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Arizona Dept. Environmental Quality
1998
Re: Yarnell Mine, Yavapai County

Includes:

1) **Draft executive summary Aquifer Protection permit No. 101015**

2) **Draft Aquifer Protection permit No. 101015**

3) **Draft Air Quality Control Permit**

EXECUTIVE SUMMARY
AQUIFER PROTECTION PERMIT NO. P - 101015

DRAFT

Facility Name

Yarnell Mining Company, Yarnell Project

Facility Status

The Yarnell Project is classified as a new facility and has no prior permitting history.

Facility Location

The Yarnell Project is located near the town of Yarnell, Arizona, Yavapai County. It occupies portions of Sections 14, 15, 22, and 23 of Township 10N, Range 5W of the Gila and Salt River baseline and meridian.

Facility Description

The Yarnell Project will be an open pit gold mine and hydrometallurgical precious metal leaching facility operated by the Yarnell Mining Company. The facility will occupy approximately 200 acres.

The mining operation will consist of an open pit mine and ore crushing operation, a lined heap leach pad, pregnant solution pond, barren solution pond, ADR (adsorption, desorption, recovery) process plant, cyanide tank, stormwater conveyance channels, process solution ditches and process pipelines, according to the design and operational plans. The operations will capable of processing in excess of 1.2 million tons of ore per year.

The Yarnell Mining Company will mine and leach low-grade gold ore that will be placed on a composite-lined heap leach pad. The heap leach pad has been designed to accommodate approximately seven million tons of ore. Approximately 1.2 million tons of ore will be placed per year for a period of six years. The ore will be stacked on the leach pad in 20 foot lifts to a height not to exceed 220 feet. Each lift will be leached for approximately 100 days with a dilute solution of sodium cyanide. The pregnant (gold-bearing) solution will be collected by a network of perforated piping overlying the synthetic liner which will transport all solution from the leach pad to the pregnant solution pond. The gold will be recovered by pumping the solution through a series of activated carbon columns. The carbon will be periodically stripped of its gold content and the loaded eluate pumped to the electrowinning cells. Barren solution from the processing plant will flow to a mixing tank where fresh sodium cyanide and caustic soda will be added as required. The cathodes will be melted and the molten bullion cast into doré bars for shipment to a refinery.

Best Available Demonstrated Control Technology (BADCT)

The Yarnell Project relies on engineered controls to demonstrate BADCT requirements. The heap leach facility and the process ponds are designed and shall be constructed to meet prescriptive design criteria as outlined in the *Final Draft, Arizona Mining BADCT Guidance Manual* (August, 1996).

Two solution storage ponds (pregnant and barren) shall be constructed with a primary and secondary liner of 60-mil high density polyethylene (HDPE). An HDPE geonet shall be placed between the two HDPE liners as a leak detection layer. The secondary HDPE liner shall be installed on top of a minimum of 6-inch thick liner bedding material consisting of clay amended local material. The liner bedding material shall be placed in one lift over a prepared subgrade, and shall be compacted to provide a maximum permeability of 1×10^{-6} cm/sec.

In the event of a leak in the primary liner, solution shall be collected in the leak detection layer and transported by gravity to a sump. The sump shall contain at a minimum, a 10-inch diameter leak detection pipe designed to allow pumping of collected solution at a rate consistent with the flow capacity of the leak detection system.

The two solution storage ponds and the stormwater/emergency overflow pond are designed to provide the containment needed for runoff from a 100-year, 24-hour storm event, solution accumulation resulting from a 24-hour power outage, a working volume equivalent to nine feet of solution in the pregnant and barren solution ponds, and an additional two feet of freeboard.

The proposed heap leach pad liner shall be constructed as a composite liner system consisting of a 60-mil HDPE geomembrane material overlying a bedding material consisting of clay amended local material. The liner bedding shall be placed in two 6-inch lifts over a prepared subgrade and shall be compacted in place to provide a maximum permeability of 1×10^{-6} cm/sec. A minimum thickness of 18 inches of 3/4-inch minus ore shall be placed on the HDPE liner in order to protect the geomembrane from puncture.

A leak detection system shall consist of drainage pipe bedded in a sand-filled drainage channel constructed between the HDPE liner and liner bedding layer. The leak detection system layout is structured to divide the entire leach pad into 11 distinct areas for monitoring, with the leak detection system located along the downgradient sides of each monitoring area. The 11 leak detection drains shall convey leakage in separate pipes to three sumps located along the south side of the heap leach pad.

A subsurface drain system for shallow groundwater shall be constructed prior to the heap leach pad subgrade placement. The subsurface drain shall consist of drain pipe enclosed in drain gravel and filter fabric. The subsurface drain system shall convey collected shallow groundwater to a sump located on the downgradient side of the solution pond area.

One stormwater/emergency overflow pond shall be constructed with a primary liner of 60-mil HDPE. The HDPE liner shall be installed on top of a minimum 6-inch thick liner bedding material constructed in the same manner as the solution storage ponds.

Monitoring Requirements

All monitoring required in this permit shall continue for the duration of the permit, regardless of the discharge or operational status of the facility.

Prior to any discharges the permittee shall collect and analyze a minimum of 8 quarterly groundwater samples to establish ambient water quality data for evaluating any long-term changes in groundwater quality in accordance with PART IV of the individual APP. Once the 8 quarters have been completed, groundwater monitoring will cease until discharge into the tailing facility begins. Alert Level (AL) concentrations will be calculated using an ADEQ approved methodology.

For each of the monitored analytes that are reasonably likely to be present in the discharge for which an Aquifer Water Quality Standard (AWQS) has been adopted, and for those analytes for which a numeric standard is adopted by rule at a future time, the Aquifer Quality Limit (AQL) shall be established.

The point of compliance (POC) pursuant to A.R.S. § 49-244.2.b designated for the Yarnell Project shall be located at monitor well YMC-03, 34° 11' 50" north, 112° 44' 40" west. Monitoring results shall be reviewed by the permittee and Aquifer Protection Permit Compliance to determine if AQLs and ALs have been exceeded.

Compliance with Aquifer Water Quality Standards

The Yarnell Project has been designed and will be constructed and operated to minimize discharge to the environment and to ensure that AWQSs are not violated at the point of compliance. Therefore a comprehensive monitoring program has been set up to insure that no AWQSs will be exceeded at the point of compliance.

Stormwater and Surface Water Considerations

Stormwater and surface water considerations were adequately incorporated into the design of Tailing Facility No. 4 and will be inspected for the duration of the permit. This insures that no discharge control components are impacted by surface water.

Technical Capability

Bema Gold, Inc. owns and operates several mineral and precious metal mines throughout the world at which heap leach facilities are utilized. On the basis of prior mining activities, Bema Gold, Inc. has demonstrated that their technical approach meets industry standards.

The Yarnell Mining Company has subcontracted with Shepherd Miller, Inc. of Denver, Colorado, to provide design services for the heap leach pad, solution ponds, and associated ancillary facilities. Shepherd Miller, Inc. provide design services under the direction of Mr. Mark Montoya of the Yarnell Mining Company.

Financial Capability:

The Yarnell Mining Company has demonstrated to ADEQ that it can meet the financial capability requirements under A.R.S. § 49-243.N and A.A.C. R18-9-108.B.8. by submitting a bond in the amount of $285,924.00

Zoning Requirements

Mines are exempt from zoning requirements pursuant to A.R.S. § 11-830.

Aquifer Protection Permit

DRAFT

Permit Number P-101015
Yarnell Mining Company
Yarnell Project

Table of Contents

STATE OF ARIZONA
AQUIFER PROTECTION PERMIT NO. P-101015

1.0 AUTHORIZATION

AUTHORIZATION TO DISCHARGE POLLUTANTS IN A MANNER SUCH THAT CURRENT AND REASONABLY FORESEEABLE FUTURE USES OF THE AQUIFER ARE PROTECTED

In compliance with the provisions of Arizona Revised Statutes (A.R.S.) Title 49, Chapter 2, Articles 1, 2, and 3; Arizona Administrative Code (A.A.C.) Title 18, Chapter 9, Article 1; A.A.C. Title 18, Chapter 11, Article 4 and amendments thereto; and the conditions set forth in this permit;

Facility Name: Yarnell Project

Owner:	**Operator:**
Yarnell Mining Company P.O. Box 1182 Yarnell, AZ 85362	Yarnell Mining Company P.O. Box 1182 Yarnell, AZ 85362

is authorized to operate the Yarnell Project, located near the town of Yarnell, Arizona, Yavapai County. It occupies portions of Sections 14, 15, 22, and 23 of Township 10N, Range 5W of the Gila and Salt River baseline and meridian.

Latitude	34° 12' 26"	North
Longitude	112° 44' 59"	West

This permit shall become effective on the date of the Water Quality Division Director's signature and shall be valid for the life of the facility (operational, closure, and post-closure periods) provided that the facility is constructed, operated, and maintained pursuant to all the conditions of this permit according to the design and operational information documented or referenced in PARTS 1, 2, 3, 4,5, 6 and 7 of this permit, and such that Aquifer Water Quality Standards are not violated at the applicable point of compliance.

_____

Ed Sadler
Director, Water Quality Division
Arizona Department of Environmental Quality
Signed this_____day of_____, 1998

2.0 SPECIFIC CONDITIONS

2.1 Facility Description

The Yarnell Project will be an open pit gold mine and hydrometallurgical precious metal leaching facility operated by the Yarnell Mining Company (YMC). The proposed location of the facility is in the Weaver Mountains of Yavapai County, Arizona, approximately one mile south of the community of Yarnell, Arizona. The facility, occupies approximately 200 acres.

The mining operation will consist of an open pit mine and ore crushing operation, a lined heap leach pad, pregnant solution pond, barren solution pond, ADR (adsorption, desorption, recovery) process plant, cyanide tank, stormwater conveyance channels, process solution ditches and process pipelines, according to the design and operational plans approved by the Arizona Department of Environmental Quality (ADEQ), Water Permits Section (WPS), Mining Unit. The operations are capable of processing in excess of 1.2 million tons of ore per year.

YMC will mine and leach low-grade gold ore that will be placed on a composite-lined heap leach pad to be constructed in three phases. Phases 1, 2, and 3 will consist of approximately 15, 12, and 9 acres respectively. The heap leach pad has been designed to accommodate approximately seven million tons of ore. Approximately 1.2 million tons of ore will be placed per year for a period of six years. The ore will be stacked on the leach pad in 20 foot lifts to a height not to exceed 220 feet. Each lift will be leached for approximately 100 days with a dilute solution of sodium cyanide. The pregnant (gold-bearing) solution will be collected by a network of perforated piping overlying the synthetic liner. The piping will transport all solution from the leach pad to the pregnant solution pond. The gold will be recovered by pumping the solution through a series of activated carbon columns. The carbon will be periodically stripped of its gold content and the loaded eluate pumped to the electrowinning cells. Barren solution from the processing plant will flow to a mixing tank where fresh sodium cyanide and caustic soda will be added as required. The cathodes will be melted and the molten bullion cast into doré bars for shipment to a refinery.

2.2 Permitted Activities

The permittee is authorized to operate a hydrometallurgical precious metal recovery facility as described in Part 2.1. The unpermitted disposal and burial of municipal solid waste, nonhazardous solid waste and special waste are prohibited at the Yarnell Project pursuant to A.R.S. Title 49, Chapter 4, Articles 1 and 9 and shall be in accordance with all federal, state, and county regulations.

2.2.1 Solution Ponds

Three ponds shall be constructed to collect and store process solution and stormwater runoff from the heap leach pad. The total capacity, less freeboard, of the three ponds is approximately 9.3 million gallons (3.1 million gallons each). The ponds are designed for two feet of freeboard which is equivalent to an additional 1.7 million gallons bringing the total pond capacity to 11 million gallons. The criteria for sizing are summarized below:

1. Containment of precipitation on the heap leach pad from a 100-year, 24-hour storm event, totaling 5.4 million gallons. The area of stormwater runoff consists of the solution ponds, the 36-acre heap leach pad, two acres for the lined channels between the solution ponds, and the lined area in the ADR plant area.
2. Operating volume in the pregnant and barren ponds totaling 2 million gallons (1 million gallons in each pond).
3. Emergency heap leach pad draindown totaling 1.7 million gallons.

Facility	Latitude	Longitude
Barren Pond	34° 11' 49" North	112° 44' 13" West
Pregnant Solution Pond	34° 11' 51" North	112° 44' 18" West
Stormwater/Emergency Overflow Pond	34° 11' 50" North	112° 44' 15" West

2.2.2 Heap Leach Process

The cyanide heap leach process shall be utilized as described in the approved plans submitted with the APP application dated December, 1995 (*Application*), and subsequent supplemental documents. Heap leaching shall be restricted to the 36-acre heap leach pad, associated solution collection and transport ditches, pregnant solution pond, barren solution pond, stormwater/emergency overflow pond, and process plant as specified in the approved plans and designs submitted with the *Application* and supplemental documents as referenced in Part 5.1, No. 6.

Facility	Latitude	Longitude
Heap Leach Pad	112° 44' 59"	34° 12' 26"

2.2.3 Assay Laboratory

The permittee is authorized to dispose of inorganic liquid waste from the assay laboratory in the barren solution pond.

2.3 Discharge Controls

Discharges, as defined by A.R.S. § 49-201.11, from the 36-acre heap leach pad, associated solution collection and transport ditches, solution pipelines, pregnant solution pond, barren solution pond, cyanide tanks, assay lab, fuel tank farm and process plant resulting from overtopping, overfilling, precipitation, run-on, malfunction of level controllers, alarms, or human error are prohibited.

2.3.1 Solution Ponds

All ponds shall maintain a minimum of two feet of freeboard to prevent overtopping as stated in Table 4.1.

2.3.2 Heap Leach Pad

Leached ore generated by heap leach processing shall not be removed from the heap leach pad, except for further pilot scale testing for metallurgical purposes or reclamation. The permittee shall notify the ADEQ, Aquifer Protection Permit Program before removal. Other removal or transfer of leached ore shall require a major modification to the permit pursuant to A.A.C. R18-9-113 and R18-9-121.C.

2.3.3 Assay Laboratory

Discharging organic waste from the assay laboratory to any on-site impoundment or area is prohibited. The facility shall be monitored for discharge and seepage at the required frequencies listed in Table 4.1. Organic solvents used in the assay laboratory shall be collected in glass containers and disposed of as hazardous waste. The volumes and location of organic waste disposal from this facility shall be recorded and maintained at the site.

2.3.4 Stormwater Diversion Channels

Stormwater diversion channels shall be constructed and maintained pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344), and designed for the peak runoff from the 100-year, 24-hour storm event. The channels shall be inspected for the parameters and frequencies listed on Table 4.1.

2.4 Application of Facility BADCT (Best Available Demonstrated Control Technology)

The Yarnell Project relies on engineered controls to demonstrate BADCT requirements. The heap leach facility and the process ponds are designed and shall be constructed to meet prescriptive design criteria as outlined in the *Final Draft, Arizona Mining BADCT Guidance Manual* (August, 1996).

2.4.1 Solution Ponds

Two solution storage ponds (pregnant and barren) shall be constructed with a primary and secondary liner of 60-mil high density polyethylene (HDPE). An HDPE geonet shall be placed between the two HDPE liners as a leak detection layer. The secondary HDPE liner shall be installed on top of a minimum of 6-inch thick liner bedding material consisting of clay amended local material. The liner bedding material shall be placed in one lift over a prepared subgrade, and shall be compacted to provide a maximum permeability of 1×10^{-6} cm/sec.

In the event of a leak in the primary liner, solution shall be collected in the leak detection layer and transported by gravity to a sump. The sump shall contain at a minimum, a 10-inch diameter leak detection pipe designed to allow pumping of collected solution at a rate consistent with the flow capacity of the leak detection system. The leak detection monitoring points and parameters are listed in Table 4.2

The two solution storage ponds and the stormwater/emergency overflow pond are designed to provide the containment needed for runoff from a 100-year, 24-hour storm event, solution accumulation resulting from a 24-hour power outage, a working volume equivalent to nine feet of solution in the pregnant and barren solution ponds, and an additional two feet of freeboard.

2.4.2 Heap Leach Pad

The proposed heap leach pad liner shall be constructed as a composite liner system consisting of a 60-mil HDPE geomembrane material overlying a bedding material consisting of clay amended local material. The liner bedding shall be placed in two 6-inch lifts over a prepared subgrade and shall be compacted in place to provide a maximum permeability of 1×10^{-6} cm/sec. A minimum thickness of 18 inches of 3/4-inch minus ore shall be placed on the HDPE liner in order to protect the geomembrane from puncture.

A leak detection system shall consist of drainage pipe bedded in a sand-filled drainage channel constructed between the HDPE liner and liner bedding layer. The leak detection system layout is structured to divide the entire leach pad into 11 distinct areas for monitoring, with the leak detection system located along the downgradient sides of each monitoring area. The 11 leak detection drains shall convey leakage in separate pipes to three sumps located along the south side of the heap leach pad. The leak detection monitoring points and parameters are listed on Table 4.3 and 4.4

A subsurface drain system for shallow groundwater shall be constructed prior to the heap leach pad subgrade placement. The subsurface drain shall consist of drain pipe enclosed in drain gravel and filter fabric. The subsurface drain system shall convey collected shallow groundwater to a sump located on the downgradient side of the solution pond area.

2.4.3 Stormwater/Emergency Overflow Pond

One stormwater/emergency overflow pond shall be constructed with a primary liner of 60-mil HDPE. The HDPE liner shall be installed on top of a minimum 6-inch thick liner bedding material constructed in the same manner as the solution storage ponds.

2.5 Operational Requirements

All monitoring required in this permit shall continue for the duration of the permit, regardless of the discharge or operational status of the facility, unless otherwise designated in this permit or an approved contingency plan. A request to modify the operational monitoring program with the approval of the ADEQ may be made at anytime. Requests for changes shall be in writing and include justification for the changes.

2.5.1 Monitoring Requirements

Monitoring shall be performed pursuant to the conditions in Part 6.2.

2.5.2 Solution Pond Leak Detection Monitoring System

A leak detection / collection system shall be incorporated into the design of the pregnant and barren solution ponds. This system shall be monitored and inspected according to the terms and frequencies found in Tables 4.1 and 4.2. Any liquids detected shall be pumped out and returned to the process ponds. If the leakage rate for an impoundment exceeds 1,000 gallons per acre per day (gpad), the permittee shall implement the contingency plan under Part 2.5.12.2 or Part 2.5.12.3 of this permit.

2.5.3 Heap Leach Pad Leak Detection Monitoring System

The leak detection system shall be monitored in accordance with Tables 4.1 and 4.3. Any liquids detected shall be pumped out and disposed of within the process ponds. If the leakage rate exceeds 15 gallons per day (gpd) for each of the leak detection monitoring areas (2 - 11), the permittee shall implement the contingency plan under Part 2.5.12.4 or Part 2.5.12.5 of this permit.

2.5.4 Heap Leach Pad Underdrain System Fluid Monitoring

Monitoring shall commence upon completion of the underdrain system. If present, fluids discharged from the underdrain system shall be monitored according to the terms and frequencies specified in Tables 4.1, 4.4, 4.6, 4.8, 4.11, and 4.14 of this permit.

2.5.5 Groundwater and Surface Water Monitoring

2.5.5.1 Groundwater Sampling Protocol

Static water levels shall be measured and recorded before sampling any monitoring wells. Monitoring wells shall be purged of at least three borehole volumes (as calculated using the static water level) or until indicator parameters (pH, temperature, conductivity) are stable, whichever represents the greater volume. If evacuation results in the well going dry, the well shall be allowed to recover to eighty percent of the original borehole volume, or for 24 hours, whichever is shorter, before sampling. If after 24 hours there is not sufficient water for sampling, the well shall be recorded as "dry" for the monitoring event. An explanation for reduced pumping volumes, a record of the volume pumped, and modified sampling procedures shall be reported on the Self-Monitoring Report Form.

As an alternative method for sampling, the permittee may conduct the sampling using the low-flow purging method as described in the Arizona Water Resources Research Center *Field Manual for Water Quality Sampling* (March, 1995). The well must be purged until indicator parameters, which shall include dissolved oxygen, turbidity, pH, temperature, and conductivity, stabilize.

All sampling procedures, preservation techniques and holding times shall be consistent with the most recent ADEQ Quality Assurance Project Plan (QAPP). Parameters designated as "dissolved" in Tables 4.7 through 4.12 require field-filtered samples. Trip blanks, equipment blanks, and duplicate samples shall be obtained as stated in the QAPP and chain of custody shall be followed.

