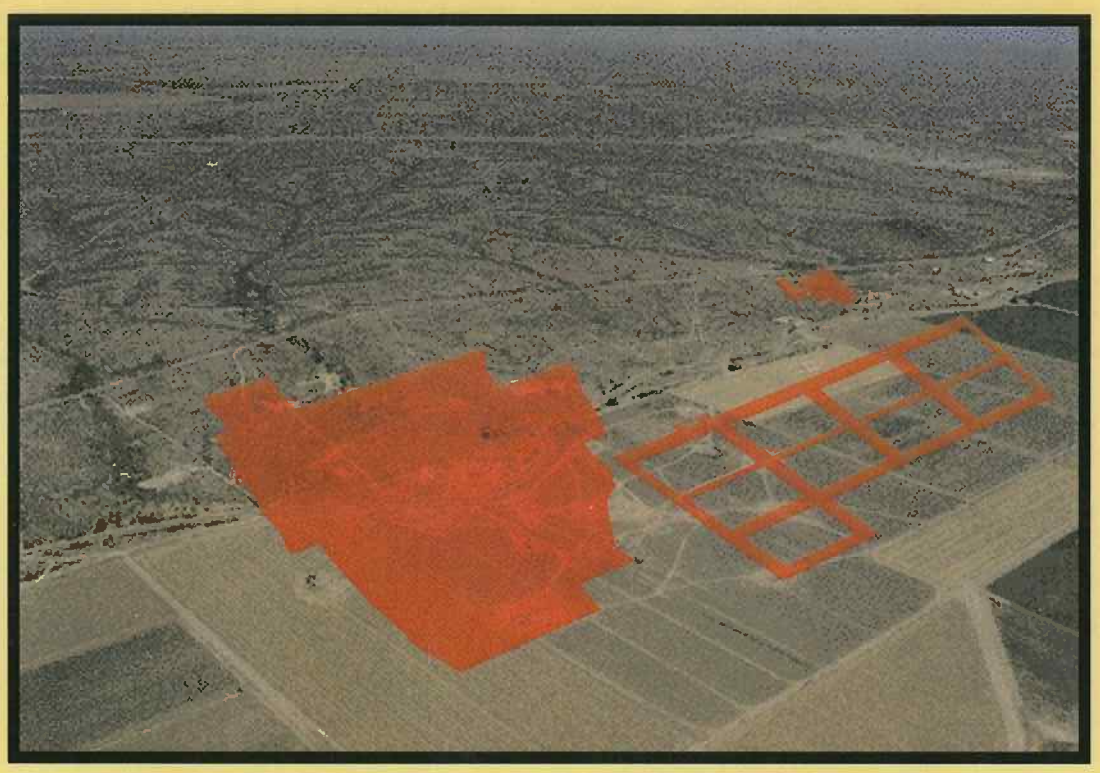
MAGMA

MAGMA COPPER COMPANY

Request for Minor Aquifer Exemption



MAGMA FLORENCE IN-SITU PROJECT

Underground Injection Control Permit Application, Form 4 and Request for Minor Aquifer Exemption

019

January 1996

UNDERGROUND INJECTION CONTROL
PERMIT APPLICATION, FORM 4
AND
REQUEST FOR MINOR AQUIFER EXEMPTION

MAGMA FLORENCE IN-SITU PROJECT

JANUARY 1996

MAGMA

MAGMA

MAGMA COPPER COMPANY

FLORENCE PROJECT

January 19, 1996

Mr. Clyde Morris
Section Chief
Region IX
Environmental Protection Agency
75 Hawthorne Street
San Francisco, California 94105

15-1899/08/09

Subject: Aquifer Exemption Application and
Underground Injection Control (UIC) Act
Permit Application for the Magma Copper Company
In-situ Leach Mine
Florence, Arizona

Dear Mr. Morris:

At the instruction of Mr. Jose Luis Gutierrez, Project Officer for the Magma Copper Company (Magma) in-situ permits, Magma is hereby submitting the Aquifer Exemption Application for a minor exemption as per the requirements of 40 CFR 144-146. Also submitted is UIC Form 4 "UIC Permit Application", along with the required supplemental information.

