

State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

John Bemis
Cabinet Secretary

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Fernando Martinez, Director
Mining and Minerals Division



February 12, 2013

Dear Potential Bidders:

The Abandoned Mine Land (AML) Program is soliciting bids for the **Oscura Mine Maintenance Project** (EMNRD-MMD-2013-04) located near Carrizozo, New Mexico.

This is considered a small construction project and the maximum bid amount that will be considered is \$20,000 including New Mexico Gross Receipts Tax. The engineer's cost estimate for this project is \$6,000.

The scope of work will consist of the following:

1. Access:

There old road to the mine site is no longer in an accessible condition. The Contractor must hand-carry all materials and tools to the site from the nearest road (approximately 1/3 mile). This will probably require the culvert to be delivered in sections.

2. Construct Culvert with Gate:

The Contractor shall muck open the existing adit as necessary for construction. The Contractor shall not damage the existing timbers. The Contractor shall construct and install the culvert with bat gate as shown in Figure 2. The steel plate for the bat gate shall be ASTM A588 or ASTM A242 (weathering) or ASTM A847 or ASTM A606, Type 4 (weathering). The Contractor shall submit to the project engineer mill certifications for all steel used in the gate prior to fabrication. All welding shall be consistent with AWS D1.6, "Structural Welding Code." Field welders shall be AWS certified. The Contractor shall also use the attached specifications for the polyurethane foam.

3. Safety:

The Contractor shall follow appropriate procedures in accordance with OSHA regulations.

4. Bidding contractors must have a current and appropriate Contractors License with the State of New Mexico and provide proof of current liability insurance if selected.

5. The bid will be lump sum and include all work and materials necessary to complete the job and the bid amount must include New Mexico Gross Receipts Tax.
6. Bidders who are subject to the Pay Equity Reporting Requirement shall complete and sign the applicable pay equity form (PE 10-249 or PE250) and submit the form with their bid. Bidders who fall within the exception to the Pay Equity Reporting Requirement shall submit an affirmative statement with their bid indicating they are not subject to the Pay Equity Reporting Requirement, and list which exemption they fall under.
7. The Contract will expire September 28, 2013.
8. No pre-bid meeting is scheduled. However, if you would to see the work location before bidding, the Project Engineer can arrange a site visit for you.

All interested parties may mail, e-mail, or fax a bid (including Gross Receipts Tax) to:

EMNRD Abandoned Mine Land Program
Attention: Mike Tompson
1220 South Saint Francis Drive
Santa Fe, New Mexico 87505

Fax: (505) 476-3402
e-mail: mike.tompson@state.nm.us

At least three Contractors will be notified for bidding on this contract, and one Contractor will be selected with the lowest reasonable bid. The deadline date for receipt of bids will be no later than **March 14, 2013 at 5:00 pm**.

If you have any questions, please call me at (505) 476-3427 or e-mail mike.tompson@state.nm.us.

Sincerely,

Michael W. Tompson, P.E.
Project Engineer
Abandoned Mine Land Program
Mining and Minerals Division

cc: John Kretzmann, *AML Program Manager*
Randall Armijo, *AML Project Manager*
Connie Romero, *MMD Financial Specialist*

DIVISION 13 - SPECIAL CONSTRUCTION

The following sections describe the special construction to be performed under this contract.

13050 - POLYURETHANE FOAM CLOSURES

The following section describes the polyurethane foam (PUF) closures to be installed in the specified mine features. The work consists of installing a bottom form, installing PUF to specifications, backfilling over the PUF to the specified level, and, where required, installing corrugated steel riser pipes with steel grates and ventilation/drainage pipes.

The Contractor shall inform the Project Engineer and Project Manager of the times and places at which PUF is to be placed at least three working days in advance.

