2002 Nomination Report for
Cove 3 - Phase 2 AML Reclamation Project
Cove, Arizona

Submitted by:

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Project Start Date:	August 13, 2001
Project Completion Date:	December 24, 2001 (total of 135 Calendar Days)
Contract Cost:	$1,270,700
Contractor:	Lansing Construction & Triad Western Constructors, A Joint Venture

Nomination Submittal Date: March 15, 2002

NARRATIVE DESCRIPTION OF THE AML PROJECT WORK

1. Brief History / Background of Cove AML Problem

The Cove 3 project is located within the mountainous terrains of the Chuska and Lukachukai mountains at an elevation ranging between 7,400 to 7,600 feet above sea level and southwest of Cove, Arizona. Companies that include F.A. Sitton, Navajo Uranium, VCA and Kerr McGee mined uranium outcrops originating from the Saltwash member of the Morrison formation of the Jurassic Age. Mining occurred during the 1940's until the late 1960's, and Navajo individuals were the primary labor force. The miners used wheelbarrows to haul the ore to the entrance of the portal with a typical distance ranging between 200 to 2,000 feet. It is estimated that more than three million pounds of uranium ore and 14 million pounds of vanadium ore were produced during the mining operations. The local Navajo worked hard and strenuously with minimum pay and were exposed to harmful dosage of radiation without their knowledge.

The mining operations had a major impact on the local community in terms of the employment. Little did they know about the unknown dangers associated with the uranium industry. Only in retrospect, the impacted communities and the Navajo Nation have begun to understand the impacts and have witnessed huge losses of numerous men who worked in the mines. The reclamation work currently performed is of minor significance to the communities but very appreciative of the Navajo AML reclamation efforts.

The mining operations created an impact from a human and environmental perspective with numerous scars left behind are very evident. Due to the lack of federal oversight and regulations, multitude of physical hazards exist such as deep and dangerous portals, incline and vertical shafts, unstable highwalls, benches, rimstrips, radioactive mine waste piles and polluted water that has caused massive environmental degradation. These hazards pose extreme dangers to the local Navajos, livestock and wildlife. Without proper knowledge of health and environmental risks, they were exposed to a wide variety of radiation anomalies while grazing their livestock. Livestock and wildlife utilized the mines for shelter during hot or inclement weather and drank contaminated water.

Prevalent land use is open grazing, hiking, hunting and camping. The mountain range bears spiritual / religious significance to the Navajo medicine people and various areas were used for placement of spiritual offerings and gathering of herbs for healing applications.

2. Description of Reclamation Work

The reclamation activities include a total of eleven AML project areas that addressed Priority 1, 2, and 3 underground and surface mines that were completed in 135 calendar days. The following mine features were addressed: Total earthwork of 99,000 cubic yards of dangerous piles and embankments, cover material, drainage structures, and one subsidence; closure of 50 portals, one prospect, and one vertical shaft closure using Polyurethane Foam (PUF); closure of 4 portals utilizing a combination of cinderblock bulkhead and drain fields; and

the revegetation of 18.5 acres. Highwalls and mine related cliffs are heavily associated with the portal / rimstrips and waste piles are located on steep slopes just outside the mine features.

During construction, the Contractor was provided with site radiological characterization maps necessary to follow the selective handling sequence and comply with in-house radiological clean-up guidelines. The portals, prospects and subsidence were closed either by backfilling or with a PUF plug. Waste piles were utilized to backfill the portals, rimstrips and highwalls or hauled to designated burial pits and covered with clean soil material. Other common work performed at the site(s) include access road improvements, contouring and rough grading of all disturbed areas, removing all refuse and waste generated by reclamation activities.

Specific Problems and Innovative Solutions

Value Engineering Assessments- Due to mountainous site locations and difficult terrain, site assessments were very difficult to perform. Additional process time was required to complete the inventory assessment to the technical specifications development phase. Each specific mine feature and associated work unit had to be identified and conveyed onto respective maps. Numerous site visits and discussions by the Value Engineering Team were necessary to finalize the Technical Specifications.

Biological Restrictions- Schedule for most project areas were completed within a limited and specific time frame due to existing Threatened and Endangered Species and winter weather conditions. On-going monitoring of the Mexican Spotted Owl (MSO) impacted seven project sites. Biological restrictions were typically from March 1, 2001 to August 31, 2001 thus allowing only six months to complete the project development and construction. The winter weather usually arrives late November until March leaving only two months for construction season.