Also included at the request of Mr. Gutierrez is Volume I of the Aquifer Protection Permit (APP) Application submitted on this same date to the Arizona Department of Environmental Quality (ADEQ), APP Mining Unit. Magma trusts that your staff will find the Aquifer Exemption and UIC Applications complete.

Magma would like to take this opportunity to commend you on the cooperation of your staff, and especially Mr. Gutierrez, in the preparation of these documents. Early on, it was recognized by Magma, the ADEQ, and the EPA that these applications paralleled sections of Arizona's APP Application. Through the suggestions and efforts of Mr. Gutierrez, and Ms. Shirin Tolle, APP Officer, Magma was able to organize the two permits at a substantial reduction of paper work and time. Ms. Tolle, as you are probably aware, is a Region IX EPA employee on temporary duty assignment to the ADEQ.

Magma has appreciated EPA attendance at joint Magma/ADEQ meetings, and in joint meetings with other interested parties.

Submitted with this letter are the following documents required by Mr. Gutierrez:

Volume I - UIC	Contains the Aquifer Exemption and UIC Applications.
Volume II	Site characterization. Volume II is the exact same volume for the UIC Application as the APP Application.
Volume III	Sampling and Analysis Plan. Same volume for UIC and Arizona APP Applications.

14605 East Hunt Highway ■ Florence, Arizona 85232
(520) 868-5090 ■ FAX (520) 868-0463

Volume IV	Hydrogeological Modeling. Same volume for Arizona APP and UIC Application.
Volume V	Facility Design. Same volume for Arizona APP Application and UIC Application.
Volume I - APP	APP Application. Submitted at the request of Mr. Gutierrez.
Volume I - Appendix A	This appendix contains confidential business information submitted as part of the Aquifer Exemption Application. Magma claims confidentiality of this information under 40 CFR 144.5.

Magma is looking forward enthusiastically to working with Mr. Gutierrez and others on your staff over the next several months. This is a breakthrough project for Magma and the copper industry as a whole as this site would be the first fully-operational Class III copper in-situ mining of its type.

Congress, through its funding of the U.S. Bureau of Mines and the Santa Cruz Joint Venture In-situ Project Site in Arizona, has recognized that in-situ mining is an efficient way of meeting the needs of the nation for copper as a strategic metal, and yet doing so in a manner conducive to minimize environmental impacts on the land. Magma believes this mine to be the first of several of its type over the next years.

Sincerely,

John T. Kline
Environmental Project Manager

JTK:kw
Enclosures

cc: Mr. Mike Eamon, Magma Copper Company
Mr. Jose Gutierrez, U.S. Environmental Protection Agency
Mr. Charles Taylor, Magma Copper Company
Ms. Shirin Tolle, Arizona Department of Environmental Protection

VOLUME I

TABLE OF CONTENTS

VOLUME I

TABLE OF CONTENTS - Continued

APPENDICES

LIST OF TABLES

LIST OF FIGURES

LIST OF SHEETS

SECTION 2.0

REQUEST FOR MINOR AQUIFER EXEMPTION

2.1 NEED FOR EXEMPTION

Magma requests the proposed minor aquifer exemption in order that the Environmental Protection Agency (EPA) may proceed with the review and approval of Magma's UIC application for an area permit. The requested permit will enable Magma to develop a facility to recover copper from the orebody that lies below the water table.

The copper will be extracted by use of in-situ leach mining methods. In-situ mining is a technically and economically viable approach, and allows the mining to be conducted with minimal land disturbance. Normal open-pit mining was considered, but is not a preferred alternative as it produces a sizable land disturbance and provides a lower economic outcome.

The area for which the exemption is requested covers the areal extent of the orebody (about 300 acres) and buffer zone extending 1/2-mile outward. There is no other area which could be considered for mining the orebody.