13051 - MATERIALS AND EQUIPMENT

Unless otherwise specified, polyurethane foam (PUF) shall have a minimum installed density of 1.85 pounds per cubic foot (p.c.f.). Machine-applied or poured-in-place PUF shall be equivalent to SWD Urethane Co. "SWD 425," North Carolina Foam Inc. "NCFI-811," Foam Concepts LLC, "EFS Equipment-less Foam Sealant", Mine Seal, LLC, "PUF-Seal" or Urethane Contractors Supply and Consulting "SES III 2.0 Pour." Bagged PUF shall be equivalent to Foam Concepts Inc. "EFS Equipment-less Foam Sealant" or Mine Seal, LLC "PUF-Seal,"¹ or approved equal.

PUF characteristics shall conform to the following standards:

PUF CHARACTERISTIC	STANDARD	SPECIFICATION
Density	As specified	ASTM D1622
Closed Cell Content	>85%	ASTM D6226
Compressive Strength	25 psi minimum	ASTM D1621
Water Absorption	0.2 lbs./sq. ft. maximum	ASTM D2842
Exothermic Reaction Rate	Low	-
Fire Resistance	High	-

PUF used in mine closures shall not contain chlorinated fluorocarbons (CFC's) or hydrochlorofluorocarbons (HCFC's).

The proportioning unit shall be capable of attaining a minimum temperature of 125°F and shall be a Gusmer Model H-11 or equivalent¹. For remote project locations, or with the approval

¹ Use of brand names is for the purpose of describing the standard of quality, performance and characteristics desired and is not intended to limit or restrict competition.

of the Project Manager, smaller capacity proportioners will be acceptable. In this event the proportioner shall be the Gusmer FF or equivalent.

Minimum heated hose length from proportioner to gun shall be 80 feet. The hose shall maintain or increase component temperature from the proportioner. Longer heated hose lengths may be required depending upon the distance from the proportioning unit to the reclamation site. Approval of the Project Manager is required for the use of any length of unheated hose on a PUF closure.

The application gun shall be capable of mixing plural components in the proper ratio at the minimum acceptable output of four pounds per minute. The gun shall be a Gusmer AR mechanically self-cleaning design or equivalent. Application guns constructed by individuals or manufacturers not typically used in the PUF industry may be used if warranted by the PUF supplier or manufacturer.

For poured foam, separate component measuring and mixing containers shall be used. Each component shall be assigned a specific measuring container, each marked with a predetermined volume level corresponding to the required mix ratio. The components shall always be measured in the same quantities, the components added in a separate container, and thoroughly mixed using an appropriate mixing device. In all cases, measuring and mixing of poured PUF shall be done in strict accordance with manufacturer's recommendations, including maintenance of recommended temperatures of the components for mixing and placement. The Contractor shall supply a proper thermometer and use it to check each mixed batch.

The manufacturer shall package bagged foam with pre-measured amounts of each component.

Foam shall be used prior to the end of the manufacturer's designated shelf life.

Corrugated steel pipe used for access to or venting of the mine shall be as specified in Division 2. Unless otherwise indicated, corrugated steel pipe shall consist of 14 or 16 gauge galvanized steel pipe with helical or annular corrugations. The pipe shall be free of rust, gaps in seams, holes in the wall, and deformations that reduce the inside diameter by more than two inches.

13052 - MATERIAL SAFETY, HANDLING AND TRANSPORT

Materials shall be stored in accordance with the manufacturer's recommendations. All safety precautions outlined by the Polyurethane Division of the Society of Plastics Industries, NFPA, OSHA, EPA, and the manufacturer's Material Safety Data Sheets (MSDS) shall be observed. MSDS and technical data sheet shall be on-site and available at all times.

There shall be no welding, smoking, or open flames within 25 feet of PUF application. A minimum 15-pound, class ABC, fire extinguisher shall be on site during foam application.

Workers wearing organic respirator masks and safety glasses or goggles shall apply PUF. State or federal regulations requiring additional safety equipment shall supersede these requirements.

The Contractor shall follow all applicable state and local regulations for the transport and use of PUF and chemicals required for cleanup. The Contractor shall obtain any required permits for transportation. In the event of a component leak or spill, the Contractor shall notify the appropriate agencies and jurisdictions.