Navajo AML Reclamation staff had to plan properly to complete the project and to work very closely with the Department s Biologist and regulatory agencies to address these restrictions. Protected Activity Centers (PAC) for MSO was established for protection and recovery. The PAC areas include: no destruction / harvest of trees greater than 9 inches; access roads upgraded only for construction access and no use of campfires. PAC areas were also designated and allowed personnel to access non-impacted projects only at a specific time.

Partnering Concept - The construction schedule allowed the crew to work concurrently on multiple projects on four day / ten hour shifts and on weekends to make the most of the good working weather. Navajo AML accommodated the Contractor by working overtime / flextime and this maximizes construction time. The Contractor had problems retaining qualified personnel due to long travel distances up to 75 miles one way per day. Constant Partnering meetings and on-site decision-making with Contractor also contributed to the project completion.

Construction Difficulties

The terrain exhibit steep narrow canyons with sheer vertical relief creating multi-level

benches and limited working space for personnel and construction equipment. The Contractor often used smaller size earthmoving equipment to maneuver on these sites. Over time, the sites had growth of natural vegetation thus having to reestablish access routes.

As part of the scope-of-work, two main requirements are water and a source of cover material. The water was obtained from off-site sources and hauled / stored in typically in 10,000 gallon tanks at the project site. The one-way water hauling distance was 30 miles. Water is utilized for backfilling compaction and for dust control. Mine waste was used to backfill the dangerous highwalls and portals eventually covering excess waste with clean fill material. Prior evaluation of geologic formation ensured cover material would not expose natural uranium outcrop.

Some portals required using PUF material for closure in an effort to minimize environmental degradation. The Technical Specifications further required the Contractors to manually deliver all materials to the site that involved hiking and horseback delivery. Following the PUF closure, the exterior was backfilled with native stone thus developing a natural appearing rock wall protecting the PUF material from ultraviolet light.

Health and Safety Concerns

The Health and Safety Plan developed by the Department and eventually with the Contractor encountered numerous concerns were addressed which are as follows:

o Unforeseen dynamite, blasting caps and fuses (explosives), shut down procedures, and disposal of the explosives.

o Safety while working at the edge of the cliffs by personnel and equipment, procedures for berms, spotters, tying off, slope stability.

o Delivering PUF and materials down 200 feet drop in elevation, vertical cliffs, and dangerous terrain.

o Working at open portal openings and ensuring adequate ventilation, check for gases, procedures to limit exposure to radiation from natural outcrops and radon / progeny.

o Highwall stabilization above portals and access roads.

o Unknown wildlife that may be within the interior of the portals (bears, snakes, etc.)

Navajo AML currently maintains an in-house Health Physics and Instrumentation and Monitoring Plan (HPIMP). This HPIMP was necessitated because of our past reclamation work has been with uranium mines, thus maintaining personnel exposure As Low As Reasonably Achievable (ALARA). All staff and contractors received four hours of Radiological and Health / Safety orientation. Prior to construction activities, all personnel are required to submit an initial bioassay sample and an exit sample to monitor internal radiation exposures. Random quarterly

samples are collected from a percentage of the crew and thermoluminscent dosimeter (TLD) badges are utilized on quarterly basis as well. On site monitoring was conducted with radiation detection equipment to monitor personnel and equipment for contamination (gamma and beta radiation) coupled with air sampling for air borne contaminants. Personal protective equipment (PPE) such as tyveck coveralls and respirators were also utilized. Engineering controls, such as dust suppression with water was the best method and if this was not working then job shutdown were initiated.

Drainage and Erosion Problems

With project sites located at the edge of the mesa, drainage had to be addressed that included very small watersheds and other larger areas exceeding 5 acres in size. Two portals had standing water and seepage. One portal had water flowing at 15 gallons per minute for two days and all work was halted. Eventually, the seepage from the portals were addressed with 6 inch PVC pipe and 2 inch corrugated steel pipe to allow continual flow / drainage. A couple of gravel drainage filters were installed for decontamination of water.