The proposed injection zone is not now used as source of drinking water and will not be used as a source of drinking water during the 15-year life of the mine. Simulation models were used to evaluate the impacts of the proposed mining operation. The models indicate that the proposed mining operation will not interfere with known or reasonably foreseeable sources of drinking water and as such meets the requirements of 40 C.F.R. 146.4 (a). Information presented in Appendix A of this volume demonstrates the economic viability of the proposed mining operation and establishes the economic justification for the exemption in accordance with 40 C.F.R. 146.4 (b)(1). Appendix A includes operating costs, capital costs, and profitability numbers, that is released, may cause loss of competitive advantage in the sale and revenues of the copper produced at Florence.

The economic justification in Appendix A of this volume includes information that is considered confidential, and is marked with the words "CONFIDENTIAL BUSINESS INFORMATION" in compliance with 40 C.F.R. 144.5.

Information included in the application and attached volumes further explain the need for the exemption and the potential impact of this relatively small site within the 100-square-mile impact study area.

Magma submits the application to mine the in-situ resource in compliance with regulatory goals to reduce waste and minimize pollution. In-situ leaching will leave virtually no impact on the surface of the land after closure when compared to other mining methods.

2.1.1 Exempted Aquifer (40 C.F.R. 144.7)

The area for which Magma is requesting exemption includes the copper mineralized zone shown in the attached plan view (Sheet 2.1-1 [UIC]). Two typical cross sections are shown that illustrate the outline of the orebody. The orebody is located approximately 350 to 1,240 feet below land surface. Figure 2.1-1 (UIC) is a typical east-west section and Figure 2.1-2 (UIC) is a typical north-south section. Magma is requesting a minor exemption that extends horizontally outward from the orebody 1/2 mile. The planned production schedule includes the copper extraction rate for the life of the mine.

2.2 FACILITY DATA

2.2.1 Location

The 213-acre in-situ mine area is located approximately 1 mile west/southwest of Poston Butte and 2 miles northwest of Florence, Arizona (as shown on Sheet 2.1-1 [UIC]). The Gila River trends west-southwest and is located approximately 1/2 mile south of the mine area.

2.2.2 Prior and Existing Uses

Magma purchased the mine property from Conoco Oil Company in 1992. Conoco operated the underground mine during the 1970s but ceased activities by 1975. Magma controls the uses of the water within the proposed boundary. The mine site and the few homes associated with Magma's drilling and farming operations use imported bottled water and not well water for drinking due to excessive nitrate levels in the water. The area will not be used for drinking water in the future as Magma owns or controls the land.

Three irrigation wells are located on the mine site. Two of these wells are used by the San Carlos Irrigation and Drainage District (SCIDD) and discharge to the North Side Canal. The remaining installation is utilized by local farmers and discharges into small irrigation ditches. The wells are generally located near the center of the site along the SCIDD Canal. Tables 2.2-1 and 2.2-2 provide the addresses of the property owners in the area and contains more information related to these wells. Use of irrigation wells that could potentially interfere with leaching operations will either be closed or relocated to other areas of Magma's 10,000-acre property.

2.2.3 General Surface Conditions

The project site is located on both agricultural and undisturbed land. It is at a nominal elevation of 1,475 feet above sea level. The elevation of the site declines approximately 25 feet from north to south. At least three river terraces are present on the site. These terraces mark past base levels and northern extent of the active channel of the Gila River. The northern-most extent of the active floodplain is currently located approximately 1/4 mile south of the mine site.

The surface of the project site can be divided into two segments based on land usage. As depicted in Figure 2.2-1 (UIC), this division occurs approximately where the San Carlos Irrigation and Drainage District (SCIDD) North Side Canal traverses the property. The southern portion is dominated by agricultural activities, whereas the northern portion has remained relatively

undisturbed desert land. Numerous archaeological sites exist in the northern portion. Primary disturbances north of the canal consist of dirt roads. These roads provide access from Hunt Highway to adjacent agricultural and mine-related areas. The Southern Pacific Railroad also passes north of the proposed site.

2.3 AQUIFER DATA

2.3.1 Description of the Regional Groundwater System

The Arizona Department of Water Resources (ADWR) has divided the saturated materials within the area into four main hydrogeologic units. The Upper Alluvial Unit is analogous to the Upper Basin-Fill Unit (UBFU) referenced in this report. The Middle Silt and Clay Unit is analogous to the Middle Fine-Grained Unit (MFGU), and separates the UBFU and Lower Basin-Fill Unit (LBFU). The Lower Conglomerate Unit is analogous to the LBFU referenced in this report. The Hydrologic Bedrock Unit is similar to the bedrock zones referenced in this report.