2.5.5.2 Point of Compliance

Monitor well YMC-3 shall be established as the point of compliance well and used to monitor both hazardous and nonhazardous substances as listed on Table 4.5.

2.5.5.3 Underdrain System Sump

The permittee shall monitor the heap leach pad underdrain system sump quarterly, or when water is present in the underdrain system sump.

Fluids discharged from the underdrain system shall be considered groundwater and therefore, the AWQS shall

apply. Water flow rates into the underdrain system sump shall also be recorded and reported quarterly.

2.5.5.4 Surface Water Monitoring Points

Pursuant to A.R.S. § 49-203.B.2, the permittee shall sample Cottonwood Spring and Fool's Gulch Spring listed in Table 4.5 for the parameters and frequencies listed on Tables 4.6, 4.9, 4.12, and 4.15, or when water is present.

The applicable water quality standards for both springs shall be either the Surface Water Quality Standards for aquatic and wildlife [warm water fishery] and fish consumption or the Aquifer Water Quality Standards, whichever is most stringent, or AQLs as established by Part 2.5.5.6.2. Surface water flow rates from both springs shall be recorded and reported on a quarterly basis.

2.5.5.5 Surface Water Sampling Protocol

Surface Water samples shall include both field-filtered and unfiltered samples for each parameter in Tables 4.6, 4.9, 4.12, and 4.15 designated as dissolved. All surface water sampling procedures, preservation techniques, and holding times shall be consistent with the most recent ADEQ QAPP. Trip blanks, equipment blanks and duplicate samples shall be obtained as stated in the QAPP and chain of custody shall be followed.

2.5.5.6 Ambient Water Monitoring

The permittee collected eight quarterly samples of groundwater from POC well YMC-3 from April, 1995 through December, 1996, for the parameters listed in Table 4.6. These eight quarterly analyses shall be used to establish ambient groundwater quality data for evaluating any long-term changes in water quality. Until the mine is constructed and operations begin, no further groundwater monitoring at YMC-3 is required. However, the self monitoring report forms must still be submitted pursuant to Part 2.5.8.

The permittee has submitted the ambient groundwater monitoring data for POC well YMC-3 in tabulated format, along with copies of all laboratory analytical reports, the Quality Assurance/Quality Control (QA/QC) procedures used in collection and analysis of the samples, and a report which includes the statistical calculation of the ALs and AQLs (aquifer quality limits).

2.5.5.6.1 Alert Levels

ALs shall be established as the upper prediction interval for each parameter sampled during the ambient monitoring period. For pH, the ALs shall be established as both the upper and lower prediction intervals. Prediction intervals are defined by and shall be calculated by the methods given in the following documents and their subsequent revisions:

- Environmental Protection Agency, 1989. *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities -- Interim Final Guidance.* Office of Solid Waste, Waste Management Division, EPA/530-SW-89- 026 (or NTIS # PB89-151047).
- Environmental Protection Agency, 1992. *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities -- Addendum to Interim Final Guidance*, Office of Solid Waste, Permits and State Programs Division.
- Gibbons, R.D., 1994, *Statistical Methods for Groundwater Monitoring,* John Wiley & Sons, New York; and
- American Society for Testing and Materials, June 1996, *The Provisional Standard Guide for Developing Appropriate Statistical Approaches for Ground-Water Detection Monitoring Program.*

Another method may be used for any future calculations with prior ADEQ approval.

2.5.5.6.2 Aquifer Quality Limits

For each of the monitored analytes for which an AWQS has been adopted, and for those analytes which may have a numeric standard adopted by rule at a future time, the AQL shall be established as follows:

1. If the calculated AL is less than the AWQS, then the AQL shall be set equal to the AWQS.
2. If the calculated AL is greater than the AWQS, then the AQL shall be set equal to the AL.

2.5.5.7 Ambient Underdrain System Sump Monitoring

Within 24 months of the effective date of this permit, the permittee shall obtain 12 monthly or 8 quarterly analyses of water samples for the underdrain system to establish the parameters to be monitored listed in Table 4.6. Within 60 days of the completion of the ambient water quality monitoring of the underdrain system, the permittee shall submit all analytical data and calculations necessary to establish ALs and AQLs for the underdrain system pursuant to Part 2.5.5.6.1 and Part 2.5.5.6.2. This data shall be submitted to the ADEQ Aquifer Protection Permit Program and shall be placed in Tables 4.8 and 4.11.

2.5.5.8 Ambient Surface Water Monitoring

Within 24 months of the effective date of this permit, the permittee shall obtain 12 monthly or 8 quarterly analyses of water samples from Cottonwood Spring and Fool's Gulch Spring to establish the parameters to be monitored listed in Table 4.6. These analyses shall establish ambient water quality data for evaluating any long-term changes in water quality.

Within 60 days of the completion of the ambient water quality monitoring for the springs, the permittee shall submit all analytical data and calculations necessary to establish ALs and AQLs for each spring pursuant to Part 2.5.5.6.1 and Part 2.5.5.6.2. This data shall be submitted to the ADEQ Aquifer Protection Permit Program and shall be placed in Tables 4.9 and 4.12.

2.5.5.9 Compliance Water Monitoring

Within 30 days of the initiation of mining operations, the permittee shall begin monitoring at the POC well, YMC-3 for the parameters listed in Table 4.7. Monitoring shall continue at the POC on a quarterly basis. In addition, once every two years from the date of issuance of this permit, monitor well YMC-3 shall be monitored for the parameters listed in Table 4.10.

After completion of the ambient water monitoring requirements for the underdrain system and the two springs, the permittee shall monitor the underdrain system and the two springs for the parameters listed in Tables 4.8 and 4.9 respectively, on a quarterly basis, or when water is present. (If no water is present in the springs or the underdrain system, the permittee shall report "Dry" on the Self-Monitoring Report Forms). In addition, once every two years, the underdrain system and the springs shall be monitored for the parameters listed in Tables 4.11 and 4.12, respectively.

Monitoring results shall be reviewed by ADEQ Aquifer Protection Permit Compliance to determine if any ALs or AQLs have been exceeded. If compliance monitoring indicates that an AL or AQL has been exceeded, the permittee shall follow the requirements of the contingency plan provided in Part 2.5.12.1

2.5.6 Construction Monitoring

A Quality Assurance Engineer (QAE) shall be responsible for all quality assurance procedures. The QAE shall be a third party Arizona-registered Professional Engineer. The QAE shall be responsible for reporting and certifying that all liner installation and testing are performed to approved specifications in the *Responses to ADEQ Comments on Technical Issues Associated with the Aquifer Protection permit Application for the Yarnell Project* dated June 27, 1997.

2.5.6.1 Heap Leach Pad and Solution Pond Liner Bedding Material Preparation and Testing

The liner bedding layer for the heap leach liner shall be constructed in two 6-inch lifts to a minimum depth of 12 inches. The liner bedding layer for the solution ponds shall be constructed in one lift to a minimum depth of 6 inches. Following the installation of the first lift of the heap leach pad liner bedding layer and surface impoundment liner bedding layer, a professional engineer registered in the state of Arizona shall verify that soil samples of the first lift meet the following specifications:

1. Greater than 30% by weight passing the No. 200 sieve.
2. A minimum plasticity index of 10% to 30%.

After installation of the first lift, the professional engineer shall verify that the compacted liner bedding material meets the following specifications based on verification sampling:

1. A maximum hydraulic conductivity of 10^{-6} cm/sec.
2. Compaction to 95% of maximum dry density from the standard Proctor test.

Verification sampling for the first lift must be completed and the specifications met prior to construction of the second lift. Verification sampling of the liner bedding material applies to Phases I, II, and III of the Heap Leach Pad construction. Verification testing shall be conducted at the following frequencies:

1. Phase I: Three to five verification samples taken from noncontiguous areas.
2. Phases II and III: Two verification samples taken from noncontiguous areas. Results of all subgrade and verification sampling shall be submitted to the ADEQ Aquifer Protection Permit Program.

2.5.6.2 Geomembrane Liner Testing

1. Visual examination of the panels upon delivery to the site, with documentation of the manufacturer's mark number and receipt of mill certification data.
2. Physical examination of the panels upon unfolding and spreading, with checking of nominal widths and examination for material flows or defects.
3. Each panel shall be pressure tested by air pressure testing of the air channel between parallel seams. The minimum air channel test pressure shall be 30 pounds per square inch (psi), with a maximum pressure drop of 3 psi over a 5-minute period.
4. Each sample cut from the seamed material shall be shear and peel tested at a frequency of one sample every 500 linear feet. The shear (or bonded seam strength) test shall be conducted according to ASTM D-3083 and ASTM D-638, and have a shear strength of 120 lb/inch width of seam. The peel (or peel adhesion) test shall be conducted according to ASTM D-413 and ASTM D-638, and have a minimum peel strength of 70 lb/inch width of seam. Failure for both tests shall be in a ductile manner and observed at the film bond to be acceptable.
5. Each type of test shall be performed on five replicate specimens from each material sample (equivalent to five shear tests and five peel tests per material sample). The test results shall be reported individually, with four out of five tests meeting strength requirements being acceptable.
6. In the event of a failed test (less than four of five tests meeting strength requirements), additional samples shall be collected at 50-foot intervals along the seam on either side of the failed sample location, with additional sampling and testing conducted until tested seam conditions are acceptable. The seam in the failed test area between the acceptable test locations shall be extrusion welded and tested.
7. Conformance testing shall be conducted every 100,000 ft^2 of liner or each lot, whichever is less, with results available prior to installation. Conformance testing shall include thickness-ASTM D-751, compound density-ASTM D-1505, carbon black content-ASTM D-1603, and melt index-ASTM D-1238.

2.5.6.3 Heap Leach Underdrain System

Construction shall proceed according to the requirements in Part 2.5.6.

2.5.7 Operational Monitoring

2.5.7.1 Heap Leach Pad

The heap leach pad shall be inspected for the items listed in Table 4.1 on a daily basis. A log book, as described in Part 2.5.8.2, of these inspections shall be kept at the facility for ten years from the date of each inspection, available for review by ADEQ personnel.

Any damage to the heap leach pad identified during an inspection shall be noted in the log book. If substantial damage is identified during inspection, proper repair procedures shall be performed. All repair or modification procedures and material(s) used shall be documented in the log book. If no damage to the heap leach pad is identified during the inspection, the permittee shall indicate in the log book that the required inspection occurred during the day.

2.5.7.2 Underdrain System

The heap leach pad underdrain system sump shall be inspected on a daily basis for the items listed in Table 4.1. Any damage to the underdrain system sump shall be noted in the log book described in Part 2.5.8.2.

2.5.7.3 Solution Ponds

During operation, the pregnant and barren solution ponds must maintain a minimum of two feet of freeboard to prevent overtopping, overfilling, wind and wave action, rainfall, run-on, malfunctions of level controllers, alarms, and other equipment, or human error. All freeboard measurements shall consist of the vertical distance between the fluid surface and the lowest point on the berm of the pond.

The solution ponds shall be inspected weekly and after storms for evidence of overtopping, sudden drops in liquid level, and deterioration of dikes or other containment devised as specified in Table 4.1. All daily inspections, notations of damage, and repairs shall be reported in the log book described in Part 2.5.8.2.

2.5.7.4 Waste Rock Monitoring

Waste rock at the Yarnell Project that lies within 0 to 20 feet of either side of the ore zone shall be sampled and analyzed on a quarterly basis for the duration of the project. Each quarterly waste rock sample shall be collected as a composite of blended mine waste from blast hole cuttings collected during that quarter, and shall be analyzed for leachability (EPA method 1312 Synthetic Precipitation Leaching Procedure, SPLP) and acid generating potential using the Acid-Base Accounting method (British Columbia Acid Rock Drainage Manual method or equivalent). Results of the waste rock characterization shall be submitted to the Aquifer Protection Permit Program for review to determine if any ALs as stated in Table 4.16 have been exceeded. If it is determined that an AL has been exceeded, the permittee shall follow the requirements of the contingency plan in Part 2.5.12.6.

2.5.8 Reporting Requirements

2.5.8.1 Groundwater, Surface Water, and Underdrain System Monitoring Reports

1. The permittee shall complete the Self-Monitoring Report Form, provided by ADEQ, to reflect monitoring requirements as designated in Tables 4.7 through 4.12 and submit to the ADEQ Aquifer Protection Permit Compliance, along with other reports required by this permit.
2. Tables 4.7 through 4.12 list the parameters to be monitored and the frequency for reporting results for

groundwater, springs, and the underdrain system monitoring. Monitoring methods shall be recorded on the Self-Monitoring Report Forms, along with any deviations from the methods and frequencies prescribed in this permit.

3. The permittee shall complete the Self-Monitoring Report Form to the extent that the information reported may be entered on the form. If no information is required during a quarter, the permittee shall enter "did not sample" on the Self-Monitoring Report Form and submit the report to ADEQ. The results of all monitoring required shall be submitted in such format as to allow direct comparison with the limitations and requirements of the permit. Reports are due 30 days after the end of the sample period.

4. The Self-Monitoring Report Form shall include: copies of laboratory analysis forms, documentation of sampling date and time, name of sampler(s), static water level in monitor well prior to sampling, sampling method, purging volume, flow rate for springs and underdrain system, indicator parameters, analytical methods, method detection limits, date of analysis, preservation and transportation procedures, and the name of the analytical facility.

2.5.8.2 Facility Inspection Records

All individual facilities shall be inspected for the items and frequencies listed in Table 4.1. A log book of these inspections shall be kept at the facility or other approved location for ten years from the date of each inspection, available for review by ADEQ personnel. The permittee shall keep a log book of facility inspections and record all of the following information: name of inspector, date and shift inspection was conducted, condition of facility components, any damage or malfunction, and the repair(s) performed.

If substantial damage is identified during inspection, proper repair procedures shall be performed. All repair or modification procedures and material(s) used shall be documented in the log book. If no damage to the facility is identified during the inspection, the permittee shall indicate in the log book that the required inspection occurred.

2.5.9 Reporting Location

Signed copies of all reports required herein, *except* for those required in Part 2.5.5.7, Part 2.5.5.8, Part 2.5.7.4, and Part 3, shall be submitted to:

Arizona Department of Environmental Quality
Aquifer Protection Permit Compliance
3033 North Central Avenue
Phoenix, Arizona 85012
Phone (602) 207-4620

Signed copies of the reports required in Part 2.5.5.7, Part 2.5.5.8, Part 2.5.7.4, and Part 3 shall be submitted to:

Arizona Department of Environmental Quality
Aquifer Protection Permit Program
3033 North Central Avenue
Phoenix, Arizona 85012

2.5.10 Analytical Methodology

The permittee shall use any EPA approved or Arizona State approved analytical method for each parameter required in this permit as long as the method provides detection limits which are adequate for the regulatory limits of the parameters specified in the permit. All samples must be analyzed by a laboratory certified by the Arizona Department of Health Services, Office of Laboratory Licensure and Certification, for each analysis performed. For results to be considered valid, all analytical work shall meet quality control standards specified in the approved methods.

A list of certified laboratories can be obtained at the address below:

Arizona Department of Health Services
Office of Laboratory Licensure and Certification
3443 North Central Avenue, Suite 810
Phoenix, Arizona 85012
Phone (602) 255-3453

Upon submittal of the samples to a state-certified laboratory for analysis, a copy of the appropriate portions of the signed permit shall be forwarded to the laboratory for reference.

2.5.11 Reporting Deadline

Sample Collected During Quarter Beginning:	**Quarterly Report Due By:**
January	April 28
April	July 28
July	October 28
October	January 28

2.5.12 Contingency Plan Requirements

The permittee shall develop and maintain at least one copy of a contingency plan(s) at the location where day-to-day decisions regarding the operation of facilities are made. The permittee shall revise promptly all copies of the contingency plan(s) to reflect approved changes. The permittee shall advise anyone responsible for the operation of the facility of the location of copies of all contingency and emergency plans.

2.5.12.1 AL or AQL Exceedence Contingency

1. If preliminary laboratory results indicate an AL or AQL exceedence at the POC well YMC-3, Cottonwood Spring, Fools Gulch Spring, or the heap leach underdrain system, the permittee may request the laboratory to re-analyze the sample before reporting the results to ADEQ. Within five days of receiving *final* laboratory results indicating an AL or AQL exceedance, the permittee shall notify the ADEQ Aquifer Protection Permit Compliance.
2. Verification sampling shall be conducted within five days of receiving laboratory results indicating that an AL or AQL has been exceeded. (The verification sample(s) need only be collected from the point at which the AL or AQL has been exceeded and analyzed for only the parameter(s) which has exceeded the AL or AQL.)
3. Within five days of receiving the laboratory results from the verification sampling, the permittee shall notify the ADEQ Aquifer Protection Permit Compliance in writing of the results, regardless of whether the results are positive or negative.
4. If the results of verification sampling indicate that an AL or AQL has <u>not</u> been exceeded, no further action is required unless otherwise instructed by ADEQ.
5. If the analytical results from the verification sampling confirm that an AL or AQL has been exceeded, the permittee shall, within 14 days of receiving the laboratory results, collect an additional set of water samples from the point of compliance well, spring, or underdrain system. These water samples shall be submitted to a laboratory for analyses of the parameters listed in Tables 4.13, 4.14, or 4.15, whichever is applicable. The results from this second verification sampling shall be reported in writing to the ADEQ Aquifer Protection Permit Compliance within five days of receiving the laboratory results.

6. If the results from the second verification sampling confirm that an AL or AQL has been exceeded, the permittee shall within 30 days of receiving the laboratory results, submit to the ADEQ Aquifer Protection Permit Compliance, either (1) or (2):

   (1) A written report that includes all of the information as specified in A.A.C. R18-9-113.C.1 through 5. Upon approval by the ADEQ Aquifer Protection Permit Compliance, the permittee shall initiate the actions necessary to mitigate the impacts of the exceedance.

   (2) A demonstration that the AL or AQL exceedance resulted from error(s) in sampling, analysis, or statistical evaluation.

The ADEQ reserves the right to require the construction of additional monitor wells in the event of a verified exceedance at any of the four monitoring points. In addition, ADEQ may require additional monitoring, investigation, or remediation beyond those specified in this permit in the event of an AL or AQL exceedance. If the permittee submits a demonstration that an AL or AQL exceedance was due to error(s) in sampling, analysis, or statistical evaluation, and this demonstration is not accepted by the ADEQ Aquifer Protection Permit Compliance, the ADEQ may require that the permittee submit the written report required pursuant to Part 2.5.12.1.6.1.

2.5.12.2 *De Minimus* Exceedances in Surface Impoundments

The permittee shall, at a minimum, initiate the following actions within five days of becoming aware of an exceedance of the *de minimus* leak detection action leakage rate of 1,000 gpad or 0.6 gallons per minute (gpm):

1. Pump out all fluid collected in the leachate collection system,
2. Quantify and record the amount of fluid pumped from the leachate collection system,
3. An assessment of the potential for migration of liquids out of the containment system,
4. An assessment of the current conditions of the liner system.

2.5.12.3 Rapid and Large Leakage Exceedances in Surface Impoundments

Additional response actions based on leakage rates in excess of 11,000 gpad or 6.9 gpm shall include:

1. Head reduction on the liner including emptying of the impoundment,
2. Visual inspections to identify areas of leakage,
3. Repair of all identified areas of leakage,
4. Closure or partial closure of the impoundment if identified areas of leakage cannot be repaired,
5. After repairs have been made, the leakage rate shall be monitored while the pond is being filled.

The permittee may be required to install additional groundwater monitoring wells if the above alert levels are exceeded and/or there is a large, sudden release of hazardous material from the process ponds, solution process ditches, or leach pad.

Within 30 days of a confirmed rapid and large leakage rate exceedance, the permittee shall submit a written report to ADEQ which includes the documentation specified in A.A.C. R18-9-113.C.1 through 5. In addition to actions already taken, the report shall detail additional response actions to be taken for increased leakage rates.

2.5.12.4 *De Minimus* Exceedances in Heap Leach Pad

The permittee shall at a minimum, initiate the following actions within five days of becoming aware of an

exceedance of the *de minimus* leak detection action leakage rate of 15 gpd for each monitoring area (2 - 11):

1. Quantify and record the amount of fluid pumped from the leachate collection system.
2. Identify the area of the heap leach pad that is leaking.

2.5.12.5 Rapid and Large Leakage Exceedances in Heap Leach Pad

Additional response actions based on leakage rates in excess of 74 gpd for each of the monitoring areas (2 - 11) shall include:

1. Conduct an assessment of the potential for migration of liquids out of the containment system.
2. Determine the location of the leak and if feasible, excavate the affected area and repair the liner. If removal of the ore from the affected area is not feasible, the permittee shall prevent leach solution from reaching the area of the leak by ceasing to leach the ore above the affected area or covering the top of the heap above the affected area with a synthetic liner, or any other method approved by the Aquifer Protection Permit Program.
3. A report on the responsive actions taken and the change in the leak rate.