The main erosion control structures implemented were diversion berm / channels, riprap, rough grading, natural vegetative mulch, and re-vegetation. The berms were designed to address watershed that were small in area. The natural drainage were kept in place or diverted away from the reclaimed areas using compacted earthen material. The channels and riprap were utilized on larger water sheds. Rough grading was practiced on all areas that were disturbed and tracked by heavy equipment (dozer) with all slopes of 3:1 to minimize water runoff. Natural vegetative mulch from grubbing operation, trees and boulders were stockpiled and placed on final contours. The sites were revegetated with a native seed mix.

Wildlife Concerns

The Chuska and Lukachukai mountain range is home for most wildlife. There were concerns of wildlife using portals for shelter and the installation of wire mesh was implemented to discourage access primarily by bats. This method of exclusion has protected the wildlife by not being entombed during the construction.

During one mesh closure, evidence of bear tracks leading into the portal was discovered that included torn mesh. Careful observation prevented the loss of the black bear and any accident during construction.

Aesthetic Concerns

The reclamation plan included re-vegetation and contouring disturbed areas for aesthetic purposes. Contouring eliminated any sharp or rough edges of the buried cell material and blend in with the landscape eliminating new drainages from developing.

Hydro seeding and hand broadcasting were methods used for re-vegetation. The seeding rate was doubled to 50 lbs per acre. Hay / straw mulch were applied at 2 tons per acre over the seeded areas. Tracking a dozer to crimp the straw mulch in place stabilized this mulch. At

times, high-speed canyon winds prevented seeding and mulching.

Cultural Concerns

Navajos viewed the earth as their mother. Mother Earth is their protector and provider. The Holy Ones indicated that the earth is also home to many species including all the mammals, reptiles and amphibians. There is a relationship between all species including the humans. Each species have their roles and contribution to the earth. It is expected of the Navajo to care and respect the earth. The disruption in any of the balanced universe such as mining causes disharmony and could lead to illnesses. The Navajo also believe that their home was specifically designated within the four Sacred Mountains located in Arizona, New Mexico and Colorado. There are four worlds the Navajo have journeyed through and believed we are in the last world, the Glitter World. In perspective, past mining activities damaged the Mother Earth, harmony needs to be restored and preserved. In this case, reclamation utilizing technology (Glitter World) has restored the harmony and balance among the human and animal.

Another preservation effort is to preserve the past such as the ancient Indian ruins. The project had an archaeological site near one of the mine features. Navajo AML coordinated with Navajo Nation Archaeological Department and the Historic Preservation Department in identifying and establishing boundaries for no disturbance zones.

3. Efficiency of the Reclamation Work

The overall project was complicated in nature because of difficult terrain, scope of work, safety & health concerns, and NEPA restriction placed on the project. The construction window was very small due to biological restrictions, standard holidays and winter weather days. However, the project completed all the major work items specified in the Technical Specifications.

Effectiveness and Innovation of the Reclamation Design and Techniques

This was the first time the Department worked in these mountains and with this type of terrain. Early work on the grant writing, inventory, site visits, teamwork, value engineering and partnering efforts proved to be very effective in every phase of the project. The entire project addressed T&E restrictions, weather, inaccessibility, and dangerous location of the mine waste material while incorporating safety concerns.

The project incorporated several new methods of project management. The reclamation activities were closely coordinated on a specific timeline for each project and associated subsites. In this way several project sites could be monitored simultaneously, without sacrificing quality, safety, cost, and overall project management. The Department implemented concepts such as multi-task / skills project managers, project management software and cross training of field staff on every aspect of the project. This included utilizing all current technologies available such as GIS/GPS integrated with SurvCADD/CAD systems, latest models of conventional survey equipment, up to date personal computer work stations, and OSM sponsored training.

During bidding phase the Department developed a visual aid (powerpoint slides) and graphical, assisting the bidders with competitive bids due to T&E restrictions.

4. Benefit to the Land Owner, Local community and Wildlife

This project fulfilled the objective of SMCRA in eliminating the dangerous mine features and addressing the environmental impacts while ensuring the protection of the public, livestock and wildlife.

The contractorÆs Navajo workforce received decent wages that help the local economy and ease the high unemployment situation. The Department gained valuable reclamation experienced which can be applied to future projects.

Again, the Navajo people view themselves, their world and environment as an interconnected whole system including religion, concepts of health and harmony with nature.