The Upper Alluvial Unit consists mainly of unconsolidated to slightly consolidated, interbedded gravels, sands and silt, with some finer-grained materials existing as lenses. The lower half to one-third of this unit is a transition zone containing interbedded-coarse and fine-alluvial material typical of the underlying Middle Silt and Clay Unit. The upper alluvial unit is a significant aquifer throughout the area, with well yields that have been reported up to 3,000 gallons per minute (gpm).

The Middle Silt and Clay Unit generally separates the upper basin-fill from the lower basin-fill. This fine-grained unit is reported to be laterally extensive throughout the basin. Near the margins of the basins, this unit may not be distinguishable from the overlying or underlying materials. The Middle Silt and Clay Unit is known for groundwater production in and of itself in the Eloy sub-basin. The middle alluvial unit has been intercepted during drilling at the in-situ mine area, and has been identified on off-site water well logs for wells within the 100-square mile Florence Project Area (see Sheet 2.1-1 [UIC]).

The Middle Silt and Clay Unit has been divided into two sub-units (Hardt and Chattany, 1965). The uppermost sub-unit consists of about 90 percent clay with intermittent gravel and sand lenses. This sub-unit has been described in core and water well logs throughout the study area as presented in Volume II of the Aquifer Protection Permit Application. The lower fine-grained sub-unit is the thickest and is found in deeper areas of the basin where which it may exceed 3,000 feet in thickness (Hardt and Chattany, 1965). It is predominantly an evaporite unit consisting of anhydrite with minor clay and silt. This sub-unit has been identified to the north and northeast of the proposed mine site, but not within 3 miles of the site.

Beneath the Middle Silt and Clay Unit is the Lower Alluvial Unit. This unit is also known as the Lower Conglomerate Unit, as reported by Montgomery (1994) and Conoco (1976). It is the deepest alluvial unit in the Eloy basin and was intercepted during current investigation drilling activities. The lithology of the Lower Alluvial Unit is characterized by semi-consolidated to consolidated coarse sediments consisting of granite fragments, cobbles, boulders, sands, and gravels.

The Lower Alluvial Unit locally produces groundwater. In many cases, yields from wells penetrating the lower basin-fill can exceed 1,000 gpm and can be as large as 2,500 gpm (Montgomery, 1994). Where the lower basin-fill occurs directly beneath the middle fine-grained unit, groundwater may exist under confined or semi-confined conditions. Where the Lower Alluvial Unit is in direct contact with the Upper Alluvial Unit groundwater exists under generally unconfined conditions.

The Lower Alluvial Unit rests on fractured and faulted bedrock. The bedrock consists of Precambrian granite, gneiss, and schist. The bedrock is considered to be impermeable and non water-bearing compared to the basin-fill units, but is reported to be locally permeable in areas where it is highly fractured. Many wells completed in the area are screened in the basin-fill units as well as the bedrock.

2.3.2 Groundwater Use

Based on ADWR records through May, 1995 (ADWR, 1995), there are 382 registered wells within the 100-square mile Florence Project Area. Sheets 2.1-1 (UIC) and 2.1-2 (UIC) show the locations of these wells. As presented in Table 2.3-1, these wells are used for irrigation, domestic, public water supply, and monitoring purposes. Agricultural and municipal entities are the primary consumers of groundwater in the project area.

Water well data (ADWR, 1995) are more concentrated east and west of the Florence Project Area where the thickness of the basin-fill units is greater. With the exception of the Gila River channel area, water well log coverage is significant south of the Florence Project Area. However, wells in this area are generally less than 500 feet deep and do not encounter bedrock. Very few water wells are located within 2 miles north of the Florence Project Area. This area does contain exploration coreholes. Sheet 2.1-1 (UIC) shows locations of water wells with available logs and other information.