The permittee may be required to install additional groundwater monitoring wells if the above alert levels are exceeded and/or there is a large, sudden release of hazardous material from the process ponds, solution transport ditches or leach pad.

2.5.12.6 Waste Rock Characterization and Management Plan

If the results from either or both analyses required in Table 4.16 indicate an AL exceedance, YMC shall identify the area where the non-inert waste rock was deposited and if possible, isolate this material by covering it on all sides with inert material to a minimum depth or thickness of 20 feet.

If, there are two of more AL exceedances within any four consecutive quarters of waste rock characterization, the Aquifer Protection Permit Program shall re-assess the potential for the waste rock dump to discharge contaminants to the aquifer.

2.5.12.7 Slope Failure

If a slope failure involving the heap leach pad occurs, the permittee shall promptly close the active area in the vicinity of the failure, and conduct a field investigation of the failure to analyze its origin and extent, its impact on the heap leach operations, temporary and permanent repairs and changes in operational plans considered necessary.

If physical evidence shows the deformation of the slope during the operation of the mine and operations which may compromise the stability of the face, or if slope failure occurs, the permittee shall:

1. Within five days of becoming aware of the slope failure, notify the ADEQ Aquifer Protection Permit Compliance pursuant to A.A.C. R18-9-113.B, and
2. Within 30 days, submit a written report to ADEQ Aquifer Protection Permit Compliance pursuant to A.A.C. R18-9-113.C.1 through 5 and identify alternate methods of control which may include but are not limited to temporary cessation within the area of instability.

Upon approval by the ADEQ Aquifer Protection Permit Program, the permittee shall initiate the actions necessary to mitigate the impacts of the failure.

2.5.12.8 Drainage Structure Failure

If a drainage structure such as a ditch or diversion berm fails or is blocked the permittee shall promptly repair it. The temporary repairs shall be replaced by permanent repairs as soon as conditions allow. The repairs shall be designed to prevent future failures. Within 30 days of becoming aware of a ditch or diversion berm failure, the permittee shall submit to the ADEQ Aquifer Protection Permit Program, a written report indicating the actions taken.

2.5.12.9 Accidental Discharge

The permittee shall correct any failure that results in an accidental discharge or violation of a permit condition and take the following actions:

2.5.12.9.1 Spills

Within 30 days of a spill that might cause the exceedance of an AL or AQL or might cause imminent and substantial endangerment to public health or the environment, the permittee shall submit to the ADEQ Aquifer Protection Permit Compliance a written report that includes the documentation required in Part 2.10.7.2 The report must include the information required pursuant to A.A.C. R18-9-113.C.1 through 5. Upon review of this report, ADEQ may require additional monitoring and/or actions.

2.5.12.9.2 Spills / Unauthorized Discharge of Cyanide Solution

In the event of a spill of cyanide solution within a secondary containment area, the solution shall be isolated and pumped to alternative storage containers within the heap leach circuit. The secondary containment structure shall be detoxified with hydrogen peroxide or an equivalent oxidizing agent and washed with water. The neutralized solution shall be pumped into the barren solution pond.

If the spill occurs outside the secondary containment area, the affected area shall be isolated and detoxified. An earthen berm shall be constructed around the spill area. Hydrogen peroxide or an equivalent oxidizing agent shall be used to detoxify the spill and the neutralized solution shall be pumped to the leach pad or barren solution pond. The area shall be excavated to remove all contaminated material and the contaminated material shall be placed on the leach pad.

2.5.12.9.3 Spills / Unauthorized Discharge of Hydrochloric Acid

Hydrochloric acid shall be stored in its own secondary containment area. Spilled acid shall be contained by the secondary system and pumped to the carbon acid wash tank for temporary storage while the primary storage vessel is fixed or replaced and the area is neutralized.

If the spill occurs outside the secondary containment area, the affected area shall be isolated and detoxified. An earthen berm shall be constructed around the spill area. The spill is to be diluted by flushing with water. The area shall be excavated to remove all contaminated material and the contaminated material shall be placed on the leach pad.

2.5.12.9.4 Spills / Unauthorized Discharge of Unidentified Material

In the event of any accidental spill or unauthorized discharge of suspected hazardous or toxic materials on the facility site the related area shall be promptly isolated and attempts to identify the material shall be made. Information on persons that may have been exposed to the material shall be recorded. If the material is not identified with certainty, or is identified as being in the category of unacceptable waste, a qualified contractor shall remove and dispose of the material according to applicable federal, state and county regulations.

2.5.12.10 Emergency Response

The permittee shall provide for emergency response on a 24-hour basis in the event that a condition arises which results in imminent and substantial endangerment to public health or the environment. The emergency response plan shall be kept at the facility and provide the following:

1. Designation of an emergency response coordinator who shall notify the ADEQ Aquifer Protection Permit Compliance within 24 hours that emergency response measures are taken or those portions of the contingency plan that address an imminent and substantial endangerment are activated.
2. A general description of the procedures, personnel and equipment to be used to assure appropriate mitigation of unauthorized discharges.
3. A list of names, addresses and telephone numbers of persons to be contacted in the event of an emergency.

The emergency response coordinator shall notify the ADEQ Emergency Response Unit immediately upon discovering a release of a hazardous substance in excess of a reportable quantity in accordance with 40 C.F.R. 302 et seq. All releases of hazardous substances shall be reported in accordance with 40 C.F.R. 302 et seq.

Within 30 days of completion of any mitigation action, the permittee shall submit to the ADEQ Aquifer Protection Permit Compliance, a written report describing the cause, impacts, and mitigation of the discharge.

2.6 Temporary Cessation

The permittee shall notify the ADEQ Aquifer Protection Permit Program in writing before temporarily ceasing any operation at the facility. The notification shall include a description of any action taken to maintain discharge control systems such that discharge is minimized to the greatest extent practicable during temporary cessation and that an exceedance of an AWQS does not occur at the POC during temporary cessation. Notification of a temporary cessation does not relieve the permittee of any permit responsibilities.

2.7 Closure and Post Closure

2.7.1 Closure Notification

The permittee shall notify the ADEQ Aquifer Protection Permit Program of the intent to cease operations prior to ceasing, without intent to resume, an activity for which the facility was designed or operated. Within 90 days following notification, the permittee shall submit for approval, to the ADEQ Aquifer Protection Permit Program, a closure plan according to the requirements of A.R.S. § 49-252 and A.A.C. R18-9-116.C which eliminates, to the greatest extent practicable, any reasonable probability of further discharge from the facility and of exceeding Aquifer Water Quality Standards at the applicable point of compliance. This plan shall be in addition to the approved closure strategy included in the *Application*.

2.7.2 Closure/Post-Closure Pit Modeling

At closure, the permittee shall evaluate and model the post-closure effects of the open pit. Factors to be evaluated shall include groundwater intrusion, estimated static water level in the pit and estimated amount of time needed to reach static water level, geochemistry of pit water, and the geochemistry of exposed rocks in the pit. The model shall also evaluate the potential for the water level in the pit to rise to an elevation where the hydraulic gradient reverses and the pit water migrates into both groundwater and surface water. This closure/post-closure evaluation shall be submitted to ADEQ prior to complete closure of the mine.

2.7.3 Detoxification/Neutralization of Heap Leach Material

Prior to closure and rinsing of the heap leach material with fresh water, the permittee shall collect four effluent, or pore water, samples from the spent ore and have them analyzed for pH, weak acid dissociable (WAD) cyanide,

nitrate, and any other constituents that may be present as a result of the leaching process. Samples shall be taken at the toe of the heap.

Rinsing of the heap leach material with fresh water (passive rinsing) shall be performed for a period of time until gold values in the rinsate from the heap reach a level which become uneconomical to recover. Following passive rinsing, active rinsing with hydrogen peroxide or an equivalent agent shall be conducted. The permittee shall actively rinse the heap leach material until the effluent meets all AWQS.

Following active rinsing, the permittee shall collect six effluent samples over a 6-day period from the toe of the heap. Each of the six samples shall be analyzed for pH, WAD cyanide, nitrate, and any of the metals detected from the four pre-neutralization samples. When the mean value for WAD cyanide is less than 0.2 milligrams per liter with no individual sample exceeding 2.5 times the mean, the pH is between 6.0 and 8.5, and all other parameters meet AWQS, the heap leach material shall be considered neutralized.

After neutralization of the heap has been completed, residual seepage that discharges from the heap must meet AWQS if discharged to the subsurface and Surface Water Quality Standards (SWQS) if discharged to any Waters of the United States as defined by section 502(7) of the clean water act (33 United States Code section 1362(7)).

2.7.4 Closure Completion

Upon completion of closure activities, the permittee shall give written notice to the ADEQ Aquifer Protection Permit Program indicating that the approved closure plan has been fully implemented.

2.7.5 Post-Closure Requirements

Upon completion of closure activities, the permittee shall submit a post-closure plan to the ADEQ Aquifer Protection Permit Program for approval. The requirements shall be established based on a review of facility closure activities and shall be reviewed and approved by the ADEQ Aquifer Protection Permit Program.

Post-closure requirements shall include maintenance and monitoring activities consisting of: periodic verification that all the containment, monitoring structures, and facilities retain their integrity and their operability, appropriate repairs, and monitoring of groundwater. These activities shall continue for a period of time and frequency to be determined at the time of closure, and approved by the ADEQ Aquifer Protection Permit Program. The frequency of the monitoring shall not be modified nor the monitoring cease without approval by the ADEQ.

2.7.5.1 Post-Closure Plan

The post-closure plan shall ensure that any reasonable probability of further discharge from the facility, and of exceeding AWQS at the applicable POC, are eliminated, to the greatest extent practicable. The post-closure plan shall comply with the requirements of A.R.S. § 49-252 and A.A.C. R18-9-116.

2.7.5.2 Post-Closure Completion

The permittee shall submit a written notice to the ADEQ Aquifer Protection Permit Program when the post-closure activities have been completed.

3.0 COMPLIANCE SCHEDULE

The permittee shall submit the required information to the ADEQ Aquifer Protection Permit Program within the time frames specified from the effective date of this permit.

3.1 Requirements

1. Within 30 days, submit a copy of the facility emergency response plan. The plan shall include all of the information as required in A.A.C. R18-9-114.B.1 through 5.
2. Within 30 days of completion of construction of any facility referenced in Part 2.5, submit the results of all quality control/assurance testing and verification testing.
3. Within 60 days of the completion of the ambient groundwater monitoring period for Cottonwood Spring, Fools Gulch Spring, and the underdrain system, submit the tabulated groundwater data and statistical calculations used for determining ALs and AQLs.
4. Every 12 months pay an annual registration fee based on the daily influent of pollutants in the following table pursuant to A.R.S. § 49-242:

DISCHARGE OR INFLUENT PER DAY UNDER THE PERMIT (IN GALLONS)	ANNUAL FEE
2,000 to 9,999	$25
10,000 to 99,999	$100
100,000 to 999,999	$1,000
1,000,000 to 9,999,999	$3,000
10,000,000 to more	$5,000

4.0 MONITORING REQUIREMENT TABLES

Table 4.1 Operational Monitoring

Parameter	Performance Levels	Inspection Frequency
Barren Solution and Pregnant Solution Ponds	No visible cracks or leaks in liner; pumps and fittings maintained without leaks and in good working order; minimum two feet of freeboard; no evidence of seepage	Daily
Berm Integrity	No substantial erosion; no evidence of seepage; no slumping	Weekly and after storms
Heap Leach and Solution Pond Leak Detection Sumps	No impairment of access; pumps working properly; level of liquids in sumps observed and recorded in on-site log; no visible cracks in sump	Daily
Solution Ditches	No evidence of spillage on the crest or outside the ditch embankment or leakage; no evidence of seepage; no visible cracks or leaks in liner; minimum two feet of freeboard	Daily
Tanks	No evidence of spills or leakage; pumps and fittings maintained without leaks in good working order; log kept on-site for operation and maintenance	Annually
Process Plant and Assay Lab	No evidence of process solution discharge or seepage	Weekly
Storm Water Diversion Ditches	No substantial erosion; no overgrowth of weeds; free of obstruction and debris; no build-up of sediment	Monthly
Underdrain Sump	No impairment of access; no visible cracks in sump	Daily

Table 4.2 Solution Pond Leak Detection Monitoring

Sampling Point	Identification	Location
1	Barren Solution Pond Leak Detection Sump	34° 11' 49" N 112° 44' 13" W
2	Pregnant Solution Pond Leak Detection Sump	34° 11' 51" N 112° 44' 18" W

Parameter	Alert Level	Monitoring Method	Monitoring Frequency	Reporting Frequency
Presence of Fluid	Reserved	Field Inspection	Daily during fluid containment	Quarterly
Volume Pumped	Reserved	Record volume pumped	As pumped	"
Rate Pumped	N/A	Record rate pumped	As pumped	"
De Minimus Leakage Rate	1,000 gpad[1]	Record volume collected	Daily during fluid containment	"
Rapid and Large Leakage Rate	11,000 gpad[2]	Record volume collected	Daily during fluid containment	"

[1] If leakage rate exceeds 1,000 gpad, implement contingency plan in Part 2.5.12.2

[2] If leakage rate exceeds 11,000 gpad, implement contingency plan in Part 2.5.12.3

Table 4.3 Heap Leach Pad Leak Detection Monitoring

Sampling Point	Identification	Location
3	Leach Pad Detection Sump A Monitoring Areas 2, 3, 4, 6	34° 11' 58" N 112° 44' 31" W
4	Leach Pad Detection Sump B Monitoring Areas 7, 9, 10, 11	34° 11' 58" N 112° 44' 31" W
5	Leach Pad Detection Sump C Monitoring Areas 5, 8	34° 11' 58" N 112° 44' 31" W

Parameter	Alert Level	Monitoring Method	Monitoring Frequency	Reporting Frequency
Presence of Fluid	Reserved	Field Inspection	Daily during fluid containment	Quarterly
Volume Pumped	Reserved	Record volume pumped	As pumped	"
Rate Pumped	N/A	Record rate pumped	As pumped	"
De Minimus Leakage Rate	15 gpd per area[3]	Calculation	Daily during fluid containment	"
Rapid and Large Leakage Rate	74 gpd per area[4]	Calculation	Daily during fluid containment	"

[3] If leakage rate exceeds 15 gpd, implement contingency plan in Part 2.5.12.4
[4] If leakage rate exceeds 74 gpd, implement contingency plan in Part 2.5.12.5

Table 4.4 Heap Leach Pad Leak Detection Monitoring

Sampling Point	Identification	Location
6	Leach Pad Detection Sump C Monitoring Area 1	34° 11' 58" N 112° 44' 31" W

Parameter	Alert Level	Monitoring Method	Monitoring Frequency	Reporting Frequency
Presence of Fluid	Reserved	Field Inspection	Daily during fluid containment	Quarterly
Volume Pumped	Reserved	Record volume pumped	As pumped	"
Rate Pumped	N/A	Record rate pumped	As pumped	"
De Minimus Leakage Rate	0.5 gpd per area[5]	Calculation	Daily during fluid containment	"
Rapid and Large Leakage Rate	2.2 gpd per area[6]	Calculation	Daily during fluid containment	"

[5] If leakage rate exceeds 0.5 gpd, implement contingency plan in Part 2.5.12.4
[6] If leakage rate exceeds 2.2 gpd, implement contingency plan in Part 2.5.12.5

Table 4.5 Groundwater and Surface Water Monitoring Points

Monitoring Point	Designation	ADWR No.	Cadastral Location	Latitude	Longitude
YMC-03	Hazardous & non-hazardous POC well	55-548395	(B-10-5) 23acb	34° 11' 50" N	112° 44' 40" W
Cottonwood Spring	Hazardous & non-hazardous monitoring point	Not required	(B-10-5) 14bdd	34° 12' 59" N	112° 44' 31" W
Fool's Gulch Spring	Hazardous & non-hazardous monitoring point	Not required	(B-10-05) 15ddc	34° 12' 08" N	112° 45' 19" W
Heap Leach Underdrain System	Hazardous & non-hazardous monitoring point	Not required	(B-10-05) 23bab	34° 12' 19" N	112° 44' 42" W

Table 4.6 Ambient Groundwater and Surface Water Monitoring Parameters and frequencies

Parameter	Sampling Frequency	Reporting Frequency
Field pH	Quarterly	Upon completion of 8 quarters of samples
Field conductivity	"	"
Field temperature	"	"
Lab pH	"	"
Lab conductivity	"	"
Total dissolved solids	"	"
Sulfate	"	"
Chloride	"	"
Fluoride	"	"
Carbonate	"	"
Bicarbonate	"	"
Hydroxide	"	"
Total alkalinity	"	"
Nitrite/Nitrate as total Nitrogen	"	"
Calcium	"	"
Magnesium	"	"
Potassium	"	"
Sodium	"	"
Antimony	"	"
Arsenic	"	"
Barium	"	"
Beryllium	"	"
Cadmium	"	"
Chromium	"	"
Copper	"	"
Iron	"	"
Lead	"	"
Manganese	"	"
Mercury	"	"
Nickel	"	"
Selenium	"	"
Silver	"	"
Thallium	"	"
Zinc	"	"
Gross Alpha	"	"
Gross Beta	"	"
Cyanide, Total	"	"
Cyanide, Free	"	"

Table 4.7 Quarterly Compliance Groundwater Monitoring, POC YMC-3

Parameter	AWQS	Alert Level	Sampling Frequency	Reporting Frequency
Field pH (standard units)	Reserved	6.4	Quarterly	Quarterly
Field conductance (umhos/cm)	Reserved	None	"	"
Field temperature (°C)	Reserved	None	"	"
Total dissolved solids (mg/l)	Reserved	655	"	"
Antimony[7] (mg/l)	0.006	0.005	"	"
Cadmium[7] (mg/l)	0.005	0.003	"	"
Mercury[7] (mg/l)	0.002	0.001	"	"
Nitrate + Nitrite as Total Nitrogen (mg/l)	10.0	1.2	"	"
Sulfate (mg/l)	Reserved	95	"	"
Cyanide, total[8] (mg/l)	Reserved	0.10	"	"

[7] Dissolved; field-filtered sample required.

[8] If concentration of total cyanide is equal to or greater than 0.2 mg/l, permittee must analyze sample for WAD and free cyanide.