An oxygen meter shall be used to test air before and during installation of the bottom forms or any other work inside a mine opening. The oxygen meter shall be a National Mine Service (NMS) OX231 oxygen meter or equivalent. The oxygen meter shall continuously monitor oxygen levels and have an audible warning. If the oxygen level falls below 19 percent, all personnel shall withdraw from the working area in the mine until the oxygen content increases to safe levels.

Any remedy for increasing oxygen content of the working area or providing ventilation from the surface shall be determined in consultation with the Project Manager.

13055 - EXECUTION

Debris, dirt, and loose rock in the mine opening shall be cleared wherever PUF will be installed. Historic debris shall be placed neatly to the side of the completed opening. Trash shall be taken to permitted landfill or transfer station. No mine equipment such as skips or carts shall be embedded in PUF.

I. Formwork

The bottom form and cross members may consist of any commonly available building materials capable of sustaining an initial lift of two to four feet of PUF. Acceptable cross member materials include, but are not limited to, reinforcing steel, 2x4's, dowels, cardboard tubes, and fabric air-inflated plugs. Acceptable bottom form materials include, but are not limited to, plywood, cardboard, paneling, and carpeting. Any combination of the above materials will be acceptable. Alternate bottom forms shall be reviewed with the Project Manager prior to use.

The formwork shall be installed at that level specified in the closure drawings or as directed by the Project Engineer following uncovering by the Contractor of the existing conditions within the mine opening. Unless otherwise indicated, cross members may be placed

at an angle no greater than 20 degrees from the horizontal as long as both ends are seated in competent rock. The bottom form shall be set over the cross members.

All bottom forms shall be completed prior to the application of any polyurethane foam. The Contractor shall provide the Project Manager with a list of installed depth to bottom forms for polyurethane foam closures. Any breach in the bottom form caused by rock fall or other reason shall be repaired prior to the arrival of PUF applicators at that site. The Contractor shall be responsible for the integrity of the bottom form and the loss of any polyurethane should it fail.

II. Ventilation/Drainage Pipe and Corrugated Steel Pipe

The ventilation/drainage pipe shall consist of a six-inch diameter Schedule 40 PVC or similar gauge HDPE pipe. The ventilation/drainage pipe shall be cut with a hacksaw across the circumference to create slits no longer than three inches and no less than ¼-inch wide at six-inch increments. Only the portions of the pipe exposed to common fill, granular fill, and lightweight aggregate fill shall be slit.

Four to twelve inches of the ventilation/drainage pipe shall extend above the finish grade, except where otherwise indicated. The six-inch PVC or HDPE pipe shall be encased in an eight-inch steel sleeve in the portion exposed above grade and for two feet below grade, except where otherwise indicated. The annular area shall be filled with concrete or grout.

The ventilation/drainage pipe and corrugated steel pipe for access shall be placed over a portion of the bottom form unobstructed by cross members. In shafts with more than one compartment, the access pipe shall be placed in one of the outside compartments, or as directed by the Project Manager. Both pipes shall be open to the underlying mine void after installation of the foam and shall be supported by a tripod or other load-bearing device such that the load is not placed on the bottom form. Any welding that takes place above the PUF closure shall take place prior to placement of PUF in the mine opening or after installation of the backfill. Under no circumstances shall welding take place over exposed PUF.

The slits made for drainage in the ventilation/drainage pipe shall be covered with visqueen or polyethylene tape during foam application. After application of PUF the visqueen or tape shall be removed exposing the slits. Any foam covering the slits shall be removed to allow an unobstructed flow of water into the pipe.

The corrugated steel pipe shall have PUF covering the outside of the pipe at least two inches thick in the common fill section of the PUF plug. Polyurethane foam may be draped or splashed against the culvert during foam installation to achieve this coverage.

Steel strap with a width greater than two inches shall be welded to the steel sleeve across the opening of the ventilation/drainage pipe in such a manner as to prevent rocks with a dimension greater than two inches from being dropped down the pipe. As an alternative, steel

grating as specified in Division 5 may be cut to fit the opening across the ventilation/drainage pipe and welded in place.