2.3.3 Community Drinking Water Systems

The Town of Florence owns five public supply wells in the general vicinity of the Florence Project area. Two wells are located approximately 2 1/2 miles east of the Florence proposed in-situ mine area at Florence Gardens. Three wells are located in the Town of Florence, approximately 3 miles southeast of the mine area (see Sheet 2.1-1 [UIC]). The three wells located in the Town of Florence provide drinking water to the residents and businesses of Florence. The two wells located at Florence Gardens provide drinking water to the residents of Florence Gardens, the Air National Guard (ANG), and the Immigration and Naturalization Service (INS).

The Arizona Department of Corrections owns two water supply wells; one located approximately 2 1/2 miles south, and one located approximately 3 miles east of, the proposed in-situ mine area (see Sheet 2.1-1 [UIC]). These wells provide drinking water to approximately 4,200 inmates at the Florence Complex of the Arizona State Prison. The majority of privately owned domestic wells are located outside of the Florence Project Area region serviced by the Town of Florence, in rural areas to the south of the project area. Tables 2.3-1 and 2.3-2 present additional information concerning these wells.

Table 2.3-3 summarizes large municipal water providers in the Pinal AMA (ADWR, 1995). Of the providers listed in Table 2.3-3, the Arizona State Prison at Florence and the Town of Florence are within 5 miles of the proposed in-situ mine area (see Sheet 2.1-1 [UIC]). Groundwater pumped from wells in 1985 which serve these two entities, as presented in Table 2.3-3, consist of 1,055 acre/feet (ac-ft) and 1,284 ac-ft, respectively.

2.3.4 Agricultural Withdrawals

The majority of groundwater reported in Table 2.3-4 is used by SCIDD, which is an element of San Carlos Irrigation Project (SCIP). SCIP is the primary user of surface water diverted from the Gila River and groundwater pumped from the area. The other primary element of SCIP is Gila River Indian Community (GRIC). Approximately 80 percent of the land in the region is used for agriculture (Beer, 1988). The main crop is cotton which is watered using flood irrigation methods. Approximately 12 percent of the farmers in the area use groundwater from private wells. The remaining farms utilize surface water supplied by SCIDD through three canals; the Florence-Casa Grande Canal, the North Side Canal, and the Florence Canal.

2.3.5 Nearby Property Owners

There are only two property owners within the 1/2-mile exemption boundary other than Magma. Sheet 2.1-1 (UIC) shows that ASARCO, Inc., another mining company, has a portion of their land that lies to the west of the proposed in-situ mine site. There are no wells of any type found on that land.

A portion of land owned by the State of Arizona lies in the south half of Section 28 of Township 4 South, Range 9 East. This land is leased to Magma under Mineral Lease 11-26500. Another portion of State of Arizona land lies in the northeast corner of the proposed exemption area. Again, there are no wells on that land either.

The San Carlos Irrigation District (SCID) has two irrigation wells located inside the 1/2-mile exemption area. These wells will be closed and replaced outside of the exemption area prior to mining operations.

2.4 PROJECT TYPE - AREA PERMIT FOR CLASS III WELLS

Magma plans to commence facility construction in March 1997 and to ship the first copper in January 1998. Operations are expected to continue for approximately 15 years.

2.4.1 In-Situ Mining Process

Magma proposes to mine copper at the facility using an in-situ leaching process. The process involves the following principal components:

- A series of injection wells to inject diluted sulfuric acid into selected segments of the copper oxide orebody.

- A series of recovery wells to recover copper sulfate solutions from the orebody.
- A series of hydraulic control wells to prevent production fluids from entering the surrounding aquifer.
- A solvent extraction/electrowinning (SX/EW) plant to recover copper from the production fluids.
- A neutralization unit to neutralize raffinate (spent sulfate solutions).
- An evaporation/tailing impoundment to contain and evaporate neutralized raffinate.
- An impoundment to collect stormwater and or spills.
- Fuel and chemical storage tanks.

A detailed description of the operational components associated with the proposed in-situ facility are presented in Volume V of this application.

The classification of the wells will be Class III. There will be 2,000 to 3,000 wells drilled and used during the expected 15-year mine life; therefore, this is an application for an area permit as described in 40 C.F.R. 144.33. The project type is extraction of copper. The classification of wells is described in 40 C.F.R. 144.6 (c) (2).