Table 4.8 Compliance Monitoring for the Underdrain System Sump

Parameter	AWQS	Alert Level	Sampling Frequency	Reporting Frequency
Field pH (standard units)	Reserved	Reserved	Quarterly, or when water is present	Quarterly
Field conductance (umhos/cm)	Reserved	none	"	"
Field temperature (°C)	Reserved	none	"	"
Total dissolved solids (mg/l)	Reserved	Reserved	"	"
Antimony[9] (mg/l)	0.006	Reserved	"	"
Cadmium[9] (mg/l)	0.005	Reserved	"	"
Mercury[9] (mg/l)	0.002	Reserved	"	"
Nitrate + Nitrite as Total Nitrogen (mg/l)	10.0	Reserved	"	"
Sulfate (mg/l)	Reserved	Reserved	"	"
Cyanide, total[10] (mg/l)	Reserved	Reserved	"	"

[9] Both field and unfiltered samples required
[10] If concentration of total cyanide is equal to or greater than 0.2 mg/l, the permittee shall analyze the sample for WAD and free cyanide

Table 4.9 Compliance Monitoring for Cottonwood and Fools Gulch Springs

Parameter	SWQS or AWQS	Alert Level	Sampling Frequency	Reporting Frequency
Field pH (standard units)	6.5 - 9.0	Reserved	Quarterly, or when water is present	Quarterly
Field conductance (umhos/cm)	None	Reserved	"	"
Field temperature (°C)	None	none	"	"
Total dissolved solids (mg/l)	Reserved	Reserved	"	"
Antimony[11](mg/l)	0.006	Reserved	"	"
Cadmium[11] (mg/l)	Calculated	Reserved	"	"
Mercury[11] (mg/l)	0.00001	Detection Limit	"	"
Sulfate (mg/l)	Reserved	Reserved	"	"
Cyanide, total[12] (mg/l)	0.0097	Reserved	"	"
Turbidity (NTU)	50	Reserved	"	"

[11] Both field and unfiltered samples required
[12] If concentration of total cyanide is equal to or greater than 0.0097 mg/l, permittee must analyze sample for WAD and free cyanide

Table 4.10 Biennial Compliance Groundwater Monitoring for POC, YMC-3

Parameter	AWQS	Alert Level	Sampling Frequency	Reporting Frequency
Calcium (mg/l)	Reserved	130	Every 2 years	Every 2 years
Magnesium (mg/l)	Reserved	30	"	"
Potassium (mg/l)	Reserved	7	"	"
Sodium (mg/l)	Reserved	115	"	"
Chloride (mg/l)	Reserved	100	"	"
Fluoride (mg/l)	Reserved	3	"	"
Carbonate (mg/l $CaCO_3$)	Reserved	Reserved	"	"
Bicarbonate (mg/l $CaCO_3$)	Reserved	Reserved	"	"
Hydroxide (mg/l $CaCO_3$)	Reserved	Reserved	"	"
Total Alkalinity (mg/l $CaCO_3$)	Reserved	425	"	"
Nitrate (mg/l)	10.0	1.2	"	"
Cation/anion balance (calculated)	None	±5%	"	"
Arsenic[13] (mg/l)	0.05	0.01	"	"
Barium[13] (mg/l)	2	0.9	"	"
Manganese[13] (mg/l)	Reserved	11	"	"
Selenium[13] (mg/l)	0.05	0.01	"	"
Zinc[13] (mg/l)	Reserved	0.5	"	"
Gross Alpha (pCi/l)	15	Reserved	"	"

[13] Dissolved; field-filtered sample required

Table 4.11 Biennial Compliance Groundwater Monitoring for the Underdrain System

Parameter	AWQS	Alert Level	Sampling Frequency	Reporting Frequency
Calcium (mg/l)	Reserved	Reserved	Every 2 years	Every 2 years
Magnesium (mg/l)	Reserved	Reserved	"	"
Potassium (mg/l)	Reserved	Reserved	"	"
Sodium (mg/l)	Reserved	Reserved	"	"
Chloride (mg/l)	Reserved	Reserved	"	"
Fluoride (mg/l)	4.0	Reserved	"	"
Carbonate (mg/l $CaCO_3$)	Reserved	Reserved	"	"
Bicarbonate (mg/l $CaCO_3$)	Reserved	Reserved	"	"
Hydroxide (mg/l $CaCO_3$)	Reserved	Reserved	"	"
Total Alkalinity (mg/l $CaCO_3$)	Reserved	Reserved	"	"
Nitrite/Nitrate as total Nitrogen (mg/l)	10.0	Reserved	"	"
Cation/anion balance (calculated)	Reserved	±5%	"	"
Arsenic[14] (mg/l)	0.05	Reserved	"	"
Barium[14] (mg/l)	2.0	Reserved	"	"
Manganese[14] (mg/l)	Reserved	Reserved	"	"
Selenium[14] (mg/l)	0.05	Reserved	"	"
Zinc[14] (mg/l)	Reserved	Reserved	"	"
Gross Alpha (pCi/l)	15	Reserved	"	"

[14] Dissolved; field-filtered sample required

Table 4.12 Biennial Compliance Groundwater Monitoring for Cottonwood and Fools Gulch Springs

Parameter	SWQS or AWQS	Alert Level	Sampling Frequency	Reporting Frequency
Calcium (mg/l)	Reserved	Reserved	Every 2 years	Every 2 years
Magnesium (mg/l)	Reserved	Reserved	"	"
Potassium (mg/l)	Reserved	Reserved	"	"
Sodium (mg/l)	Reserved	Reserved	"	"
Chloride (mg/l)	Reserved	Reserved	"	"
Fluoride (mg/l)	4.0	Reserved	"	"
Carbonate (mg/l $CaCO_3$)	Reserved	Reserved	"	"
Bicarbonate (mg/l $CaCO_3$)	Reserved	Reserved	"	"
Hydroxide (mg/l $CaCO_3$)	Reserved	Reserved	"	"
Total Alkalinity (mg/l $CaCO_3$)	Reserved	Reserved	"	"
Nitrate (mg/l)	10.0	Reserved	"	"
Arsenic[15] (mg/l)	0.05	Reserved	"	"
Barium[15] (mg/l)	2.0	Reserved	"	"
Iron[15] (mg/l)	Reserved	Reserved	"	"
Manganese[15] (mg/l)	Reserved	Reserved	"	"
Selenium[15] (mg/l)	0.002	Reserved	"	"
Zinc[15] (mg/l)	Calculated	Reserved	"	"
Gross Alpha (pCi/l)	15	Reserved	"	"

[15] Dissolved; field-filtered and unfiltered samples required

Table 4.13 Contingency Groundwater Monitoring for POC, YMC-3

Parameter	AWQS	Sampling Frequency	Reporting Frequency
Field pH	Reserved	On contingency	Within 5 days of receiving lab results
Field conductance	Reserved	"	"
Field temperature	Reserved	"	"
Lab pH	Reserved	"	"
Lab conductance	Reserved	"	"
Total dissolved solids (mg/l)	Reserved	"	"
Sulfate (mg/l)	Reserved	"	"
Chloride (mg/l)	Reserved	"	"
Fluoride (mg/l)	4.0	"	"
Carbonate (mg/l)	Reserved	"	"
Bicarbonate (mg/l)	Reserved	"	"
Hydroxide (mg/l)	Reserved	"	"
Total alkalinity (mg/l)	Reserved	"	"
Nitrate (mg/l)	10.0	"	"
Nitrite/Nitrate as total nitrogen (mg/l)	10.0	"	"
Calcium (mg/l)	Reserved	"	"
Magnesium (mg/l)	Reserved	"	"
Potassium (mg/l)	Reserved	"	"
Sodium (mg/l)	Reserved	"	"
Cation/anion balance	Reserved	"	"
Antimony[16] (mg/l)	0.006	"	"
Arsenic[16] (mg/l)	0.05	"	"
Barium[16] (mg/l)	2	"	"
Beryllium[16] (mg/l)	0.004	"	"
Cadmium[16] (mg/l)	0.005	"	"
Chromium[16] (mg/l)	0.1	"	"
Copper[16] (mg/l)	Reserved	"	"
Iron[16] (mg/l)	Reserved	"	"
Lead[16] (mg/l)	0.05	"	"
Manganese[16] (mg/l)	Reserved	"	"
Mercury[16] (mg/l)	0.002	"	"
Nickel[16] (mg/l)	0.1	"	"
Selenium[16] (mg/l)	0.05	"	"
Thallium[16] (mg/l)	0.002	"	"
Zinc[16] (mg/l)	Reserved	"	"
Cyanide, total [17] (mg/l)	Reserved	"	"
Gross alpha (pCi/l)	15	"	"

[16] Dissolved; field filtered sample required.
[17] If total cyanide concentration is equal to or greater than 0.2 mg/l, permittee must analyze sample for free and WAD cyanide.

Table 4.14 Contingency Groundwater Monitoring for the Underdrain System

Parameter	AWQS	Sampling Frequency	Reporting Frequency
Field pH	Reserved	On contingency	Within 5 days of receiving lab results
Field conductance	Reserved	"	"
Field temperature	Reserved	"	"
Lab pH	Reserved	"	"
Lab conductance	Reserved	"	"
Total dissolved solids (mg/l)	Reserved	"	"
Sulfate (mg/l)	Reserved	"	"
Chloride (mg/l)	Reserved	"	"
Fluoride (mg/l)	4.0	"	"
Carbonate (mg/l)	Reserved	"	"
Bicarbonate (mg/l)	Reserved	"	"
Hydroxide (mg/l)	Reserved	"	"
Total alkalinity (mg/l)	Reserved	"	"
Nitrate (mg/l)	10.0	"	"
Nitrite/Nitrate as total nitrogen (mg/l)	10.0	"	"
Calcium (mg/l)	Reserved	"	"
Magnesium (mg/l)	Reserved	"	"
Potassium (mg/l)	Reserved	"	"
Sodium (mg/l)	Reserved	"	"
Cation/anion balance	Reserved	"	"
Antimony[18] (mg/l)	0.006	"	"
Arsenic[18] (mg/l)	0.05	"	"
Barium[18] (mg/l)	2.0	"	"
Beryllium[18] (mg/l)	0.004	"	"
Cadmium[18] (mg/l)	0.005	"	"
Chromium[18] (mg/l)	0.1	"	"
Copper[18] (mg/l)	Reserved	"	"
Iron[18] (mg/l)	Reserved	"	"
Lead[18] (mg/l)	0.05	"	"
Manganese[18] (mg/l)	Reserved	"	"
Mercury[18] (mg/l)	0.002	"	"
Nickel[18] (mg/l)	0.1	"	"
Selenium[18] (mg/l)	0.05	"	"
Thallium[18] (mg/l)	0.002	"	"
Zinc[18] (mg/l)	Reserved	"	"
Cyanide, total[19] (mg/l)	Reserved	"	"
Gross alpha (pCi/l)	15	"	"

[18] Dissolved; field-filtered sample required
[19] If total cyanide concentration is equal to or greater than 0.2 mg/l, permittee must analyze sample for free and WAD cyanide.

Table 4.15 Contingency Groundwater Monitoring for Cottonwood and Fools Gulch Springs

Parameter	SWQS or AWQS	Sampling Frequency	Reporting Frequency
Field pH	6.5 - 9.0	On contingency	Within 5 days of receiving lab results
Field conductance	Reserved	"	"
Field temperature	Reserved	"	"
Lab pH	Reserved	"	"
Lab conductance	Reserved	"	"
Total dissolved solids (mg/l)	Reserved	"	"
Total suspended solids (mg/l)	Reserved	"	"
Sulfate (mg/l)	Reserved	"	"
Chloride (mg/l)	Reserved	"	"
Fluoride (mg/l)	4.0	"	"
Carbonate (mg/l)	Reserved	"	"
Bicarbonate (mg/l)	Reserved	"	"
Hydroxide (mg/l)	Reserved	"	"
Total alkalinity (mg/l)	Reserved	"	"
Nitrate (mg/l)	10.0	"	"
Nitrite/Nitrate as total nitrogen (mg/l)	10.0	"	"
Calcium (mg/l)	Reserved	"	"
Magnesium (mg/l)	Reserved	"	"
Potassium (mg/l)	Reserved	"	"
Sodium (mg/l)	Reserved	"	"
Antimony[20] (mg/l)	0.006	"	"
Arsenic[20] (mg/l)	0.05	"	"
Barium[20] (mg/l)	2.0	"	"
Beryllium[20] (mg/l)	0.004	"	"
Cadmium[20] (mg/l)	Calculated	"	"
Chromium[20] (mg/l)	Calculated	"	"
Copper[20] (mg/l)	Calculated	"	"
Iron[20] (mg/l)	Reserved	"	"
Lead[20] (mg/l)	Calculated	"	"
Manganese[20] (mg/l)	Reserved	"	"
Mercury[20] (mg/l)	0.00001	"	"
Nickel[20] (mg/l)	Calculated	"	"
Selenium[20] (mg/l)	0.002	"	"
Thallium[20] (mg/l)	0.002	"	"
Zinc[20] (mg/l)	Calculated	"	"
Cyanide, total[21] (mg/l)	0.0097	"	"
Gross alpha (pCi/l)	15	"	"

[20] Both field-filtered and unfiltered samples required.
[21] If total cyanide concentration is equal to or greater than 0.0097 mg/l, the permittee shall analyze sample for free and WAD cyanide.

Table 4.16 Contingency Monitoring for Waste Rock

Analysis	Sample Frequency	Alert Levels
Acid Base Accounting	Quarterly	The ANP/AGP ratio is ≤ 3 or total sulfur ≥ 0.1%
EPA Method 1312, SPLP (or similar leachability test, approved by ADEQ, WPS-MU) for:	Quarterly	AWQS:
Antimony		0.006 mg/l
Arsenic		0.05 mg/l
Beryllium		0.004 mg/l
Cadmium		0.005 mg/l
Chromium		0.1 mg/l
Lead		0.05 mg/l
Mercury		0.002 mg/l
Selenium		0.05 mg/l
Thallium		0.002 mg/l

5.0 REFERENCES AND PERTINENT INFORMATION

5.1 References

The terms and conditions set forth in this permit have been developed based upon the information contained in the following:

1. Arizona Revised Statutes, Title 49, Chapter 2, Articles 1,2, and 3
2. Arizona Administrative Code, Title 18, Chapter 9, Article 1
3. Arizona Administrative Code, Title 18, Chapter 11, Article 1 and 4
4. Final Draft, Arizona Mining BADCT Guidance Manual, August 1996
5. Aquifer Protection Permit Application dated December, 1995
6. Inventory No. 101015, including all correspondence, engineering reviews and hydrological reviews
7. Public Notice dated:
8. Public Hearing comments, correspondence and any additional supplemental information contained in the permit file:
9. Other:

5.2 Facility Information

The ADEQ Aquifer Protection Permit Program shall be notified within 30 days of any change in any of the information below:

1. Facility Contact Person: Mr. Mark Montoya, General Manager
2. Address: P.O. Box 1182, Yarnell, AZ 85362
3. Emergency Telephone Number: (520) 648-2500
4. Landowner of Facility Site: Yarnell Mining Company
   P.O. Box 1182
   Yarnell, AZ 85362

6.0 General Conditions and Responsibilities

6.1 Preservation of Rights[22]

This permit shall not be construed to abridge or alter causes of action or remedies under the common law or statutory law, criminal or civil, nor shall any provision of this permit, or any act done by virtue of this permit, be construed so as to stop any person, this state or any political subdivision of this state, or owners of land having groundwater or surface water rights or otherwise, from exercising their rights or, under the common law or statutory law, from suppressing nuisances or preventing injury due to discharges.

6.2 Monitoring Requirements[23]

1. The permittee shall conduct any monitoring activity necessary to assure compliance with any other Aquifer Protection Permit condition, with the applicable water quality standards established pursuant to A.R.S. §§ 49-221 and 49-223, and with A.R.S. §§ 49-241 through 49-251.
2. The permittee shall make, for each sample taken or measurement made as required by this permit, a monitoring record consisting of all of the following:
   (1) The date, time, and exact place of a sampling or measurement and the name of each individual who performed the sampling or measuring.
   (2) The procedures used to collect the sample or make the measurement.
   (3) The date on which sample analysis was completed.
   (4) The name of each individual or laboratory who performed the analysis.
   (5) The analytical techniques or methods used to perform the sampling and analysis.
   (6) The chain of custody records.
   (7) Any field notes relating to the information described in Paragraphs (1) through (6)
3. The permittee shall retain or have access to a monitoring record made pursuant to PART VI, Section B.2 for a period of 10 years after the date of the sample or measurement.

6.3 Reporting of Bankruptcy or Environmental Enforcement[24]

The permittee shall notify the Director within five days after the occurrence of any one of the following:

1. The filing of bankruptcy by the permittee.
2. The entry of any order or judgment against the permittee for the enforcement of any environmental protection statute and in which monetary damages or civil penalties are imposed.

6.4 Inspections[25]

The director may, on presentation of credentials, enter into, on or through any public or private property from which a discharge has occurred, is occurring or may occur, as is reasonably necessary to ensure compliance with this chapter. The director or a department employee may take samples, inspect and copy records required to be maintained pursuant to this chapter, inspect equipment, activities, facilities and monitoring equipment or methods of monitoring, take photographs and take other action reasonably necessary to determine the application of, or compliance with, this chapter. The owner or managing agent of the property shall be afforded the opportunity to accompany the director or department employee during inspections and investigations, but prior notice of entry to the owner or managing agent

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22 A.R.S. § 49-206
23 A.A.C. R18-9-112.A, C, and D
24 A.A.C. R18-9-113.D
25 A.R.S. § 49-203.B.1

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2. The permittee shall make, for each sample taken or measurement made as required by this permit, a monitoring record consisting of all of the following:
   (1) The date, time, and exact place of a sampling or measurement and the name of each individual who performed the sampling or measuring.
   (2) The procedures used to collect the sample or make the measurement.
   (3) The date on which sample analysis was completed.
   (4) The name of each individual or laboratory who performed the analysis.
   (5) The analytical techniques or methods used to perform the sampling and analysis.
   (6) The chain of custody records.
   (7) Any field notes relating to the information described in Paragraphs (a) through (g)
3. The permittee shall retain or have access to a monitoring record made pursuant to PART VI, Section B.2 for a period of 10 years after the date of the sample or measurement.

6.3 Reporting of Bankruptcy or Environmental Enforcement[24]

The permittee shall notify the Director within five days after the occurrence of any one of the following:

1. The filing of bankruptcy by the permittee.
2. The entry of any order or judgment against the permittee for the enforcement of any environmental protection statute and in which monetary damages or civil penalties are imposed.

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[22] A.R.S. § 49-206
[23] A.A.C. R18-9-112.A, C, and D
[24] A.A.C. R18-9-113.D
[25] A.R.S. § 49-203.B.1

is not required if reasonable grounds exist to believe that such notice would frustrate the enforcement of this chapter. If the director or department employee obtains any samples before leaving the premises, he shall give the owner or managing agent a receipt describing the samples obtained and a portion each sample equal in volume or weight to the portion retained. If an analysis is made of samples, or monitoring and testing are performed, a copy of the results shall be furnished promptly to the owner or managing agent.

6.5 Proper Operation[26]

1. The facility shall be so designed, constructed and operated as to ensure the greatest degree of discharge reduction achievable through application of the best available demonstrated control technology, processes, operating methods or other alternatives, including, where practicable, a technology permitting no discharge of pollutants.
2. Pollutants discharged shall in no event cause or contribute to a violation of aquifer water quality standards at the applicable point of compliance for the facility.
3. No pollutants discharged shall further degrade, at the applicable point of compliance, the quality of any aquifer that already violates the aquifer quality standard for that pollutant.

6.6 Technical and Financial Capability [27]

1. The permittee shall have and maintain the technical and financial capability necessary to fully carry out the terms and conditions of the permit.
2. The Director may establish any of the permit conditions described in A.A.C. R18-9-109 through R18-9-116 on the basis of the Director's evaluation of the permittee's technical or financial capability necessary to carry out the terms and conditions of the individual Aquifer Protection Permit.
3. The permittee shall maintain any bond, insurance policy, or trust fund provided under R18-9-108(B)(8)(c)(iii) or R18-9-121(A). A bond, insurance policy, or trust fund required to be maintained under this subsection shall remain in effect for the duration of the permit.

6.7 Other Rules and Laws

The issuance of this permit does not waive any federal, state, county or local government rules, regulations or permits applicable to this facility.

6.8 Permit Actions[28]

The filing of a request by the permittee for a permit action does not stay any existing permit condition.

6.8.1 Public Notice[29]

The Director shall issue a public notice of all proposed permit actions pursuant to R18-9-124.

6.8.2 Permit Modifications[30]

1. The permittee shall give written notice to the Director 180 calendar days before any major modification to the facility described in A.R.S. § 49-201(19) pursuant to A.A.C. R18-9-113.A.
2. The Director may modify an individual Aquifer Protection Permit based upon a request or upon the Director's initiative. A request for permit modification shall be in writing and shall contain the facts and reasons which justify the request. The Director may modify an individual Aquifer Protection Permit if the Director determines

[26] A.R.S. § 49-243.B.1, 2, and 3
[27] A.A.C. R18-9-117
[28] A.A.C. R18-9-121
[29] A.A.C. R18-9-121.G
[30] A.A.C. R18-9-121.C and D

any one or more of the following:

(1) That material and substantial alterations or additions to a permitted facility justify a change in permit conditions.

(2) That the discharge from the facility violates or could reasonably be expected to violate any Aquifer Water Quality Standard.

(3) That rule or statutory changes have occurred, such as to require a change in the permit.

3. Notwithstanding A.A.C. R18-9-121(G) and R18-9-124(F), and with the written concurrence of the permittee, the Director may make minor modifications to the individual Aquifer Protection Permit without giving public notice or conducting a public hearing, for any of the following reasons:

(1) To correct typographical errors.

(2) To increase the frequency of monitoring or reporting.

(3) To change an interim compliance date in a compliance schedule if the permittee can show just cause and that the new date does not interfere with the attainment of a final compliance date requirement.

(4) To change construction requirements, if the alteration complies with the requirements of this Article and provides equal or better performance.

(5) To replace monitoring equipment, including wells, if such replacement results in equal or greater monitoring effectiveness.

6.8.3 Additional Information

The permittee may be required to submit additional information pursuant to A.A.C. R18-9-108, including an updated permit application.

6.8.4 Permit Transfer[31]

The Director may transfer an individual Aquifer Protection Permit if the Director determines that the proposed transferee shall comply with A.R.S. §§ 49-241 through 49-251 and this Article. A permittee is responsible for complying with permit conditions, A.R.S. §§ 49-241 through 49-251, and this Article, regardless of whether the permittee has sold or otherwise disposed of the facility, until the Director transfers a permit pursuant to this subsection.

