas
- Revegetation
- Installation of permanent facilities
- Post-closure operations and maintenance

Indirect cost items include:

- Contractor mobilization and demobilization
- Contingency
- Engineering redesign fee
- Contractor profit and overhead
- Project management fee
- State of New Mexico procurement cost

Cost for the gross receipts tax was excluded from the estimate since the State of New Mexico is exempt from the gross receipts tax in accordance with the New Mexico Gross Receipts and Compensation Act, as per NMAC Chapter 7, Article 9, NMSA 3.2.100.9.

4.3 RECLAMATION SEQUENCE

The cost estimate was developed assuming that reclamation activities will follow the general sequence listed below:

- Mobilization
- Site preparation and installation of sediment controls
- Consolidation of the ore and ball mill reject stock piles with the non-economic storage areas
- Foundation and vent/shaft demolition and consolidation in the non-economic storage areas
- Regrading non-economic storage areas
- Vent and shaft plugging
- Placement of cover material over non-economic storage areas and vent and shaft areas
- Final grading and contouring
- Topsoil placement
- Fence repair/replacement
- Revegetation

In accordance with this Plan, the existing access road and ore loading pull-through at Shaft #2 will be left in place.

4.4 QUANTITY TAKE-OFF

Material handling quantities were determined from the conceptual drawings included with this plan. Earthwork quantities were determined using Autodesk Land Desktop software and verified by manual methods. Quantities for other items were determined by manual methods. Earthwork volumes were adjusted in the detailed cost estimates to account for swell for cost estimating purposes. Table 4.1 provides the take-off quantities for earthworks. Take-off quantity calculations are included in Appendix C.

TABLE 4.1
TAKE-OFF QUANTITIES

Item	Description	Quantity (cubic yards)
Ball Mill Reject Pile	Loose stockpile composed of coarse sand, gravel, cobbles, and mill ball debris	760
Ore Stockpiles	Loose stockpile composed of medium to coarse-grained sands, cobbles, and gravels	5,753
Cover material	On-site borrow	10,830(1)
Topsoil Stockpiles	Loose stockpile composed of topsoil	9,210
Non-Economic Storage Area 1	Cut Quantity - Loose stockpile composed of medium to coarse-grained sands, cobbles, and gravels	1,176
	Fill Quantity – Material from regrading and stockpile consolidation	8,049
Non-Economic Storage Area 2	Cut Quantity - Loose stockpile composed of medium to coarse-grained sands, cobbles, and gravels	1,626
	Fill Quantity – Material from regrading and stockpile consolidation	1,331

Notes:
(1) The total volume of cover material required will be approximately 16,260 cy (see Appendix B).

The ball mill reject and ore stockpiles will be used as fill material to obtain the design grades for the non-economic storage area. These materials will be placed at the base and middle of the non-economic storage areas by first excavating trenches in the middle of the piles and then filling them with the material from the ball mill reject and ore stockpiles.

4.5 EQUIPMENT RATES

Earthmoving equipment consists of typical types of equipment used by construction contractors for mine reclamation. The heavy equipment assumed for cost estimating purposes are listed below:

- 1 – CAT D8R Bulldozer
- 2 – CAT D25D Articulated Dump Trucks
- 1 – CAT 140H Motor Grader
- 1 – Water Truck 4000 Gallon Capacity
- 1 – 966G Loader

Hourly costs for each type of equipment included costs for fuel and maintenance. Weekly rental rates from Wagner Equipment Co. located in Farmington, New Mexico, were used in the cost estimate due to the short duration of the project. Rental rates are normally at higher cost than owned equipment, adding conservatism to the estimate.

Fuel costs were based on a diesel price of $4.50 per gallon based on New Mexico state-wide averages and current 2008 fuel price trends. Maintenance costs were based on values presented in the Caterpillar Performance Handbook, Edition 31, and experience.

4.6 LABOR RATES

Labor will include heavy construction equipment operators and general labor for completing the reclamation. The hourly labor rates in the cost estimate include the wage, fringe benefit, and subsistence pay since the Site is in a remote location. The hourly labor rates were taken from the Davis-Bacon wage rates determined by the Department of Labor for McKinley County, New Mexico. The hourly rate for labor in the cost estimate is provided in Table 4.2.

TABLE 4.2
HOURLY LABOR RATES

Type	Group	Wage per hour	Fringe per hour	Subsistence	Total Hourly Rate
General Labor	II	$17.05	$4.75	$4.00	$25.80
Power Equipment Operator	IV	$22.57	$5.27	$4.00	$31.84

The subsistence hourly rate was determined using values from Zone 4 of the Davis-Bacon wages.

4.7 COST ESTIMATE

The cost for reclaiming the Section 27 Mine is estimated to be $324,000, rounded to the nearest $1,000. Table 4.3 provides a summary of the reclamation costs. A detailed breakdown of the costs is included in Appendix C.