2.4.2 Injection/Withdrawal Practices

For purposes of this application, the analysis of the production well field contains an array of design, operational and closure components, and an evaluation of the alternatives related to these components. These environmental control aspects are coupled with the opportunity to optimize resource recovery throughout the life of the project.

Magma has developed a reference design that incorporates the most advanced discharge control technologies (DCTs) commercially available. Many of these technologies have been demonstrated to be effective in controlling fluid migration in related industrial applications, including oil and gas resource recovery, construction dewatering, and groundwater remediation. These cross-over technologies are only applicable to the acidified solution recover of oxide copper reserves of the subject orebody by recognizing the site specific hydrogeologic conditions of the Florence site, and the chemical and physical characteristics of the process fluids. In recognition of these factors, Magma has developed a design, operational approach and closure strategy that demonstrates the ability to meet the requirements of Underground Injection Control (UIC) regulations.

The Magma Florence oxidized copper orebody lies below the water table. The orebody is slated for in-situ leach extraction of its metallic values through deep well injection of acidified raffinate and pumped well recovery peripheral to the point of injection. Therefore, key elements of the

Magma Florence in-situ operations plan include: (1) hydraulic control to prevent excursions beyond the perimeter of the mined area; (2) corrective actions to prevent existing boreholes from becoming conduits for acidified process fluids; and (3) the proper design, construction and operation of the well system, including applicable verification of through mechanical integrity testing. Equally important is the close-as-you-go concept which is discussed in Section 2.7.

2.4.3 Operating Status of Injection/Extraction Wells

There are no operating wells at this time.

2.5 LISTING OF ALL US ENVIRONMENTAL PROTECTION AGENCY (USEPA) PERMITS OR CONSTRUCTION APPROVALS

Magma's Florence mine is not yet in operation and, as such, has few permits. Information presented in Table 2.5-1 shows the status of permits listed.

Permit requirements for Florence include an Aquifer Protection Permit (APP) from Arizona Department of Environmental Quality (ADEQ). In addition, an Air Quality Permit from Pinal County for the boilers, metal furnaces, and dust collection system for the processing plant will be required. The Arizona State Land Department will require a Mine Plan of Operation for those areas of the in-situ leaching that will occur on State lease land. Mineral lease 11-26500 is in place, but the current Mine Plan of Operations covers only exploration drilling. The ADWR will require permits for injection wells, monitor wells, and hydraulic control wells.

Under 40 C.F.R. Part 144 of the Safe Drinking Water Act (SDWA), the in-situ operation must be approved prior to operation for an aquifer exemption and a Class III Underground Injection Control (UIC) Permit issued. Under the UIC Permit program, the mine will have to show compliance with the Endangered Species Act (ESA), National Historic Preservation Act (NHPA), and the Fish and Wildlife Coordination Act (FWCA).

2.6 WATER QUALITY IMPACTS

Potential impacts on groundwater quality have been carefully evaluated and described in Magma's APP application. Section 5.0, Volume I, of the APP Application provides a brief overview of those evaluations and is attached to this application as Appendix B. As described therein, state-of-the-art models were used to evaluate the potential impacts of the proposed in-situ mining operation. the models indicate that drinking water quality standards will be maintained at the boundaries of the in-situ mine area during operations and during the 30-year post-closure period.

2.7 ANALYSES OF ENVIRONMENTAL IMPACTS AND COMMITMENT OF RESOURCES

Magma Copper Company's (Magma) policy is to effect closure on an on-going basis during operation. Once a series of wells has depleted an ore zone of copper, closure will begin in phases expected to last about 18 months each. The closure process will begin with a period where only injection occurs without acid being added. This period will be followed by a rest period of about 1 week to 1 month, depending on the acid consumption residual in the leach ore. The solutions

will then be withdrawn without injection. Withdrawal will continue until the copper and acid values drop to a low level in the solutions pumped from the spent orebody. There may then be a period where fresh water will be injected or infiltrated to sweep the ore zone in the leached area. The solution pumped during these periods will be added to the process stream and any residual acid will be consumed by the production of copper in other areas. The copper will then be removed and processed in the solvent extraction/electrowinning (SX/EW) plants.