III. Polyurethane Foam (PUF)

The depth of polyurethane foam installed to plug a shaft or stope opening shall be as specified or indicated in the contract documents or as directed by the Project Engineer.

In large pours, PUF can get hot enough to actually melt and even burn. This may leave a hollowed out plug or “eggshell” that has very little strength. The remaining foam will be cracked and discolored, very similar to severe UV damage.

Polyurethane foam shall be installed in lifts with a maximum rise of 18 inches. The lifts shall be installed no sooner than 20 minutes apart (and no sooner than 30 minutes apart for ambient air temperatures above 84°F) and have a maximum lift height of three vertical feet per hour. Installed PUF lifts shall pass through the tack free stage before applying the next lift. At no time shall sprayed or poured PUF cut into the rising foam. The PUF shall be applied in such a manner that the entire void is filled, that shadow zones or voids are not created during PUF application, and that temperatures are not raised to unsafe levels.

The Project Manager may use an infrared non-contact thermometer to monitor exothermic generation. If the ambient air temperature is below 60F, extra time will be required to allow the PUF to fully expand and may prevent each lift from reaching a full height of 18 inches. Every degree of ambient air temperature over 65°F adds at least two degrees to the temperature of the rising foam. Ambient air temperatures above 90°F can cause problems with PUF formation. PUF application shall cease if heating or off-ratio foam is observed. The Contractor shall remedy off-ratio foam and demonstrate proper quality PUF to the Project Manager before application resumes. The surface temperature should reach a plateau and start to drop before resuming foam installation. If using bulk foam, reduce the quantity per bucket as the day heats up.

Bagged or poured-in-place polyurethane foam shall be placed in strict accordance with the manufacturer's recommendations, including the need for thorough mixing of components. If required by the Project Engineer, the manufacturer of bagged or poured-in-place polyurethane foam shall provide a certified representative experienced in the placement of their product for a minimum of one eight-hour day. This representative will direct field operations and instruct the Contractor in the proper mixing, placement, and safety procedures for bagged or poured-in-place PUF.

The surfaces of the void to be filled shall be as free as possible of grease and standing water. PUF shall not be applied to surfaces with running water. Remedial action for such situations shall be reviewed with the Project Manager. Polyurethane foam shall not be applied directly to a debris plug, but shall be applied to a bottom form of known physical and chemical properties. PUF shall not be applied during rain unless the foam is fully protected from interaction with water by a physical barrier.

If off-ratio PUF is observed, the applicator must stop, correct the imbalance, and continue application with the proper ratio PUF. Correction and determination of the foam ratio shall be done on a plastic sheet away from the work area. Any lift of off-ratio PUF comprising over two percent of the intended PUF column heights shall be removed. An amount of off-ratio PUF less than two percent of the specified volume may remain if allowed to cool and if the outer perimeter of off-ratio PUF is removed. If off-ratio foam comprises more than 10 % of the specified PUF volume, five percent of the price bid for the site will be deducted as a penalty.

The Contractor shall be responsible for lost or damaged equipment. Damages or claims arising from PUF overspray shall be the responsibility of the Contractor. Under no circumstances shall foreign material be placed in the PUF material unless specifically specified or authorized by the Project Manager. Non-PUF materials shall be non-toxic and non-hazardous and shall not compromise the strength or water saturation characteristics of the PUF.

Upon reaching the specified grade level for application of PUF, the Contractor shall undertake cleanup of PUF operations.

IV. Field Quality Control

The Project Manager will make periodic checks of the quality of PUF applied. The principal check on quality will be visual. Acceptable PUF shall be tan-white to buff in color with no vesicles and a smooth to coarse orange peel surface. Any one of the following conditions shall cause PUF application to cease and efforts to correct the off-ratio condition begun.