6.8.5 Permit Suspension or Revocation[32]

1. The Director may suspend or revoke an individual Aquifer Protection Permit or Groundwater Quality Protection Permit, for any of the following reasons:

(1) Non-compliance by the permittee with any applicable provision of Title 49, Chapter 2, Article 3 of the Arizona Revised Statutes, this Article, or any permit condition.

(2) The permittee's misrepresentation or omission of any fact, information, or data related to an Aquifer Protection Permit application or permit conditions.

(3) If the Director determines that the permitted activity is causing or may cause a violation of any Aquifer Water Quality Standard.

(4) If a permitted discharge has the potential to cause or will cause imminent and substantial endangerment to public health or the environment.

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[31] A.A.C. R18-9-121.E
[32] A.A.C. R18-9-121.F

6.9 Confidentiality of Information[33]

1. Any records, reports or information obtained from any person under Title 49, Chapter 2, including records, reports or information obtained or prepared by the director or a department employee, shall be available to the public, except that the information, or a particular part of the information, shall be considered confidential on either:
   (1) A showing, satisfactory to the director, by any person that the information, or a particular part of the information, if made public, would divulge the trade secrets of the person.
   (2) A determination by the attorney general that disclosure of the information or a particular part of the information would be detrimental to an ongoing criminal investigation or to an ongoing or contemplated civil enforcement action under this chapter in superior court.
2. Notwithstanding subsection 1, the following information shall be available to the public:
   (1) The name and address of any permit applicant or permittee.
   (2) The chemical constituents, concentrations and amounts of any pollutant discharge.
   (3) The existence or level of a concentration of a pollutant in drinking water or in the environment.
3. Notwithstanding subsection 1, the director may disclose any records, reports or information obtained from any person under this chapter, including records, reports or information obtained by the director or department employees, to:
   (1) Other state employees concerned with administering this chapter or if the records, reports or information are relevant to any administrative or judicial proceeding under Title 49, Chapter 2.
   (2) Employees of the United States environmental protection agency if such information is necessary or required to administer and implement or comply with the clean water act, the safe drinking water act, CERCLA or provisions and regulations relating to those acts.
4. Financial information required to be supplied under A.R.S. § 49-243.N is confidential.

6.10 Violations and Enforcement[34]

Any person who owns or operates a facility contrary to the provisions of this permit or Title 18, Chapter 9, Article 1 of the Arizona Administrative Code, who violates the conditions specified in this permit issued pursuant to Title 18, Chapter 9, Article 1 of the Arizona Administrative Code, or who violates any Groundwater Protection Permit continued pursuant to A.A.C. R18-9-103(A) is subject to the enforcement actions prescribed in Title 49, Chapter 2, Article 4 of the Arizona Revised Statutes.

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[33] A.R.S. § 49-205
[34] A.A.C. R18-9-130

7.0 AQUIFER WATER QUALITY STANDARDS

7.1 General Standards Applicable to All Aquifers[35]

1. A discharge shall not cause the concentration of a pollutant in an aquifer to exceed at the applicable point of compliance any one of the maximum concentrations prescribed in A.A.C. R18-11-406, unless a higher Aquifer Quality Limit has been established by this permit.
2. A discharge shall not cause a pollutant to be present in an aquifer classified for a drinking water protected use in a concentration which endangers human health.
3. A discharge shall not cause or contribute to a violation of a water quality standard established for a navigable water of the state.
4. A discharge shall not cause a pollutant to be present in an aquifer which impairs existing or reasonably foreseeable uses of water in an aquifer.

[35] A.A.C. R18-11-405

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY
Air Quality Division
3033 N. Central Ave. • Phoenix, AZ 85012-2809-33 • Phone: (602) 207-2338

AIR QUALITY CONTROL PERMIT

(As required by Title 49, Chapter 3, Article 2, Section 49-426, Arizona Revised Statutes)

This air quality control permit does not relieve applicant of responsibility for meeting all air pollution regulations

1. PERMIT TO BE ISSUED TO (Business license name of organization that is to receive permit) *Yarnell Mining Company*

2. NAME (OR NAMES) OF OWNER OR PRINCIPALS DOING BUSINESS AS THE ABOVE ORGANIZATION *Dennis R. Stansbury*

3. MAILING ADDRESS *189 S. Broadway St., P.O. Box 1182*
NUMBER STREET
Yarnell, AZ 85362
CITY OR COMMUNITY STATE ZIP CODE

4. ORIGINAL EQUIPMENT LOCATION/ADDRESS *1.5 miles SW of Yarnell, via Hwy 89*
NUMBER STREET
Yarnell, Yavapai County, Arizona 85362
CITY OR COMMUNITY STATE COUNTY ZIP CODE

5. FACILITIES OR EQUIPMENT DESCRIPTION *Gold Mining Operation; See Attachment "C"*

6. THIS PERMIT ISSUED SUBJECT TO THE FOLLOWING *Conditions contained in Attachments "A" and "B"*

7. ADEQ PERMIT NUMBER *# 1000383* PERMIT CLASS *I* EXPIRATION DATE _____

PERMIT ISSUED THIS _____ DAY OF _____, *1996*

Nancy C. Wrona, Director, Air Quality Division
SIGNATURE TITLE

ADEQ/AQD/P100D (9-93)

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR QUALITY TITLE V PERMIT

COMPANY: Yarnell Mining Company
FACILITY: Gold Mine
Permit No.: 1000383
DATE ISSUED: Draft
EXPIRY DATE:

SUMMARY

This Class I, unitary permit covers the development and operation of an open-pit, gold mining operation by the Yarnell Mining Company, a subsidiary of Bema Gold (U.S.), Inc. (permittee) . The mine is located 1.5 miles southwest of Yarnell, Arizona in Yavapai County The project will consist of the open-pit mine, two waste rock areas, ore crushers, a heap leach pad, process ponds, an assay laboratory and a gold refinery plant. Electric power for the project will be provided by line power or by diesel powered generators with approximately 1,200 kilowatt capacity.

Drilling and blasting will occur in the pit, and the resulting ore and waste rock will be removed. Waste rock from the pit will be transported by haul trucks to two waste rock storage areas. Ore will be hauled to a stationary crushing facility, crushed to 80 percent minus 1½ inch size and mixed with lime. The crushed ore will be hauled to a conventional leach pad where sodium cyanide solution will be percolated through the ore for leaching. Gold will be recovered by carbon adsorption and stripping and refined by electrowinning and a doré furnace. Molten bullion will be cast into doré bars. Mining, ore processing, waste rock storage, and associated operations and support activities at the mining site will be sources of air pollutants. The principal pollutants will be particulate matter less than 10 micrometers in diameter (PM_{10}), oxides of nitrogen (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2) and volatile organic compounds (VOCs). The mine also has the potential to emit small quantities of hydrogen cyanide (HCN) and mercury (Hg).

All of these pollutants are regulated under Arizona and federal law with standards and guidelines that specify emission controls, emission limits and/or allowable ambient, off-site impacts of the pollutants. The estimated, maximum, total emissions from this project were determined as shown in Table 1. These estimates are based on the installation, operation and maintenance of the required controls and other permit requirements summarized in Table 2.

Table 1 - Estimated Emissions

Summary of Controlled Emissions							
Pollutants	PM_{10}	NO_x	CO	SO_2	VOCs	HCN	Hg
Emissions, pounds/day							
Process	249	609	202	13.9	28.0	0.0	0.088
Non-Process	927	320	1260	37.6	2.7	26.7	0.000
Total	1,176	929	1,462	51.5	30.7	26.7	0.088
Annual Emissions, tons/year							
Process	11.5	111.0	36.9	2.5	5.1	0.0	0.0083
Non-Process	71.5	16.6	65.2	1.9	0.5	4.86	0.0000
Total	83.0	127.6	102.1	4.4	5.6	4.86	0.0083

Table 2 - Summary of Permit Requirements

Emission Unit	Specie Emitted	Control Measure/ PM_{10} Control Efficiency	Emission Limit Opacity Standard (1)	Recordkeeping	Reporting
Drilling	PM_{10}	water injection, pneumatic flushing and/ or dust shroud/85%	opacity ≤ 40%	compliance with Operation and Maintenance (O and M) Plan	semi-annual, summary report of recordkeeping requirements except for performance test results
Haul Roads	PM_{10}	water/chemical application/90%	opacity ≤ 40%	record date, time, intensity and roadway designation for both suppressant and water applications	
Off-road Machinery	SO_2, PM	0.05 percent or less sulfur content in diesel No. 2 fuel	opacity ≤ 40%	record the sulfur content of fuel burned per vendor specification	
Generators	SO_2, PM	0.05 percent or less sulfur content in diesel No. 2 fuel	opacity ≤ 40%; $E = 1.02\ Q^{0.769}$ (2); $SO_2 \leq 1$ lb/MMBtu	record the sulfur content of fuel burned per vendor specification	
Carbon Kiln	Hg, PM_{10}	baghouse/98% for PM_{10}; 90% for Hg	opacity ≤ 40%; $E = 4.10\ Q^{0.67}$ (2); $SO_2 \leq 600$ ppm; $NO_x \leq 500$ ppm	results of performance test for PM_{10}	results of performance test for PM_{10} within 30 days after testing is performed
Doré Furnace	Hg, PM_{10}				
Primary Crusher Secondary Crusher	PM_{10}	high pressure water sprays or equivalent/90%	opacity ≤ 10%;	secondary crusher performance test results	
				record ore processed and hours of operation, daily/monthly	semi-annual, summary report of recordkeeping requirements except for performance test results
				compliance with O and M Plan	
Ore Conveyor	PM_{10}	water sprays/83%	opacity ≤ 10%	compliance with O and M Plan	
Lime Silo	PM_{10}	fabric filter/99%	opacity ≤ 40%	compliance with O and M Plan	
Waste Dump Erosion	PM_{10}	water or chemical suppressant application/90%	opacity ≤ 40%	for water, record of date, time, intensity and pile designation	
Ore Storage Erosion	PM_{10}	water or chemical suppressant application/90%	opacity ≤ 40%	for water, record of date, time, intensity and pile designation	
Leach Pad	HCN	drip emitters; spray bars; pH control	HCN ≤ 0.3 ppmv, 8-hour avg.	measure and record pH value daily	
	NaCN	proper storage	NaCN ≤ 140 $\mu g/m^3$, 8-hour avg.	record of date of deliveries and the method of containment as delivered and stored	

Notes: (1) Measurement methods are: EPA Reference Method 5 for PM/PM_{10} mass emission rate; Method 9 for opacity; Method 6 for SO_2: and Method 7 for NO_x.
(2) E = pounds per hour; Q = heat input in MMBtu per hour.

ABBREVIATIONS

$\mu g/m^3$	microgram per cubic meter
A.A.C.	Arizona Administrative Code
A.R.S.	Arizona Revised Statutes
ADEQ	Arizona Department of Environmental Quality
CO	carbon monoxide
dscf	standard cubic foot, dry
EPA	Environmental Protection Agency
g/scm	grams per standard cubic meter
HCN	hydrogen cyanide
Hg	mercury
kW	kilowatt
NaCN	sodium cyanide
NO_x	oxides of nitrogen
pH	the negative logarithm (base 10) of the hydrogen ion concentration of the solution
PM	particulate matter
PM_{10}	Particulate matter with an aerodynamic diameter less than or equal to ten micrometers
ppmv	parts per million by volume
scfm	standard cubic feet per minute
SO_2	sulphur dioxide
TPH	tons per hour
VOC	volatile organic compounds

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ATTACHMENT "A": GENERAL PROVISIONS

Air Quality Control Permit No. 1000383
For
Yarnell Mining Company

I. PERMIT EXPIRATION AND RENEWAL

[A.R.S. § 49-426.F, A.A.C. R18-2-304.C.2 and 306.A.1]

A. This permit is valid for a period of five years from the date of issuance of the permit.

B. The permittee shall submit an application for renewal of this permit at least 6 months, but not more than 18 months prior to the date of permit expiration.

II. NOTIFICATION OF OPERATION STARTUP

[A.A.C. R18-2-901.1]

The permittee shall furnish to the Department written notification as follows:

A. Activities not subject to 40 CFR 60, Subpart LL

A notification of the date commencement of any mine activity at the permitted source postmarked no later than 30 days after such date.

B. Activities subject to 40 CFR 60, Subpart LL

1. A notification of the date construction of an affected facility is commenced postmarked no later than 30 days after such date.

2. A notification of the anticipated date of initial startup of the an affected facility postmarked not more than 60 days nor less than 30 days prior to such date.

3. A notification of the actual date of initial startup of an affected facility postmarked within 15 days after such date.

III. COMPLIANCE WITH PERMIT CONDITIONS

[A.A.C. R18-2-306.A.8]

A. The permittee shall comply with all conditions of this permit including all applicable requirements of Arizona air quality statutes and the air quality rules. Any permit noncompliance constitutes a violation of the Arizona Revised Statutes and is grounds for enforcement action; for permit termination, revocation and reissuance, or revision; or for denial of a permit renewal application. In addition, those requirements not cited as state only are in violation of the Clean Air Act.

B. Need to halt or reduce activity not a defense. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

IV. PERMIT REVISION, REOPENING, REVOCATION AND REISSUANCE, OR TERMINATION FOR CAUSE

[A.A.C. R18-2-306.A.8.c, 321]

A. The permit may be revised, reopened, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit revision, revocation and reissuance, or termination; or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

B. The permit shall be reopened and revised under any of the following circumstances:

1. Additional applicable requirements under the Act become applicable to the class I source. Such reopening shall only occur if there are three or more years remaining in the permit term. The reopening shall be completed not later than 18 months after promulgation of the applicable requirement. No such reopening is required if the effective date of the requirement is later than the date on which the permit is due to expire, unless the original permit or any of its terms and conditions has been extended pursuant to R18-2-322(B). Any permit revision required pursuant to this subparagraph shall comply with provisions in R18-2-322 for permit renewal and shall reset the five year permit term.

2. Additional requirements, including excess emissions requirements, become applicable to an affected source under the acid rain program. Upon approval by the Administrator, excess emissions offset plans shall be deemed to be incorporated into the Class I permit.

3. The Director or the Administrator determines that the permit contains a material mistake or that inaccurate statements were made in establishing the emissions standards or other terms or conditions of the permit.

4. The Director or the Administrator determines that the permit needs to be revised or revoked to assure compliance with the applicable requirements.

5. Proceedings to reopen and issue a permit, including appeal of any final action relating to a permit reopening, shall follow the same procedures as apply to initial permit issuance and shall, except for reopenings under paragraph 1 above, affect only those parts of the permit for which cause to reopen exists. Such reopening shall be made as expeditiously as practicable.

V. POSTING OF PERMIT

[A.A.C. R18-2-315]

A. Permittee shall post such permit, or a certificate of permit issuance on location where the equipment is installed in such a manner as to be clearly visible and accessible. All equipment covered by the permit shall be clearly marked with one of the following:

1. Current permit number.

2. Serial number or other equipment number that is also listed in the permit to identify that piece of equipment.

B. A copy of the complete permit shall be kept on the site.

VI. FEE PAYMENT

[A.A.C. R18-2-326; 306.A.9.]

Permittee shall pay fees to the Director pursuant to A.R.S. § 49-426(E) and A.A.C. R18-2-326.

VII. ANNUAL EMISSIONS INVENTORY QUESTIONNAIRE

[A.A.C. R18-2-327]

A. Permittee shall complete and submit to the Director an annual emissions inventory questionnaire. The questionnaire is due by March 31 or ninety days after the Director makes the inventory form available each year, whichever occurs later, and shall include emission information for the previous calendar year.

B. The questionnaire shall be on a form provided by the Director and shall include the information required by A.A.C. R18-2-327.

VIII. COMPLIANCE PLAN AND CERTIFICATION

[A.A.C. R18-2-309]

A. Permittee shall submit a compliance certification to the Director twice each year, which describes 1) the compliance status of the source with respect to each permit condition, and 2) the methods used for determining the compliance status. The permittee shall list on the compliance certification all items of equipment on site at the time of semi-annual certification. This certification shall be submitted on March 31 and September 31 of each year.

The compliance certification shall include the following:

1. Identification of each term or condition of the permit that is the basis of the certification;

2. Compliance status of each applicable requirement;

3. Whether compliance was continuous or intermittent; and

4. Method(s) used for determining the compliance status of the source, currently and over the reporting period.

B. A copy of all compliance certification for Class I permits shall also be submitted to the EPA Administrator.

C. The permittee shall submit a compliance schedule for any episode of non-compliance. The compliance schedule shall be submitted with in fourteen (14) days of the occurrence of such episode, unless additional time is approved by the Director. The compliance schedule shall include:

1. a narrative description of how the source will achieve compliance;

2. a schedule for submission of certified progress reports no less frequently than every 6 months;

3. dates for achieving the activities, milestones, or compliance required in the schedule of compliance, and dates when such activities, milestones or compliance shall be achieved, and an explanation of why any dates in the schedule of compliance were not or will not be met, and any preventive or corrective measures adopted.

D. The permittee is required to correct any item of non-compliance as soon as possible after discovery. For any episode of non-compliance which has not been corrected at the time of semi-annual certification permittee shall submit a compliance schedule. The compliance -schedule must describe the necessary remedial measures, include milestones leading to compliance, and provide dates for achieving milestones.

IX. CERTIFICATION OF TRUTH, ACCURACY AND COMPLETENESS

[A.A.C. R18-2-304.H]

Any document required to be submitted by this permit, including reports, shall contain a certification by a responsible official of truth, accuracy, and completeness. This certification and any other certification required under this part shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

X. INSPECTION AND ENTRY

[A.A.C. R18-2-309.4]

The permittee shall allow the Director or the authorized representative of the Director upon presentation of proper credentials to:

A. Enter upon the permittee's premises where a source is located or emissions-related activity is conducted, or where records are required to be kept under the conditions of the permit;

B. Have access to and copy, at reasonable times, any records that are required to be kept under the conditions of the permit;

C. Inspect, at reasonable times, any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit;

D. Sample or monitor, at reasonable times, substances or parameters for the purpose of assuring compliance with the permit or other applicable requirements; and

E. Record any inspection by use of written, electronic, magnetic and photographic media.

XI. PERMIT REVISION PURSUANT TO FEDERAL HAZARDOUS AIR POLLUTANT STANDARD

[A.A.C. R18-2-304.C]

If this source becomes subject to a standard promulgated by the Administrator pursuant to section 112(d) of the Act, then the permittee shall, within twelve months of the date on which the standard is promulgated, submit an application for a permit revision demonstrating how the source will comply with the standard.

XII. PERMIT DEVIATION REPORTING

A. EXCESS EMISSIONS REPORTING

[A.A.C. R18-2-306.A.5.b, 306.E.3.d and 310]

A.A.C. R18-2-310 will become federally enforceable upon approval by EPA of the Department's Title V operating permits program or when A.A.C. R18-2-310 is approved by EPA for incorporation into the State Implementation Plan, whichever comes first.

1. Emissions in excess of an applicable emission limitation contained in this permit shall constitute a violation. For all situations that constitute an emergency as defined in R18-2-306(E), the affirmative defense and reporting requirements contained in that provision shall apply. In all other circumstances, it shall be an affirmative defense if the permittee of the source has complied with the reporting requirements of subsection 3. of this section in a timely manner, and has demonstrated all of the following:

   a. Excess emissions resulted from a sudden and unavoidable breakdown of the process or the control equipment; resulted from unavoidable conditions during startup or shutdown; resulted from unavoidable conditions during an upset of operations; or that greater or more extended excess emissions would result unless scheduled maintenance is performed;

   b. Air pollution control equipment, process equipment, or processes were at all times maintained and operated, in a manner consistent with good practice for minimizing emissions;

   c. Where repairs were required, such repairs were made in an expeditious fashion when the applicable emission limitations were being exceeded and off-shift labor and overtime were utilized where practical to insure that such repairs were made as expeditiously as possible.

If off shift labor and overtime were not utilized, the permittee satisfactorily demonstrated that such measures were impractical;

d. Amount and duration of the excess emissions (including any bypass operation) were minimized to the maximum extent practicable during periods of such emissions;

e. All feasible steps were taken to minimize the impact of the excess emissions on potential violations of ambient air quality standards;

f. Excess emissions were not part of a recurring pattern indicative of inadequate design, operation, or maintenance; and,

g. During the period of excess emissions, no measured violations of the ambient air quality standards established in A.A.C. R18-2-201 through R18-2-206 which could be attributed to the emitting source.

2. It shall be the burden of the permittee of the source to demonstrate, through submission of the data and information required by this section, that all reasonable and practicable measures within the permittee's control were implemented to prevent the occurrence of excess emissions.