Throughout the closure process, Magma will maintain hydraulic control over all regions of the orebody that have been subjected to in-situ leaching. During active sweeping of the individual ore blocks, this control will be accomplished in the same manner as that utilized during leaching. This approach will use surrounding recovery wells as a means of sustaining an inward gradient around the region being closed. After sweeping and reduction of the concentrations of dissolved constituents, a series of secondary control wells will continue to function and serve to capture any affected groundwater within the confines of the proposed in-situ mine area. The effectiveness of both the primary and secondary control strategies has been demonstrated as part of the groundwater modeling simulations presented in Volume IV.

The advantages of the close-as-you-go process is that water is used in an economical manner, as water must be added to the system to compensate for salts bled to the Evaporation/Tailings Pond. The net result is that most of the orebody will have been rinsed of the majority of sulfate and other leachable ions during normal operation. The closure cost will be absorbed as part of the normal operating cost, and will be accrued and expensed at an estimated $0.035 per pound of copper produced, as described more fully in Appendix A.

Once the last set of wells on line begin closure, it is expected that closure of these wells will take less than 1 year. Again, the process solutions will ultimately be neutralized and reside in the Evaporation/Tailings Pond.

The rinse solution during the sweep operation will be analyzed for sulfate. When the sulfate level decreases to below a level of 750 parts per million (ppm), then the wells will be shut down and closed in accordance with the well closure plan. The ultimate goal is to flush to a level where, upon closure, no hazardous or non-hazardous constituents will exceed Arizona Water Quality Standards (AWQS) at the Point of Compliance (POC).

Magma believes that environmental impacts will be temporary and limited to the aquifer exemption area and only during the life of the mine. Residual waters remaining in the ore zone after closure will meet primary drinking water standards, and consequently there will be no long term or irreversible environmental impacts. The operation of the in-situ leaching mining operation will allow recovery of the copper resource that otherwise would have been lost.

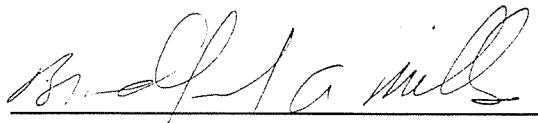
2.8 EXEMPTION CHECKLIST

Table 2.8-1 (UIC) is submitted as an aid to the Environmental Protection Agency (EPA) in determining completeness. The left column is the regulatory guidelines while the right two columns indicate the reference location of the required information and any pertinent comments.

2.9 CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Bradford A. Mills, Executive Vice President
NAME AND OFFICIAL TITLE

