STATE OF NEW MEXICO
WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF THE PETITION FOR A VARIANCE TO APPROVE ALTERNATIVE ABATEMENT STANDARDS FOR THE PECOS MINE OPERABLE UNIT

No. WQCC 18-03 (V)

Cyprus Amax Mineral Company,

Petitioner.

NEW MEXICO ENVIRONMENT DEPARTMENT'S STATEMENT OF INTENT TO PRESENT TECHNICAL TESTIMONY

Pursuant to the Water Quality Control Commission ("Commission") Adjudicatory Procedures, 20.1.3 NMAC, the New Mexico Environment Department ("Department") submits this Statement of Intent to Present Technical Testimony at the public hearing in this matter, scheduled to be held on September 11, 2018. The hearing will address the Petition for a Variance to Approve Alternative Abatement Standards for the Pecos Mine Operable Unit ("Petition"). The Pecos Mine is located near Tererro in San Miguel County, New Mexico. The Petition was filed by Cyprus Amax Mineral Company ("Petitioner") on April 12, 2018.

In accordance with 20.1.3.17.E NMAC, the Department states as follows:

1. Name of person filing the Statement of Intent

The Ground Water Quality Bureau of the Water Resources Protection Division of the Department.

2. Statement of Position

The Department does not oppose the Petition and recommends that the Commission grant the Petition.

3. Name and affiliation of the Department's witness

Kurt Vollbrecht
Manager, Mining Environmental Compliance Section
Ground Water Quality Bureau
New Mexico Environment Department
Santa Fe, New Mexico

The Department reserves the right to call additional witnesses in rebuttal.

4. Estimated length of direct testimony of each witness.

Mr. Vollbrecht's testimony is estimated to take approximately 30 minutes

5. List of exhibits to be offered at the hearing

The Department intends to offer the following exhibits into evidence at the hearing:

EXHIBIT NUMBER	TITLE OF EXHIBIT
NMED Exhibit 1	Testimony of Kurt Vollbrecht
NMED Exhibit 2	Resume of Kurt Vollbrecht
NMED Exhibit 3	Administrative Order on Consent
NMED Exhibit 4	Figure depicting area to which proposed alternative abatement standards would apply
NMED Exhibit 5	Letter of Support from NM Dept of Game and Fish
NMED Exhibit 6	April 26, 2017 Letter from State Engineer

The Department may introduce additional exhibits as evidence for the purpose of cross-examination or in rebuttal. The Department may also use additional demonstrative exhibits at the hearing, such as photographs, maps, charts, graphs, and PowerPoint slides, without introducing them into evidence.

6. Summary of Testimony

The written direct testimony of the Department's witness, Mr. Kurt Vollbrecht, is submitted herewith as NMED Exhibit 1. Mr. Vollbrecht will testify regarding the applicable

criteria for evaluation of petitions for alternative abatement standards, his review and evaluation of the Petition in this case, and how the Petitioner has met the requirements of the New Mexico Water Quality Act, NMSA 1978, §§ 74-6-1 through -17 (as amended), and the Water Quality Control Commission's Water Quality Regulations at 20.6.2 NMAC.

Respectfully submitted,

NEW MEXICO ENVIRONMENT DEPARTMENT

Lara Katz, Assistant General Counsel
Office of General Counsel
New Mexico Environment Department
1190 St. Francis Drive
Santa Fe, New Mexico 87505
Telephone: (505) 827-2885
Email: lara.katz@state.nm.us

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing Statement of Intent to Present Technical Testimony was served on the following parties of record on August 31, 2018:

Ms. Pam Castaneda
Water Quality Control Commission
1190 St. Francis Dr.
Santa Fe, New Mexico 87505
Pam.castaneda@state.nm.us
Administrator for the New Mexico Water Quality Control Commission

Matthew Wunder
New Mexico Department of Game and Fish
1 Wildlife Way
P.O. Box 25112
Santa Fe, New Mexico 87504
Matthew.wunder@state.nm.us

Dalva L. Mollenberg
Gallagher & Kennedy, P.A.
1239 Paseo de Peralta
Santa Fe, New Mexico 87501
DLM@gknet.com
Counsel for Cypress Amax Minerals Company

Stephen Vigil
Office of the Attorney General
Post Office Drawer 1508
Santa Fe, New Mexico 87504-1508
svigil@nmag.gov
Counsel for the Water Quality Control Commission

Lara Katz

STATE OF NEW MEXICO
WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF THE PETITION FOR A VARIANCE TO APPROVE ALTERNATIVE ABATEMENT STANDARDS FOR THE PECOS MINE OPERABLE UNIT

No. WQCC 18-03 (V)

Cyprus Amax Mineral Company,

Petitioner.

WRITTEN TESTIMONY OF KURT VOLLBRECHT

My name is Kurt Vollbrecht, and I am the Program Manager of the Mining Environmental Compliance Section ("MECS") with the New Mexico Environment Department ("Department" or "NMED") Water Protection Division's Ground Water Quality Bureau ("GWQB"). I am presenting this testimony in the hearing concerning the Petition for a Variance to Approve Alternative Abatement Standards ("Petition") for the alluvium/colluvium that occurs along the Pecos River and the underlying regional aquifer at the Pecos Mine in San Miguel County, New Mexico. Cyprus Amax Minerals Company ("CAMC") filed its Petition on April 27, 2018.