<u>Condition</u>	<u>Possible Cause</u>
Dark PUF color Smooth and Glassy Friable or Brittle PUF Improper Density	Excess A Component
Light in Color to White Bad Cell Structure Mottled Appearance Blowholes or Pinholes	Excess B Component

<u>Condition</u>	<u>Possible Cause</u>
Slow Rise Poor Cell Structure Frequent Equipment Clogging Slow Curing Poor Physical Properties	Bad Material
Air Bubbles on Surface Tension Cracks on Surface Excessive Air Bubbles	Pouring Too Fast Between Lifts

At any time during PUF application the Project Manager may call for a density test. The Contractor shall provide and fill a container for this purpose and the sample will be tested for density. The density of the sample shall be within the range of 1.85 to 3.00 pounds per cubic foot. Density tests indicating that PUF installed is not within the minimum specified range shall cause corrective action resulting in PUF within the acceptable nominal range, less deviation due to barometric pressure changes from Standard Temperature and Pressure.

The Contractor shall conduct density tests of PUF at no additional expense to EMNRD. At the discretion of the Project Manager, density tests showing PUF in the acceptable range will be taken in the center of the cavity to which PUF is being applied. A sampling box constructed of sheet aluminum and lined with polyethylene shall be lowered into the cavity to take a representative sample of PUF just above the level of installed polyurethane.

At the option of the Project Manager, up to three one-cubic-foot samples of PUF may be taken from the job site for density analysis at the Contractor's expense. In addition, at the option of the Project Manager, up to three samples of up to 100 cubic inches in volume may be taken for on-site tensile strength testing at the Contractor's expense. PUF shall be provided for the samples at no additional cost to EMNRD.

V. Backfilling

To protect the PUF from vandalism if the site is to be left unattended, two to six inches of fill shall be uniformly shoveled over the foam as soon as possible after the last layer of PUF has solidified. No sooner than 96 hours after PUF application, the remaining void above the PUF plug shall be backfilled. The first two-foot lift of fill shall be placed by hand, bucket, or chute to lower the velocity of impact against the PUF. With approval of the Project Manager, this fill may be placed by streaming from heavy equipment such as a loader bucket. The depths and types of fill over the PUF shall be as indicated or specified in the contract documents or as directed by the Project Manager. Unless otherwise indicated, the minimum cover shall be 24 inches of common fill.

Unless otherwise specified or directed by the Project Manager, common fill above polyurethane foam closures shall be nearby cohesionless mine waste material or other nearby cohesionless material with no pieces larger than six inches in diameter, free of debris or trash, and containing no materials classified as toxic or hazardous.

Fill above the polyurethane foam closures shall be placed in a manner that will prevent damage to the polyurethane foam plug and riser pipes and will allow these structures to assume the load from the fill gradually and uniformly.

The use of riding vibratory compaction equipment shall be prohibited above polyurethane foam closures and vibrations due to other construction equipment operations shall be kept to a minimum in these areas. With care and for the minimum acceptable period of time, small walk-behind compaction equipment, such as rammer tampers, may be used in these areas.

VI. Survey Caps

As described in Division 2, a steel pipe with grouted survey cap shall be installed near the ventilation/drainage pipe. Where the PUF/interface is less than five feet below finish grade, the pipe shall be set in a concrete footing, which shall be at least one foot in diameter and extend from the PUF/fill interface to a height of two feet. The upper six inches to one foot of pipe shall extend above grade. Where the PUF/fill interface is more than five feet below the finish grade, a six-foot long pipe shall be used. The lower two feet of pipe shall be set in concrete a minimum of one foot in diameter and the upper six inches to one foot of pipe shall extend above grade.

Alternately, the Contractor may drill and grout the cap in undisturbed, competent rock or concrete at or immediately adjacent to the feature.

VII. Cleanup

The Contractor shall clean the site of all PUF fragments and overspray. PUF overspray greater than 1/8-inch thick on timbers or historic materials shall be scraped or ablated to 1/8 inch minus to permit ultraviolet degradation of oversprayed polyurethane. Tools and equipment shall be cleaned in such a manner as to avoid injury to vegetation or wildlife. Handling of chemicals used in cleanup shall comply with all applicable local, State and Federal regulations.

13990 - SUBMITTALS

Complete data covering polyurethane foam and accessories shall be submitted in accordance with the procedure set forth in Section 01340.

END OF DIVISION 13

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