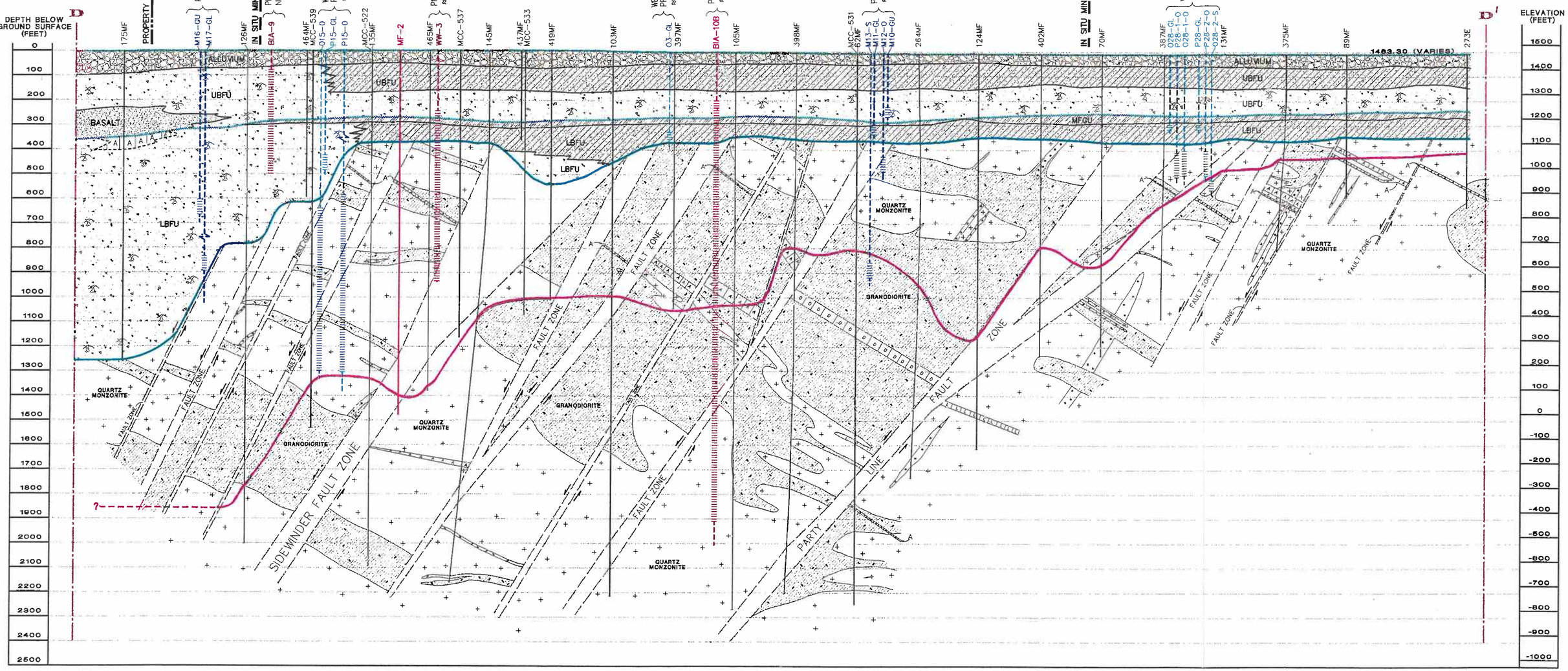


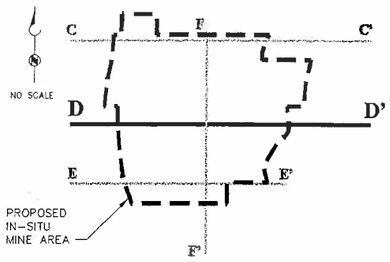
SIGNATURE

1/16/96

DATE SIGNED

GENERALIZED GEOLOGIC CROSS-SECTION D-D'
VIEW LOOKING TO THE NORTH





KEY MAP

EAST-WEST CROSS SECTION LOOKING NORTH
745,520 N MAGMA FLORENCE PROJECT

- ALLUVIUM
- SAND, SILT AND CLAY
- SAND, BOULDERS AND CLAY
- SAND, GRAVEL AND BOULDERS
- SAND & GRAVEL
- SAND, GRAVEL AND CLAY
- SILT AND CLAY
- BASALT
- UBFU UPPER BASIN FILL UNIT
- MFGU MIDDLE FINE-GRAINED UNIT
- LBFU LOWER BASIN FILL UNIT
- GRANODIORITE PORPHYRY
- QUARTZ MONZONITE PORPHYRY
- DIABASE/DIORITE
- A ANDESITE
- D DACITE
- L QUARTZ LATITE
- BASIN FILL UNCONFORMITY
- LBFU/OXIDE CONTACT
- OXIDE/SULFIDE CONTACT
- EXISTING COREHOLES
- WELLS (DASHED WHERE PROJECTED)
  - MONITORING
  - EXISTING
  - AQUIFER TESTING
  - SCREEN DISTORTION DUE TO PROJECTION

NOTE:
DEPICTIONS OF WELL PROJECTED ONTO SECTION ARE ADJUSTED TO PLACE SCREENS IN PROPER GEOLOGIC VIEW

0 200 400
VERT SCALE IN FEET

0 200 400
HORIZ SCALE IN FEET

Figure 2.1-1 (UIC)
HYDROGEOLOGIC CROSS-SECTION D-D'

MAGMA COPPER COMPANY
Florence Mining Division