TABLE 4.3
RECLAMATION COST SUMMARY

Category	Activities	Cost
Site Preparation	Install sediment control measures such as silt fences, straw bails, and sediment catchment ponds.	$8,606
Regrading	Excavate and haul ball mill reject materials, stockpiled ore material, and perform rough grading of non-economic storage areas to a 3H:1V or 4H:1V. Excavate and cover non-economic storage areas, vents, and shafts with 2 feet of borrow, 1 foot of topsoil, and perform finish grading on non-economic storage areas once covered with topsoil.	$82,076
Demolition and Portal Reclamation	Remove power poles and power lines, remove or cover unwanted concrete foundations on site, and cap vents and shafts.	$22,809
Reclamation of Disturbed Areas	Regrade areas disrupted by mining or reclamation activities to natural topography, cover with topsoil when necessary, and plant native vegetation.	$2,364
Revegetation	Seed and monitor progress of native vegetation planted on non-economic storage areas and disturbed areas.	$48,866
Installation of Permanent Facilities	Upgrade existing access road to allow for permanent access, and install perimeter fencing. Type of fencing is to be approved by the EMNRD prior to construction.	$19,565
Direct Closure Construction Cost Subtotal		**$184,000**
Direct Post-Construction Closure Monitoring Cost		**$39,000**
Indirect Construction Cost		**$101,000**
Total Estimated Reclamation Cost		**$324,000**

Indirect costs are based on a percentage of the direct construction costs. Table 4.4, *Summary of Indirect Costs*, provides a description of indirect cost items, range of typical values, and selected cost for the cost estimate.

TABLE 4.4
SUMMARY OF INDIRECT COSTS

Item	Description	Range[1]	Selected[2]	Indirect Cost[3]
Mobilization and Demobilization	Moving equipment to and from the Site, setting up construction support facilities, and construction permits	5% to 10%	10%	$18,400
Contingencies	Allowance to cover costs resulting from unexpected natural events and uncertainties	10%	3%	$18,400
Engineering Redesign Fee	Develop detailed construction documents and perform surveying	2.5% to 6%	2.5%	$4,600
Contractor Profit and Overhead	Third party profit, field support and supervision	10% to 30%	25%	$46,000
Project Management Fee	Inspect and supervise work performed by the contractor	2% to 7%	6	$11,040
New Mexico State Procurement Cost	Cost for state to retain a qualified contractor	Note 4	1.6%	$2,944
Subtotal Indirect Costs				**$101,000**

Notes:
1. Indirect costs are computed as a percentage of direct costs. The range of indirect percentages is suggested by the Office of Surface Mining (OSM, 2000).
2. The selected percentage of direct cost for the Section 27 Mine reclamation cost estimate.
3. The selected percentage multiplied by the direct closure construction cost subtotal.
4. Internal New Mexico State management cost for soliciting construction bids and selecting a reclamation contractor. The percentage is based on other New Mexico State reclamation cost estimates.

The rationale for selecting the specific percentage for determining the indirect cost is provided below:

- Mobilization and Demobilization: Higher percentage since the project is small and a remote location.
- Contingencies: Equal to the recommendation in the *Closeout Plan Guidelines* (MARB, 2006). Roy, we originally had this at 2-5%. The MARB Guidelines recommend 10% for smaller projects, so I change it to that. 10% seems reasonable.
- Engineering Redesign Fee: Lower percentage since there is good mapping and a complete reclamation design.
- Contractor Profit and Overhead: Higher percentage since the project will be small.
- Project Management Fee: Higher percentage since the project will be small.

4.8 COST ESTIMATE CONFIDENCE

The scope of work presented in this Plan provides the basis for the reclamation cost estimate. The reclamation costs are prepared based on industry-wide standards applicable to the local area, and are conservative in nature. This Plan provides the estimate of cost and supporting documentation for a third party to reclaim the Section 27 Mine in the unlikely event of forfeiture. There is a high level of confidence that a third-party contractor or UNC itself could complete the reclamation at or below the cost provided herein. This cost estimate was prepared for financial assurance purposes and is reasonably conservative. Actual construction costs may be lower.

5.0 CLOSEOUT PLAN SCHEDULE

Implementation of the Section 27 Closeout Plan will begin after it has been approved by the MMD. Prior to the start of construction the following items will be performed:

- Completion of an NPDES permit
- Additional design details, as needed, for the cover construction, and construction of the vent and shaft plugs.
- Preparation of bid package including construction drawings and construction specifications.

A specific reclamation schedule will be developed by the contractor during the construction bidding process. The general schedule for construction is expected to be as follows:

Weeks 1-2:

- Mobilization
- Installation of sediment controls
- Demolition and removal of foundations, buildings and miscellaneous structures

Weeks 2-3:

- Excavation of the ore stockpile and ball mill reject pile and consolidation in the non-economic storage areas
- Regrading of the Non-economic Storage Areas

Weeks 3-5:

- Final contouring
- Topsoil and borrow placement
- Fence repair/replacement
- Surface preparation and revegetation

6.0 REFERENCES

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