3. Excess emissions shall be reported as follows:

a. The permittee of any source issued a permit shall report to the Director any emissions in excess of the limits established by this permit. Such report shall be in two parts as specified below:

(1) Notification by telephone or facsimile within 24 hours of the time when the permittee first learned of the occurrence of excess emissions including all available information from paragraph b. of this subsection.

(2) Detailed written notification within 72 hours of the notification pursuant to subparagraph (1) of this paragraph.

b. Report shall contain the following information:

(1) Identity of each stack or other emission point where the excess emissions occurred.

(2) Magnitude of the excess emissions expressed in the units of the applicable emission limitation and the operating data and calculations used in determining the magnitude of the excess emissions.

(3) Date, time and duration or expected duration of the excess emissions.

(4) Identity of the equipment from which the excess emissions emanated.

(5) Nature and cause of such emissions.

(6) If the excess emissions were the result of a malfunction, steps taken to remedy the malfunction and the steps taken or planned to prevent the recurrence of such malfunctions.

(7) Steps taken to limit the excess emissions. If the source's permit contains procedures governing source operation during periods of start-up or malfunction

and the excess emissions resulted from start-up or malfunction, the report shall contain a list of the steps taken to comply with the permit procedures.

4. In the case of continuous or recurring excess emissions, the notification requirements of this section shall be satisfied if the source provides the required notification after excess emissions are first detected and includes in such notification an estimate of the time the excess emissions will continue. Excess emissions occurring after the estimated time period or changes in the nature of the emissions as originally reported shall require additional notification pursuant to subsection A.3.a.(2) of this Section.

5. EMERGENCY PROVISION [A.A.C. R18-2-306.E]

a. An "emergency" means any situation arising from sudden and reasonably unforeseeable events beyond the control of the source, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the source to exceed a technology-based emission limitation under the permit, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

b. An emergency constitutes an affirmative defense to an action brought for noncompliance with such technology-based emission limitations if the conditions of paragraph d of this section are met.

c. The permittee shall submit notice of the emergency to the Director by certified mail, facsimile or hand delivery within 2 working days of the time when emission limitations were exceeded due to an emergency. This notice shall contain a description of the emergency, any steps taken to mitigate emissions, and corrective action taken.

d. The affirmative defense of emergency shall be demonstrated through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An emergency occurred and that the permittee can identify the cause(s) of the emergency;

(2) The permitted facility was at the time being properly operated;

(3) During the period of the emergency the permittee took all reasonable steps to minimize levels of emissions that exceeded the emissions standards or other requirements in the permit; and

(4) The notice was submitted per paragraph c. above.

e. In any enforcement proceeding, the permittee seeking to establish the occurrence of an emergency has the burden of proof.

f. This provision is in addition to any emergency or upset provision contained in any applicable requirement.

B. OTHER PERMIT DEVIATIONS [A.A.C. R18-2-306.A.5 and 6, 306.E.3.d.]

1. Permittee shall promptly report deviations from permit requirements, including those attributable to upset conditions as defined in the permit, the probable cause of such deviations, and any corrective actions or preventive measures taken. Prompt reporting shall mean that the report was

submitted to the Director by certified mail, facsimile, or hand delivery within two working days of the time the deviation occurred.

2. In addition to subparagraph 1 above, the permittee shall submit reports of any deviations from permit requirements at least every six months, beginning six months subsequent to permit issuance.

XIII. RECORDKEEPING REQUIREMENTS

[A.A.C. R18-2-306.A.4]

A. Permittee shall keep records of all required monitoring information including, but not limited to, the following:

1. The date, place as defined in the permit, and time of sampling or measurements;

2. The date(s) analyses were performed;

3. The name of the company or entity that performed the analyses;

4. A description of the analytical techniques or methods used;

5. The results of such analyses; and

6. The operating conditions as existing at the time of sampling or measurement.

B. Permittee shall retain records of all required monitoring data and support information for a period of at least 5 years from the date of the monitoring sample, measurement, report, or application. Support information includes all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by the permit.

XIV. REPORTING REQUIREMENTS

[A.A.C. R18-2-306.A.5.a]

Permittee shall submit reports of any required monitoring at least every six months, beginning six months subsequent to this permit issuance. However, more frequent submittal of specific monitoring reports may be required in Attachment "B" to this permit.

XV. DUTY TO PROVIDE INFORMATION

[A.A.C. R18-2-304.G and 306.A.8.e]

A. The permittee shall furnish to the Director, within a reasonable time, any information that the Director may request in writing to determine whether cause exists for revising, revoking and reissuing, or terminating the permit or to determine compliance with the permit. Upon request, the permittee shall also furnish to the Director copies of records required to be kept by the permit. For information claimed to be confidential, the permittee shall furnish a copy of such records directly to the Administrator along with a claim of confidentiality.

B. If the permittee has failed to submit any relevant facts or if the permittee has submitted incorrect information in the permit application, the permittee shall, upon becoming aware of such failure or incorrect submittal, promptly submit such supplementary facts or corrected information.

XVI. PERMIT AMENDMENT OR REVISION

[A.A.C. R18-2-318, 319 and 320]

Permittee shall apply for a permit amendment or revision for changes to the facility which do not qualify for a facility change without revision under Section XVII, as follows:

A. Administrative Permit Amendment (A.A.C. R18-2-318);

B. Minor Permit Revision (A.A.C. R18-2-319);

C. Significant Permit Revision (A.A.C. R18-2-320).

The applicability and requirements for such action are defined in the above referenced regulations.

XVII. FACILITY CHANGE WITHOUT PERMIT REVISION

[A.A.C. R18-2-317]

A. Permittee may make changes at the permitted source without a permit revision if all of the following apply:

1. The changes are not modifications under any provision of Title I of the Act or under A.R.S. § 49-401.01(17).

2. The changes do not exceed the emissions allowable under the permit whether expressed therein as a rate of emissions or in terms of total emissions.

3. The changes do not violate any applicable requirements or trigger any additional applicable requirements.

4. The changes satisfy all requirements for a minor permit revision under R18-2-319(A).

5. The changes do not contravene federally enforceable permit terms and conditions that are monitoring (including test methods), recordkeeping, reporting, or compliance certification requirements.

B. The substitution of an item of process or pollution control equipment for an identical or substantially similar item of process or pollution control equipment shall qualify as a change that does not require a permit revision, if it meets all of the requirements of subsections (A) and (C) of this Section.

C. For each such change under subsections A and B of this Section, a written notice by certified mail or hand delivery shall be received by the Director and, for Class I permits, the Administrator, a minimum of 7 working days in advance of the change. Notifications of changes associated with emergency conditions, such as malfunctions necessitating the replacement of equipment, may be provided less than 7 working days in advance of the change as but must be provided as far in advance of the change as possible or, if advance notification is not practicable, as soon after the change as possible. Changes that meet the criteria listed in subsections A, B, and C.1. of this Section are exempt from the notification requirements.

1. Examples of changes that do not require notification:

a. Changes that are not physical changes or changes in the method of operation of a source and that do not have the potential to affect emissions;

b. Routine maintenance activities; and

c. Changes to activities that are insignificant under A.A.C. R18-2-101.54 or as listed as trivial by the Administrator or the Director.

2. Each notification shall include:

a. When the proposed change will occur.

b. A description of each such change.

c. Any change in emissions of regulated air pollutants.

d. The pollutants emitted subject to the emissions trade, if any.

e. The provisions in the implementation plan that provide for the emissions trade with which the source will comply and any other information as may be required by the provisions in the implementation plan authorizing the trade.

f. If the emissions trading provisions of the implementation plan are invoked, then the permit requirements with which the source will comply.

g. Any permit term or condition that is no longer applicable as a result of the change.

XVIII. TESTING REQUIREMENTS

A. Production Rates

Tests shall be conducted during operation at the normal rated capacity of each unit, while operating at representative operational conditions unless other conditions are required by the applicable test method or in this permit. With prior written approval from the Director, testing may be performed at a lower rate.

B. Operational Conditions During Testing

Performance tests shall reflect representative operational conditions of the plant. Operations during start-up, shutdown, and malfunction (as defined in A.A.C. R18-2-101) shall not constitute representative operational conditions.

C. Test Plan

At least 14 calendar days prior to performing a test, the owner or operator shall submit a test plan to the Director, in accordance with A.A.C. R18-2-312.B and the Arizona Testing Manual. This test plan must include the following:

1. test duration;
2. test location(s);
3. test method(s); and
4. source operation and other parameters that may affect test results.

D. Stack Sampling Facilities

Permittee shall provide or cause to be provided, performance testing facilities as follows:

1. Sampling ports adequate for test methods applicable to the facility;
2. Safe sampling platforms;
3. Save access to sampling platforms; and
4. Utilities for sampling and testing equipment.

E. Interpretation of Final Results

Each performance test shall consist of three separate runs using the required test method. Each run shall be conducted in accordance with the applicable standard and test method. For the purpose of determining compliance with an applicable standard, the arithmetic means of results of the three runs shall apply. If a sample is accidentally lost or conditions occur which are not under the permittee's control and which may invalidate the run, compliance may, upon the Director's approval, be determined using the arithmetic mean of the other two runs.

F. Report of Final Test Results

A written report of the results of all performance tests shall be submitted to the Director within 30 days after the test is performed. The report shall be submitted in accordance with the Arizona Testing Manual and A.A.C. R18-2-312.B.

G. Cessation of Testing After the First Run has Started

If the Director or the Director's designee is not present, tests may only be stopped for good cause. Good cause includes, forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions or other conditions beyond the permittee's control. Termination of any test without good cause after the first run is commenced shall constitute a failure of the test. Supporting documentation which demonstrates good cause must be submitted.

XIX. PROPERTY RIGHTS

[A.A.C. R18-2-306.A.8.d]

This permit does not convey any property rights of any sort, or any exclusive privilege.

XX. SEVERABILITY CLAUSE

[A.A.C. R18-2-306.A.7]

The provisions of this permit are severable, if any provision of this permit is held invalid, the remainder of this permit shall not be affected thereby.

XXI. PERMIT SHIELD

[A.A.C. R18-2-325]

Compliance with the conditions of this permit shall be deemed compliance with any applicable requirement as of the date of permit issuance, provided that such applicable requirements are included and expressly identified in this permit.

ATTACHMENT "B": SPECIFIC CONDITIONS

Air Quality Control Permit No. 1000383
For
Yarnell Mining Company

I. RELATIONSHIP OF PERMIT TO APPLICABLE STATE IMPLEMENTATION PLAN

This permit is issued pursuant to the provisions of A.R.S. §49-404.C and §49-426 and constitutes an installation permit for the purpose of the applicable State Implementation Plan.

II. APPLICABLE REQUIREMENTS

A. REFERENCE TO AND CITATION OF APPLICABLE REQUIREMENTS [A.A.C. R18-2-306.A.2.a.]

This permit specifies and references the origin of and authority for each term or condition and identifies any differences in form as compared to the applicable requirement upon which the term or condition is based.

B. LIST OF APPLICABLE REQUIREMENTS

Arizona Administrative Code (A.A.C.)

Article 6. Emissions from Existing and New Nonpoint Sources
- R18-2-604, Open areas, dry washes or riverbeds
- R18-2-605, Roadway and streets
- R18-2-606, Material handling
- R18-2-607, Storage piles
- R18-2-610, Evaluation of nonpoint source emissions

Article 7. Existing Stationary Source Performance Standards
- R18-2-702, General Provisions
- R18-2-719, Standards of performance for existing stationary rotating machinery
- R18-2-730, Standards of performance for unclassified sources

Article 8. Emissions from Mobile Sources (New and Existing)
- R18-2-802, Off-road machinery

Article 9. New Source Performance Standards
- R18-2-901.1, Subpart A - General Provisions (40 CFR Part 60, Subpart A - General Provisions, incorporated by reference)
- R18-2-901.41, Subpart LL - Metallic Mineral Processing Plants (40 CFR Part 60, Subpart LL - Standards of Performance for Metallic Mineral Processing Plants, incorporated by reference)
- R18-2-902, General Provisions
- R18-2-905, Standards of performance for storage vessels for petroleum liquids

III. EMISSION LIMITATIONS

A. PARTICULATE EMISSIONS

1. Process Fugitive Emissions [A.A.C. R18-2-901.41]

On and after the sixtieth (60) day after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial start-up, the permittee shall not cause or allow to be discharged into the atmosphere from the any affected facility (i.e., any emission points along crushing/screening circuit, conveyor transfer points and the haul truck unloading station at the primary crusher) any process, fugitive emissions that exhibit greater than 10 percent opacity. [This is a material permit condition.].

2. Other Point and Nonpoint Source Emissions [A.A.C. R18-2-610 and 702]

Opacity of visible emissions from other point and nonpoint sources shall not be greater than 40 percent.

3. Off-Road Machinery Emissions [A.A.C. R18-2-802]

The permittee shall not cause or allow emissions of smoke into the atmosphere from any off-road machinery (e.g. trucks, graders, rollers, and other mining machinery not normally driven on a completed public roadway) for any period greater than ten (10) consecutive seconds that exceeds 40 percent opacity. Visible emissions when starting cold equipment shall be exempt from this requirement for the first ten (10) minutes.

B. HYDROGEN CYANIDE (HCN) EMISSIONS [A.A.C. R18-2-730]

The permittee shall not cause or allow hydrogen cyanide to be emitted from any location in such manner and amount that the concentration of such emissions into the ambient air at any occupied place beyond the premises on which the source is located exceeds 0.3 parts per million by volume for any averaging period of eight (8) hours.

C. SODIUM CYANIDE (NaCN) EMISSIONS [A.A.C. R18-2-730]

The permittee shall not cause or allow sodium cyanide dust or dust from any other solid cyanide to be emitted from any location in such a manner and amount that the concentration of such emissions into the ambient air at any occupied place beyond the premises on which the source is located exceeds 140 $\mu g/m^3$ for any averaging period of eight (8) hours.

D. GENERATOR EMISSIONS [A.A.C. R18-2-719]

1. The permittee shall not cause or allow the discharge of particulate matter into the atmosphere from the diesel generators in excess of the following:

$$E = 1.02Q^{0.769}$$

where:

E = the maximum allowable particulate emissions rate in lbs/hr.
Q = the heat input in MMBTU/hr.

2. The permittee shall not cause or allow the discharge of sulfur dioxide into the atmosphere from the diesel generators in excess of 1.0 lb/MMBTU heat input.

3. The permittee shall not cause or allow the discharge of smoke into the atmosphere from the diesel generators which exceeds 40 percent opacity for any period greater than ten (10) consecutive seconds. Visible emissions when starting cold shall be exempt from this requirement for the first ten (10) minutes.

E. LIME SILO EMISSIONS [A.A.C. R18-2-730]

The permittee shall not cause or allow the discharge of particulate matter into the atmosphere from the lime silo in excess of the following:

$$E = 4.10P^{0.67}$$

where:

E = the maximum allowable particulate emissions rate in lbs/hr.
P = the process weight in tons/hr

F. CARBON KILN AND DORÉ FURNACE [A.A.C. R18-2-730]

1. The permittee shall not cause or allow the discharge of particulate matter into the atmosphere from the carbon kiln and Doré furnace in excess of the following:

$$E = 4.10P^{0.67}$$

where:

E = the maximum allowable particulate emissions rate in lbs/hr.
P = the process weight in tons/hr.

2. The permittee shall not cause or allow the discharge of SO_2 and NO_x into the atmosphere from the carbon kiln and Doré furnace in excess of the following:

a. sulfur dioxide - 600 ppmv; and

b. nitrogen oxides - 500 ppmv.

IV. OPERATIONAL REQUIREMENTS

A. CONTROL OF FUGITIVE DUST EMISSIONS

1. Open Areas [A.A.C. R18-2-604]

The permittee shall not cause or allow construction, blasting, and movement of earth without taking reasonable precautions to limit excessive amounts of particulate matter from becoming airborne.

2. Roadway and Streets [A.A.C. R18-2-605]

The permittee shall not cause or allow the transportation of materials likely to result in airborne dust without taking reasonable precautions to minimize particulate matter from becoming airborne.

3. Material Handling [A.A.C. R18-2-606]

The permittee shall not cause or allow the crushing, screening, handling, transporting, or conveying of materials without taking reasonable precautions to prevent excessive amounts of particulate matter from becoming airborne.

4. Storage Piles [A.A.C. R18-2-607]

The permittee shall not cause or allow the stacking of materials without taking reasonable precautions to prevent excessive amounts of particulate matter from becoming airborne. Stacking and reclaiming machinery shall be operated at all times with a minimum fall of material and in such a manner as to prevent excessive amounts of particulate matter from becoming airborne.

For the above requirements, reasonable precautions include, but are not limited to: application of chemical dust suppressants, wetting, paving, covering, detouring, and barring access.

B. CONTROL OF FUGITIVE VOLATILE ORGANIC COMPOUND (VOC) EMISSIONS [A.A.C. R18-2-730]

1. The permittee shall process, store, use, and transport solvents or other volatile compounds, paints, and alkalies in such a manner and by such means that they will not evaporate, leak, escape, or otherwise be discharged into the atmosphere so as to cause or contribute to air pollution. Where means are available to effectively reduce the contribution to air pollution, such controls will be mandatory.

2. The permittee shall not emit gaseous or odorous materials from equipment, operations or premises under his control in such quantities or concentration as to cause air pollution.

C. AIR POLLUTION CONTROL

1. Processing Equipment

a. The permittee shall utilize water sprays during times of operation of the primary and secondary crushers, screens, conveyor systems, transfer points, and storage piles at the stacker discharge points. The water shall be applied at a rate sufficient to prevent excessive amounts of particulate from becoming airborne.

b. The permittee shall, prior to start-up, install a fabric filter on the lime silo in such manner as to collect the particulate matter emitted during the silo loading process. This fabric filter shall be installed, operated and maintained in accordance with the manufacturer's specifications.

c. The permittee shall, prior to start-up, install a baghouse on the carbon kiln and doré furnace in such manner as to collect the particulate matter from these sources. This baghouse shall be installed, operated and maintained in accordance with the manufacturer's specifications.

2. Unpaved Roads

The material requirements in this condition are designed to reduce fugitive dust from the unpaved roads by 90 percent. This shall be accomplished by applying water at the application intensity and frequency specified in the table shown below for each road segment. The application intensity can be decreased if the frequency is increased and visa versa. Also, the required application intensity and frequency may be decreased during wet weather conditions.

Road Segment	Application Intensity gallons/square yard	Application Frequency hours
Haul Road - pit to junction	0.53	every 4
Haul Road - junction to crusher	0.44	every 4
Haul Road - junction to beginning of north waste dump	0.15	every 4
Haul Road - within north waste dump	0.15	every 4
Haul Road - crusher to south waste dump	0.17	every 4
Haul Road Haul Road - crusher to leach pad	0.27	every 4
Service Road - property boundary to Adsorption Desorption Refining Plant (ADRP)	0.15	every 4

If in the Department's judgement the water application intensities shown above do not achieve the goal of 90 percent dust control, the permittee shall apply magnesium chloride ($MgCl_2$) or equivalent chemical dust suppressant or increase the water application intensity appropriately to segments of the unpaved roads identified by the Department. If $MgCl_2$ is utilized, the permittee shall treat the unpaved roadways monthly with the chemical dust suppressant. The magnesium chloride application intensity shall be at least 1.34 pounds per square yard dissolved in water for application. Additionally, water shall be applied frequently enough to maintain the integrity of the chemically treated surface and assure compliance.

If the permittee can demonstrate that the application frequency of either water or chemical suppressant can be extended without reducing the control efficiency below 90 percent, with written approval by the Department, the application frequency may be extended appropriately. The alternative control method using a dust suppressant as prescribed instead of water can be employed by the permittee at their discretion.

The permittee shall maintain records for each road segment showing the time of day and date of each treatment. Also, for water, the application intensity and for chemical dust suppression, the type and quantity of chemical suppressant utilized shall be recorded.

Permittee shall use appropriate means, such as berms, signs or other effective procedures, to restrict traffic usage to the treated areas. Should there be a rock spill on a roadway such that traffic is blocked, permittee shall clean up the spill; under no circumstances is traffic to be diverted to untreated areas to avoid the spill.

3. Blasting/Drilling

The permittee shall equip blast hole drills with a combination of water injection, a pneumatic flushing device, and/or a dust shroud in order to control particulate emissions from drilling blast holes.

4. Liquid Petroleum Storage [A.A.C. R18-2-905]

a. The permittee shall install a submerged filling device or equivalent as determined by the Director on any storage tank of less than 40,000-gallon capacity.

b. The permittee shall provide for submerged filling or the equivalent as determined by the Director for the loading of petroleum products having a vapor pressure of 2.0 pounds per square inch absolute or greater.

c. The permittee shall equip all associated pumps and compressors with mechanical seals or the equivalent.

5. Sodium Cyanide (NaCN) Storage

The permittee shall ensure that sodium cyanide on the premises is contained in metal flow bins, double-lined boxes, and/or is delivered as an aqueous solution.

6. Hydrogen Cyanide (HCN) Emissions

The permittee shall maintain the leach solution pH at or above 10.5 to reduce fugitive emissions of HCN from the leach pad and processing circuit.

V. OPERATIONAL LIMITATIONS

A. MINING AND ORE PROCESSING SCHEDULES

1. The permittee shall limit the amount of ore that is processed through the crushing circuit to 15,600 tons per day and 1,200,000 tons per year, determined on a rolling 12-month total.

2. MINING AND ORE PROCESSING SCHEDULE

The permittee shall limit the mining, ore crushing and associated operations to 6,240 hours per year. There are no time restrictions on the leaching, solution processing and associated operations.

B. POWER GENERATION SCHEDULES

The permittee shall operate only one (1) of the two (2) 365 kW generators at any given time. The permittee may operate the 820 kW generator at the crushers continuously.

C. FUEL TYPE

The permittee shall burn only no. 2 diesel fuel with a sulfur content of less than 0.05 percent by weight in the generators and off-road machinery. Verification of the sulfur content shall be either by the supplier's analysis or, if requested by the Department, by ASTM D 2880-71 or an alternate method approved by the Department.

VI. PUBLIC ACCESS RESTRICTIONS

The permittee shall define the limits of public access by enclosing the process area with a fence or a natural topographic barrier adequate to restrict public access and posted to identify the area as restricted. Before construction of the fence, a plot plan showing the proposed location of the fence and natural topographic barriers shall be submitted to the Department and written approval received.

VII. PERFORMANCE TESTS

[A.A.C. R18-2-306.A.3, -311 and -312]

A. TESTING FREQUENCY

Within 60 days after achieving the maximum production rate, but no later than 180 days after initial start-up (as defined in A.A.C. R18-2-101.101), Permittee shall conduct or cause to be conducted a performance test (as required in A.A.C. R18-2-312) for particulate matter. Subsequent performance tests shall be performed bi-ennially thereafter. For each test the discharge from the baghouse servicing the carbon kiln and the doré furnace shall be tested. The Department may require additional testing when deemed necessary based on site/operation inspections.

At such time the permittee shall also conduct or cause to be conducted an initial opacity test on the primary crusher, secondary crusher and associated screening operations.

B. STACK TESTING FACILITIES

Permittee shall provide, or cause to be provided, performance testing facilities as follows:

1. Sampling ports adequate for the applicable test methods;

2. Safe sampling platforms;

3. Safe access to sampling platforms; and

4. Utilities for sampling and testing equipment.

C. PROCESS RATE DURING TESTING

The performance test shall conducted at a minimum of 95 percent of the permitted operating capacity. However, should this not be feasible, the performance test may be conducted at a lower rate upon receipt of prior written approval from the Department. This alternative testing process rate shall not be less than 80 percent nor greater than 100 percent of the permitted operating capacity. If testing is performed at a lower rate, subsequent operation shall be restricted to the process input rate used during the testing period until a subsequent performance test establishes a higher process input rate.

D. OPERATIONAL CONDITIONS DURING TESTING

The performance test shall reflect representative operational conditions of the plant. Operations during start-up, shutdown, and malfunction (as defined in A.A.C. R18-2-101) shall not constitute representative operational conditions.

E. TESTING METHODS

The performance test shall be conducted and data reduced (as required by A.A.C. R18-2-312.B) in accordance with the following test methods and procedures contained in the Arizona Testing Manual or 40 CFR Part 60, Appendix A:

1. EPA Reference Method 9 shall be used to determine opacity from process emission sources. The procedures set forth in 40 CFR §60.11 shall be used to determine initial compliance; the minimum total time of observations shall be three hours (30 / six-minute averaging periods).

2. EPA Reference Method 9 and procedures in 40 CFR §60.386(b)(2) shall be used to determine opacity from process fugitive emissions.

3. EPA Reference Method 5 shall be used to determine the particulate matter concentration. The sampling time and sample volume for each run shall be at least 60 minutes and 31.8 dry standard cubic feet (dscf), respectively.

4. EPA Reference Method 6 shall be used to determine the SO_2 concentration.

5. EPA Reference Method 7 shall be used to determine the NO_x concentration.

F. TESTING PLAN

The Department shall be notified in writing at least 30 days prior to the performance test, and a pre-test meeting with the Department shall be arranged at least 14 calendar days prior to testing to allow time for the development of an appropriate testing plan and to arrange for an observer to be present at the test. Permittee shall submit a test plan to the Department at least seven (7) calendar days prior to the pre-test meeting. Such test plan shall be in accordance with the Arizona Testing Manual and must be approved, in writing, by the Department before the test is performed.

G. TESTING PROCEDURES

Permittee shall conduct three (3) separate test runs using the required test method. Each run shall be conducted in accordance with the applicable standard and test method. Except as provided for in A.A.C. R18-2-312.C, compliance with an applicable standard shall be determined based on the arithmetic mean of the results of the three (3) test runs. If a sample is accidentally lost or conditions occur which are not under Permittee's control and which may invalidate the run, compliance may, upon the Director's approval, be determined using the arithmetic mean of the other two (2) runs. If the Director, or the Director's designee is present, tests may only be stopped with the Director's or such designee's approval. If the Director, or the Director's designee is not present, tests may only be stopped for good cause, which includes forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions, or other circumstances beyond Permittee's control. Termination of testing without good cause after the first run is commenced shall constitute a failure of the test. Supporting documentation which demonstrates good cause must be submitted.

H. TEST FAILURE

1. Except as limited by 40 CFR §60.8(c) and A.A.C. R18-2-312.C, a performance test failure constitutes a violation of the applicable emission standard. According to A.R.S. §49-464.C, a person who knowingly operates a source in violation of an emission standard is guilty of a class 5 felony. If a performance test demonstrates an exceedance, Permittee shall follow the procedures outlined in this section. Adherence to such procedures does not relieve Permittee of any enforcement action resulting from a performance test failure. Ceasing operation of the emission unit(s) immediately after Permittee discovers the test failure may relieve Permittee of an enforcement action resulting from a violation of A.R.S. §49-464.C.

2. Except when A.A.C. R18-2-306.E or R18-2-310 applies, if Permittee discovers that a performance test indicates an exceedance either by direct examination of the preliminary test results or through notification by the Department, Permittee shall:

   a. Notify the Department by telephone or facsimile as soon as practical after Permittee's discovery that the preliminary test results indicate an exceedance; and

   b. Immediately after discovery, take all necessary measures to ensure that the applicable emission standard is met. At the direction of the Department, necessary measures may include ceasing or reducing operations, immediately repairing equipment, and/or other measures which will ensure that the emission standard will be met.

3. If Permittee continues to operate the emissions unit(s) after the test failure is documented, a complete re-test shall be completed as soon as practical, but no later than 48 hours after the appropriate measures have been completed. If a re-test continues to show a test failure, Permittee shall take additional measures and re-test within 48 hours of the completion of any additional measures until a performance test demonstrates compliance with the emission standard or the Department determines that the unit(s) shall be shut down for a detailed investigation of the

problem. Re-testing does not relieve Permittee from further enforcement action, which may include a temporary restraining order issued pursuant to A.R.S. §49-462.

4. If Permittee continues to operate the emission unit(s) after the test failure is documented, a compliance schedule shall be submitted to the Department as soon as practical, but no later than 48 hours after discovery, which includes the following:

   a. A sequential list of all actions and measures taken or to be taken to achieve compliance, indicating those actions and measures that the permittee considers to be significant;

   b. Deadlines for completion of each significant action;

   c. Deadlines for submitting progress reports and a test plan;

   d. Deadlines for performing a second test; and

   e. A certification of truth, accuracy, and completeness from a responsible official.

5. If any significant deadline listed in the compliance schedule is not met, Permittee shall submit a revised compliance schedule which includes an explanation of why any significant dates in the previous schedule were not met.

I. REPORTING OF TEST RESULTS

Permittee shall submit a written report of the results of all performance tests to the Director within 30 calendar days after the test is performed. The report shall be submitted in accordance with the Arizona Testing Manual and A.A.C. R18-2-312.B.

VIII. OPERATION AND MAINTENANCE PLAN

Permittee shall submit to the Department, at least 30 days before commencing operations, an Operation and Maintenance Plan describing the actions and procedures that will be followed in order to achieve and maintain compliance with the conditions of this permit. The plan should include recordkeeping mechanisms, e.g., check lists, that will be used to track compliance with the plan. Upon receiving written approval from the Department, permittee shall implement this plan.

IX. RECORDKEEPING REQUIREMENTS [A.A.C. R18-2-306.A.4]

A. The permittee shall retain records of all required recordkeeping data and support information for a minimum period of five (5) years after the date of recording. These records shall be made available for inspection during reasonable hours at the request of an ADEQ representative.

B. The permittee shall maintain records of the following:

   1. all performance test data required for compliance certification (see VII); and

   2. the daily amount of ore processed and the monthly totals with the year-to-date total, i.e., the sum of the current month and the previous eleven (11) months;

   3. the daily hours of operation and the monthly totals with the year-to-date total, i.e., the sum of the current month and the previous eleven (11) months;

   4. the test reports or vendor specifications for the diesel fuel sulfur content;

5. the date of each drilling operation and the control method applied;

6. the date, time and intensity of each application of water or chemical dust suppressant to roadways (designate portion being treated), waste piles and ore storage piles;

7. measure and record the pH of the barren solution at the heap leach facility daily; if an adjustment is made, record the types of chemicals added and the amount;

8. the delivery dates for the NaCN and the method of containment as delivered and stored; and

9. records showing compliance with the Operation and Maintenance Plan

C. Permittee shall maintain a State of Arizona certified opacity observer on site at all times to certify compliance with opacity standards listed in this attachment, Section III. The observer shall enter all violations in a permanent record and sign that record daily to attest to its accuracy to the best of his/her knowledge. All violations of an opacity standard stated in this permit shall be reported as a permit deviation, Attachment "A", Section XII.

X. REPORTING REQUIREMENTS

[A.A.C. R18-2-306.A.5 and 309.A.3]

A. A statement certifying compliance with the limits on the daily amounts of ore processed through the crushing circuit and the daily hours of operation and the respective monthly totals shall be submitted semi-annually.

B. The permittee shall submit reports of any required monitoring (recordkeeping data) at least every six (6) months. All instances of deviations from permit requirements shall be clearly identified in such reports.

C. The permittee shall promptly report deviations from permit requirements, including those attributable to upset conditions. The report shall include the cause of such deviations and any corrective actions or preventative measures taken.

D. The permittee shall ensure that any document (including reports) required to be submitted by this permit is certified as being true, accurate, and complete by a responsible corporate official.

E. The permittee shall notify the Department in writing within 30 days of placing an order for or purchasing the equipment listed in Attachment "C". The notification shall include all information necessary to complete Attachment "C".

ATTACHMENT "C": EQUIPMENT LIST

Air Quality Control Permit No. 1000383
For
Yarnell Mining Company

Type of Equipment	Manufacturer	Model No.	Serial No.	Manufacture Date	Equipment ID No.
Feed Hopper (70-Ton Capacity)	TBD	TBD	TBD	TBD	C101
Vibrating Grizzly Feeder	TBD	TBD	TBD	TBD	C102
Primary Jaw Crusher (650 TPH Capacity) w/ Associated Conveyors	TBD	TBD	TBD	TBD	C103
Double-Deck Screen	TBD	TBD	TBD	TBD	C104
Secondary Gyrasphere Cone Crusher (650 TPH Capacity) w/ Associated Conveyors	TBD	TBD	TBD	TBD	C105
365 kW Diesel-Fired Generator	TBD	TBD	TBD	TBD	GA
365 kW Diesel-Fired Generator	TBD	TBD	TBD	TBD	GB
820 kW Diesel-Fired Generator	TBD	TBD	TBD	TBD	G1
113 kW Diesel-Fired Generator, at water supply well*	TBD	TBD	TBD	TBD	G2
25 kW Diesel-Fired Generator, at water supply well*	TBD	TBD	TBD	TBD	G3
5 - 6 kW Diesel Powered Light Plants*	TBD	TBD	TBD	TBD	L 1-5
Carbon Stripping Heater	TBD	TBD	TBD	TBD	P201
Carbon Regeneration Kiln	TBD	TBD	TBD	TBD	P202
Propane-Fired Doré Furnace (1.2 MMBTU/hr)	TBD	TBD	TBD	TBD	P203
Diesel Storage Tank (10,000 Gal. Capacity)	TBD	TBD	TBD	TBD	FA
Diesel Storage Tank (10,000 Gal. Capacity)	TBD	TBD	TBD	TBD	FB
Gasoline Storage Tank (5,000 Gal. Capacity)	TBD	TBD	TBD	TBD	FC

* - permit not required.
TBD - to be determined; complete equipment information will be provided as it becomes available.

AMERICAN COPPERMINE RESOURCES LIMITED

Page, Arizona

WHITE MESA PROJECT

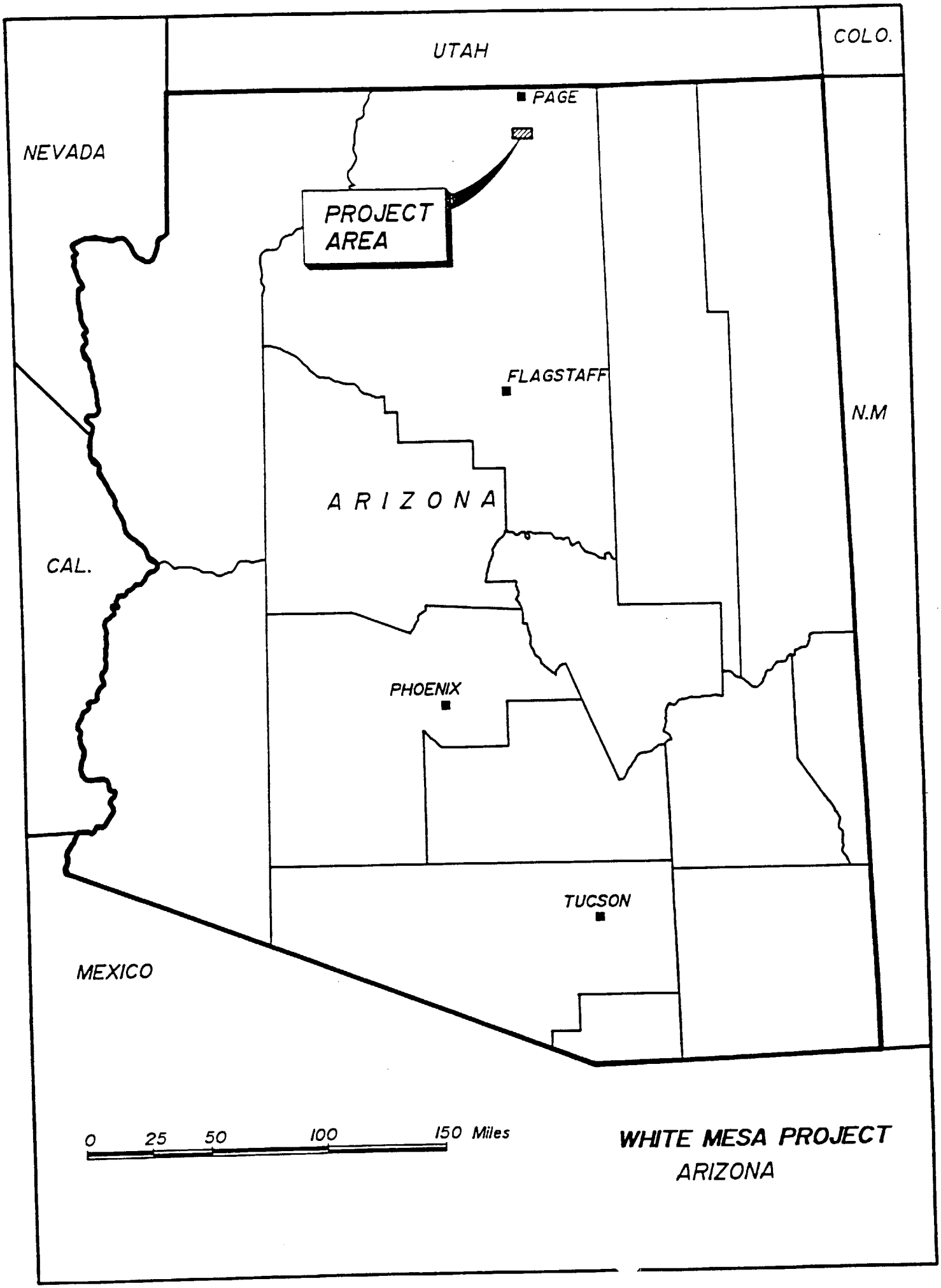
JANUARY, 1995

AMERICAN COPPERMINE RESOURCES LIMITED

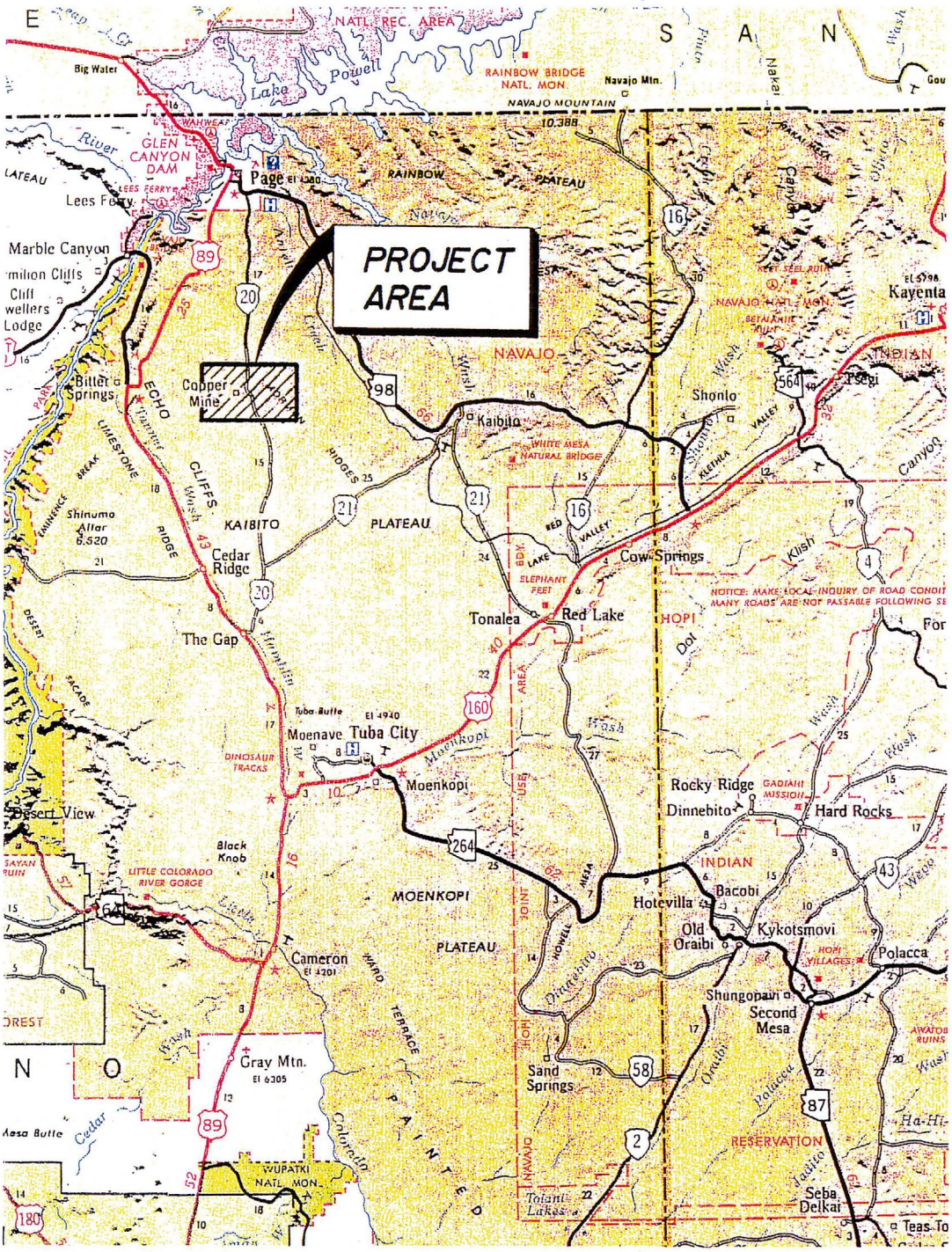
Page, Arizona

WHITE MESA PROJECT

JANUARY, 1995



WHITE MESA PROJECT
ARIZONA



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WHITE MESA PROJECT

WHITE MESA COPPER OXIDE DEPOSIT/PROJECT

White Mesa Mining District, Coconino Co., AZ

SUMMARY

Estimated mineable resource near the Copper Mine Trading Post at White Mesa totals some 35 million tons of copper oxide ore @ .36% Cu (.15% cutoff) of 50 million tons @ .30% Cu. (.10% cutoff). Top of ore lies on or near the surface, indicating surface mining methods and a low strip ratio. Copper occurs in an extremely permeable host in very soluble form, leach tests to date indicating a 99% recovery from heap leaching within a few weeks. Widespread, untested copper mineralization is evident on lease land further to the east of the deposit.

The property consists of 10,000 acres of Navajo Reservation lands and 186 acres of patented claims in the White Mesa Mining District, Coconino County, Arizona, 20 miles south of Page, AZ. The property ranges 6,000 to 6,400 feet in elevation. Abundant copper is seen in many outcrops, prospect pits and open cuts on the property.

Ore is expected to be mined at 5 million tons per year to produce about 30 to 35 million pounds of cathode copper annually for 8 to 10 years. Cash production costs should be approximately $.50/lb., with an initial capital cost in the order of $20 million. At $1.00/lb copper,

pretax cash flow from the currently indicated deposit could exceed $150 million. The potential to add to reserves is excellent.

LOCATION/INFRASTRUCTURE

The project is accessible from Page, Arizona by 16 miles of paved highway and 4 miles of all-weather, gravel road (Coconino Rte 20). From the south, the property is accessible from The Gap by 17 miles of all-weather gravel road (Coconino rte 20). The property is 100 miles north of the railhead at Flagstaff.

Power may be secured from several high voltage lines that cross the property. Information to date indicates that process water could be developed at depth or from wells south of the property. Labor is available locally from both Page and the Reservation. Excellent processing sites are evident throughout the lease area.

PREVIOUS WORK

The deposit was originally staked by individuals in 1882, with minor production. Nine patented claims and 28 unpatented claims (since invalidated), were specifically excluded from the Reservation when it was authorized by Congress.

In 1917-1919, the Navajo Copper Company produced 295,000 lbs of copper from high grade ore. Coconino Copper Company produced 287,000 lb. of copper as sulfate from 4,500 tons of ore. In 1941, Mardun Company mined 3,000 tons of ore. Shattuck-Denn Co. with Coronado Copper and Zinc drilled 49+ holes, sank shafts and did extensive exploration in the area. The U.S.B.M. investigated the resources of the area in 1943 as part of the war effort. Stark Lathing Co. mined a small quantity of ore in 1955 (dry processing). Zontelli Western drilled over 500 shallow holes in 1963 and later mined and stockpiled and/or leached/Fe-precipitated 300+ thousand tons of ore. Low copper prices and high transportation/smelting costs doomed these early efforts. The deposit appears to be ideal for development using established, modern, low cost heap leach/SXEW production methods.

WORK BY MESA MINING

In January and February, 1992, a programme of 7000 feet of reverse circulation drilling was completed. The bulk of the drilling was designed to verify the results of the Shattuck-Denn drilling("1943" drilling) in the Trading Post and Last Dutchman areas. Unfortunately detailed assays of the 1943 drilling were unavailable and one had to rely on graphic assay logs. The 1992 reverse circulation drilling confirmed expectations and indicated many other

areas of similar copper mineralization. A few drill holes were completed in these areas with mixed results.

In the spring of 1992, in excess of 100 line-miles of gradient array resistivity surveying was completed. Test profiles over the known mineralization at the Trading Post delineated the zone of alteration and mineralization.

A resistivity survey was conducted because it was believed that the hygroscopic nature if the disseminated chrysocolla (as pore fillings in the sandstone) would cause a reduction in the resistivity of the Navajo sandstone. The survey has delinated several very large areas for exploration. These areas are known to contain abundant copper showings. It is hoped that the survey would discriminate areas of significant mineralization from that of an "occurrence".

Drilling to date has confirmed that mineralization and related bleach alteration is in or close to resistivity lows.

Following the geophysics an environmental and archaeological evaluation of 600 acres in the area of the Trading Post deposit was completed.

In the spring of 1993, 6500 feet of HQ core drilling was

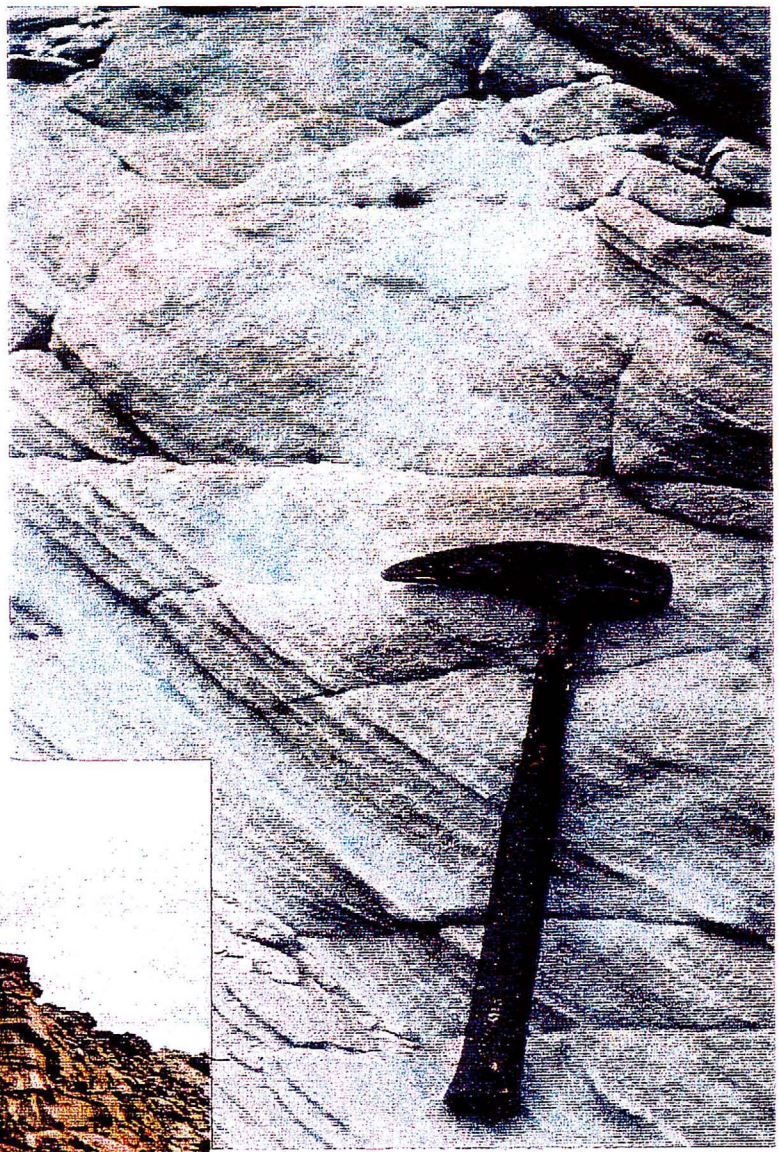
completed to test the limits of the mineralization in the Trading Post area. Permits for 35 exploration drill holes in other geological and geophysical targets have been received.

Concurrent with the exploration, a programme of metallurgical test work was completed. Samples taken from the 80' deep Zonetelli pit were evaluated in column leach test by Metcon, Tucson, AZ. More comprehensive test work on additional bulk samples from the pit and PQ drill core obtained during the reverse circulation drill programme was completed at the NA Degerstrom lab in Spokane, WA. These reports are summarized below.

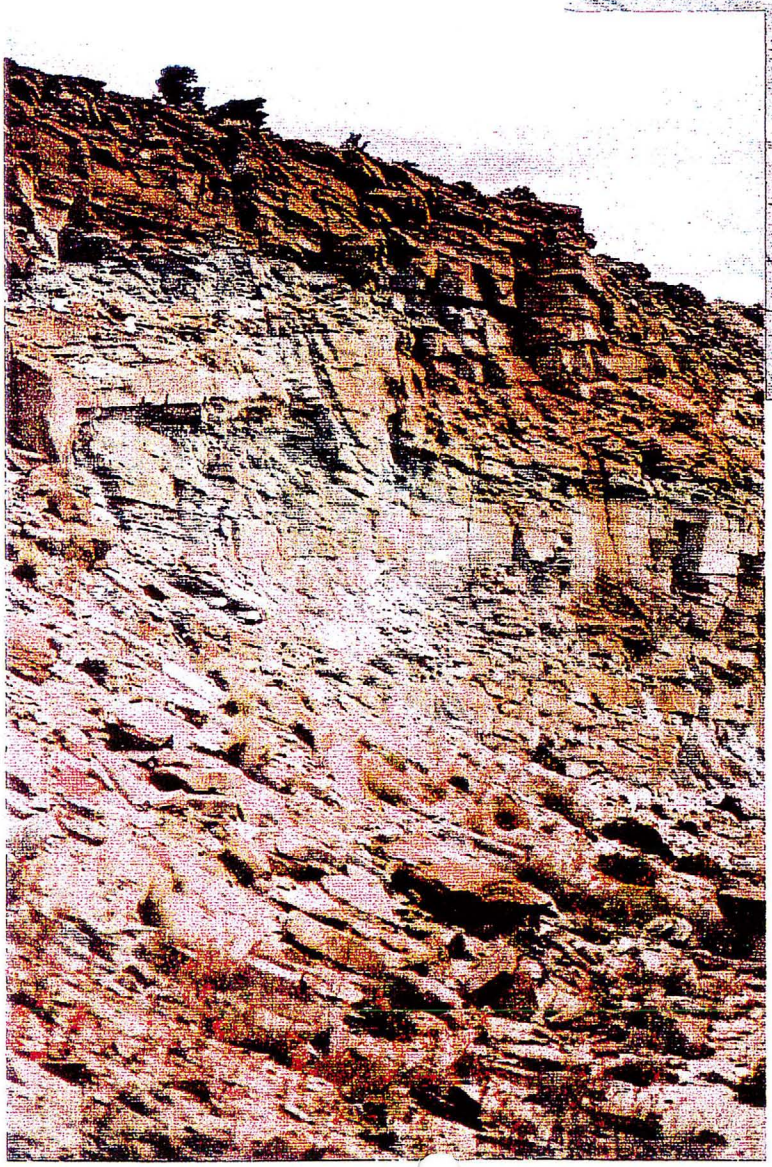
GEOLOGY

The White Mesa Copper Mining district is in the Kaibito Plateau (Navajo Uplands) and lies in an unsurveyed area of T 37N, R 9 and 10 E, Coconino County, Arizona. The district lies at an elevation of approximately 6,000 feet, 20 miles south of Page, Arizona, in the northwestern corner of the Nevajo Indian Reservation.

The White Mesa Mining District, as currently known, occurs entirely within the upper portion of the Lower Jurassic Navajo Sandstone. Known mineralization occurs over a 10 to 12 square mile area on the western flank of a



Trading Post area
copper mineralization
in Navajo sandstone



WHITE MESA PROJECT

broad, shallow, open, NNW-trending anticline. A number of faults with very minor apparent movement occur in the area, mostly subparallel and subperpendicular to the folding. No intrusive rocks are known to occur nearer than the Navajo Mountain laccolith, some 30 miles to the northeast. Many geologists have noted similarities with "roll-front" uranium deposits.

The Navajo Sandstone, one of the most widespread formations on the Colorado Plateau, is a massive cliff-former and accounts for much of the world-famous scenery for which the Navajo country is known. In the White Mesa area, the cross-bedded, dunal Navajo Sandstone reaches a thickness of 1100 to 1200 feet. It is a very uniform, consistent formation.

Typically salmon to buff orange in color, the Navajo Sandstone is bleached to a white to pale tan color over a 20+ square mile area around the White Mesa district (to a depth of 200 to 700 feet, from water well data). The formation consists of fairly uniform (.15 to .60 mm), clean, rounded silica sand grains laid down in a subaerial, sand dune environment, and is generally well-cemented by a clay and silica cement. This cement has generally been destroyed or greatly reduced in the White Mesa district, being replaced by copper minerals in the higher grade areas.

Navajo sandstone - malachite on bedding planes - Trading Post area

Mormon Ridge area mineralization

WHITE MESA PROJECT

Copper mineralization consists almost entirely of copper oxide minerals: chrysocolla (predominant), tenorite, etc. and is extremely leachable (90%+). Mineralization occurs as both large "spreads" of mineralization and high grade pods, principally in a generally flat-lying 150 to 200 foot thick unit. Occasionally, nodules and veinlets of chalcocite and bornite can be found, but these are quite rare. The bulk of known major copper mineralization seems to be concentrated at or near the edge of the bleached area.

While some higher grade mineralization occurs at or near steeply dipping chalcedony/silica veins/veinlets which fill fault and joint fractures, these do not appear to have necessarily been channelways of copper mineralization. Rather, they have the appearance of "dams", where mineralization in transit was trapped and only locally control the distribution of mineralization. The major distribution of copper mineralization is generally horizontal and crudely stratigraphically controlled. These pre-mineral veinlets appear to have behaved as "dams" in the highly porous sandstone media.

ORE RESERVES

The ore reserves were calculated using the polygon method. Drill holes were spaced on a crude 400' grid

spacing and a 400' search radius was used for calculation. A tonnage factor of 14 cu ft/ton was used. The following mineral inventories were determined.

0.05% Cu cut-off

Ore - 52.400,000 tons .271%

Waste - 35,500,000 tons

0.10% Cu cut-off

Ore - 40,000,000 tons .333%

Waste - 48,000,000 tons

0.15% Cu cut-off

Ore - 30,300,000 tons .400%

Waste - 57,600,000 tons

Ore reserves were also determined utilizing a block model method. Composited drill hole assays were weighted using an inverse cube weighting with no "Z" component to create 100' x 100' ore blocks. No vertical search was used because the ore appears to have a strong stratigraphic control which is subhorizontal.

The ore reserves were determined as follows.

0.10 % cut-off

Ore - 50,800,000 tons 0.29%

Waste - 45,100,000 tons

0.15% cut-off

Ore - 35,500,000 tons 0.36%

Waste - 60,300,000 tons

All assays are total copper. No sulphides were encountered in any of the drilling. No account was taken for poor recovery encountered on some core holes. Based on the "1943" drilling in the vicinity of 93-51 and 93-72 drill holes and the well-mineralized nature of the exposures in these areas, the 1993 drilling with very poor recovery may be understating the deposit at this location. Poor recoveries may also understate reserves encountered along the south boundary of the reserve.

SUMMARY OF METALLURGICAL STUDIES

	SAMPLE WEIGHT	CRUSH SIZE	HEAD ASSAY %CU	RECOVERY%	DAYS OF LEACH
METCON RESEARCH INC.					
NOV, 1991	TEST 1 6"COL 200# (ACID CURE)	2"	.46	99.80	12 DAYS
	TEST 2 6"COL 200# (NO ACID CURE)	2"	.46	98.08	12 DAYS
N.A. DEGERSTROM INC.					
SEPT, 1991	PIT SAMPLE	1"	.964	99.11	14 DAYS
N.A. DEGERSTROM INC.					
JAN 1992					
	SAMPLE A (4"COL) 534#	1"	.844	99.35	14 DAYS
	SAMPLE A (6"COL)	2"	.863	99.49	36 DAYS
	SAMPLE B (4"COL) 191#	1"	.384	99.06	9 DAYS
	SAMPLE B (6"COL	2"	.374	98.25	27 DAYS
	SAMPLE C (4"COL) SPLIT CORE	1"	.472	99.06	9 DAYS
	SAMPLE C (4"COL) PQ	AS SPLIT (±2")	.454	95.49	13 DAYS

POLYGON
RESERVE SUMMARY

0.05% Cut-Off
Ore - 52,384,000 0.271% Cu
Waste - 35,448,000

0.10% Cut-Off
Ore - 39,840,500 0.333% Cu
Waste - 47,991,500
W/O - 1.20

0.15% Cut-Off
Ore - 30,267,500 0.400% Cu
Waste - 57,564,500
W/O - 1.90

Tonnage Factor 14 Cu Ft/Ton
Total Material 87,832,000

RESERVES 0.10% Cut-Off

Bench		Tons	%Cu
5835	Ore	964,000	.629
	Waste	131,000	
5850	Ore	741,500	.857
	Waste	341,000	
5865	Ore	715,821	.782
	Waste	501,270	
5880	Ore	522,637	.685
	Waste	815,289	
5895	Ore	1,326,148	.366
	Waste	1,602,000	
5910	Ore	1,595,290	.322
	Waste	1,289,000	
5925	Ore	1,749,350	.234
	Waste	1,903,000	

5940	Ore	1,094,326	.350
	Waste	2,504,000	
5955	Ore	1,955,242	.421
	Waste	1,588,000	
5970	Ore	2,543,900	.366
	Waste	4,625,000	
5985	Ore	2,984,468	.222
	Waste	3,270,000	
6000	Ore	3,285,000	.183
	Waste	4,307,000	
6015	Ore	4,112,000	.306
	Waste	4,620,00	
6030	Ore	5,004,000	.275
	Waste	3,596,000	
6045	Ore	3,695,500	.255
	Waste	7,994,500	
6060	Ore	3,518,000	.337
	Waste	4,121,000	
6075	Ore	2,496,000	.490
	Waste	1,479,500	
6090	Ore	1,323,500	.255
	Waste	1,966,000	
6105	Ore	212,500	.161
	Waste	337,500	

	WASTE	0.10% Cu Cut-Off		
5835	131,000			
5850	341,000			
5865	501,500			
5880	815,500			
5895	1,602,000			
5910	1,289,000			
5925	1,903,000			
5940	2,504,000			
5955	2,588,000			
5970	4,625,000			
5985	3,270,000			
6000	4,307,000			
6015	4,620,000			
6030	3,596,000			
6045	7,994,500			
6060	4,121,000			
6075	1,479,500			
6090	1,966,000			
6105	337,500		W/O	1.20

WASTE	47,991,500	Ore	39,840,500	.333

TOTAL MATERIAL 87,832,000

ORE RESERVE
BLOCK MODEL

BENCH	CUT/OFF	WASTE	ORE	GRADE
5835	.10%	134,000	1,050,000	.587
	.15%	134,000	1,050,000	.587
5850	.10%	134,000	1,050,000	.751
	.15%	134,000	1,050,000	.751
5865	.10%	198,200	1,494,600	.657
	.15%	241,100	1,451,700	.673
5880	.10%	1,066,000	1,446,400	.319
	.15%	1,135,700	1,092,200	.379
5895	.10%	1,880,300	1,880,300	.254
	.15%	2,448,100	1,435,700	.303
5910	.10%	1,494,600	2,442,800	.260
	.15%	2,024,900	1,907,100	.300
5925	.10%	2,791,000	2,024,900	.190
	.15%	3,744,500	1,071,400	.249
5940	.10%	3,439,200	1,333,900	.2887
	.15%	3,905,300	867,800	.372
5955	.10%	1,607,100	2,785,600	.314
	.15%	2,367,800	2,024,900	.384
5970	.10%	2,967,800	4,017,700	.272
	.15%	4,837,400	2,148,100	.399
5985	.10%	3,658,900	3,482,000	.196
	.15%	4,746,300	2,148,200	.240
6000	.10%	4,885,600	3,482,100	.170
	.15%	6,557,000	1,810,700	.210
6015	.10%	3,514,200	3,953,600	.302
	.15%	4,928,500	2,539,300	.403
6030	.10%	3,760,600	5,282,000	.256
	.15%	5,260,600	3,996,300	.299
6045	.10%	3,889,200	4,607,000	.223
	.15%	5,164,200	3,322,000	.261
6060	.10%	3,717,800	4,264,300	.291
	.15%	4,928,500	3,053,600	.356

6075	.10%	3,128,500	3,589,200	.373
	.15%	4,114,200	2,603,500	.467
6090	.10%	2,389,200	2,003,500	.202
	.15%	3,064,200	1,328,500	.238
6105	.10%	92,800	616,100	.162
	.15%	567,800	541,100	.167
		TOTALS		
	.10%	**45,149,000**	**50,806,000**	**.29**
	.15%	**60,304,000**	**35,452,000**	**.36**