I. QUALIFICATIONS

I hold a Bachelor of Science degree in Geology from California State University, Hayward, and a Master of Science degree in Geology from the New Mexico Institute of Mining and Technology. I have worked for the Department for a total of 20 years, holding a variety of technical and supervisory positions in the Water Protection Division (and its predecessor divisions), including the last 13 years with MECS. I have held my current position as Program Manager of MECS for five years and I oversee 12 supervisory and technical staff. MECS is responsible for all permitting, spill response, abatement, and public participation activities associated with mining facilities in New Mexico in accordance with the New Mexico Water

Quality Act, NMSA 1978, §§ 74-6-1 to -17, and the Ground and Surface Water Protection Regulations, 20.6.2 NMAC and 20.6.7 NMAC.

A copy of my resume is marked as NMED Exhibit 2. It is accurate and current.

II. BACKGROUND ON THE PECOS MINE

The reclaimed Pecos Mine is located within the Pecos River Valley, approximately one mile north of Tererro in San Miguel County, within Sections 27 and 28, Township 18 North, Range 12 East. The mine property is owned by the New Mexico Department of Game and Fish and is surrounded by property under the stewardship of the United States Forest Service.

The first documented discovery of mineralization associated with the Pecos Mine was in 1892. From 1926 through 1939, a corporation called the American Metal Company of New Mexico ("AMCNM")[1] developed and operated a lead and zinc mine located approximately 16 miles north of the Village of Pecos at the confluence of Willow Creek and the Pecos River, as well as a mill, located about two miles northwest of the Village of Pecos, which was used to process the ore mined at the Pecos Mine. During that time period, ore was mined from 1,800 feet below ground surface. The mine produced primarily lead and zinc, along with secondary minerals including copper, silver, and gold.

Fish kills were documented in 1982 and 1991, the cause of which was determined to be discharges from the waste associated with the Pecos Mine. In the mid-1980s, NMED conducted a study of the surface water near the mine and found elevated metals concentrations in springs and other surface water features discharging from around the Pecos Mine area. Subsequent investigations showed that mine waste was also used between the 1930s and 1970s to develop and

[1] CAMC is the successor company to Amax Resource Conservation Company, which in turn is the successor corporation to the American Metal Company Limited ("AMC"). In 1925, AMC and the Goodrich-Lockhart Company formed AMCNM.

maintain roads and campgrounds at various locations in the Pecos area. In 1992, the Department entered into an Administrative Order on Consent ("AOC") with AMC and the State of New Mexico as Respondents.[2] A copy of the AOC is marked as NMED Exhibit 3. The AOC required investigation and remediation of the Pecos Mine consistent with the requirements of the federal Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. §§ 9601 to 9675. The Department is responsible for enforcement of the AOC and oversight of the work conducted thereunder.

The Statement of Work associated with the AOC designated five "operable units" to address impacts associated with historic mining and milling operations. The Pecos Mine Operable Unit ("PMOU") is the operable unit that includes the waste rock stockpile and associated features at the location of the Pecos Mine. The PMOU consists of the mine, 12.3 acres of waste rock (217,000 cubic yards), contaminated soils, five to ten acres of wetlands and riparian areas adjacent to Willow Creek and the Pecos River, and affected ground and surface water. The remedy specified in the AOC for the PMOU included: excavation and consolidation of all associated waste; installation of a geosynthetic clay liner and cover material; restoration of Willow Creek, riparian habitat, and wetlands; revegetation of all disturbed areas; diversion of subsurface and surface water flows around the capped waste pile; and restoration of surface and ground water quality.

The reclamation of the PMOU began in 1999 and was completed in 2004. The reclamation of the PMOU has met all the performance criteria set forth in the AOC and subsequent documents, with the exception of exceedance of the Water Quality Control Commission's groundwater standards at 20.6.2.3103 NMAC in four monitoring wells.

[2] The State of New Mexico is a Respondent because the New Mexico Department of Game and Fish and the New Mexico Department of Transportation are responsible for certain operable units under the AOC.

III. DESCRIPTION OF AFFECTED AQUIFER SYSTEMS

There are two aquifers associated with the Pecos Mine: a shallow aquifer that occurs along the Pecos River and Willow Creek at less than 20 feet below ground surface; and an underlying regional aquifer that occurs in multiple bedrock units beneath the entire site.

The shallow aquifer is comprised of gravel-rich alluvial deposits that occur within the Pecos River and Willow Creek valleys. The wetlands are composed of lacustrine floodplain deposits and the hillslopes are composed of colluvial deposits consisting of predominantly sandy clay and clay. The shallow aquifer (alluvial/colluvial deposits) occurs from 10 to 15 feet below ground surface adjacent to Willow Creek. The shallow aquifer proximal to the Pecos River ranges from near zero to approximately 10 feet below ground surface. Recharge to the shallow aquifer occurs from the following sources: seepage along the eastern portion of Willow Creek; seepage through the waste rock pile that leads to saturation above or within the colluvium; precipitation; and upward groundwater flow from the underlying regional aquifer. The direction of groundwater flow in the shallow aquifer is generally towards the Pecos River.

The regional aquifer occurs within multiple geologic units beneath the site, including Paleozoic limestone, dolomite, and sandstone, and underlying Precambrian schists, amphibolites, and metavolcanics. Groundwater in these geologic units occurs predominantly in fractures. Ground water in the regional aquifer generally flows from east to west and discharges to the shallow aquifer and the Pecos River.

IV. HISTORY OF ABATEMENT ACTIVITIES AT THE SITE

In accordance with the AOC, several environmental investigations of the PMOU site were conducted. These investigations included a remedial investigation ("RI") completed in 1996, a feasibility study ("FS") completed in 1997, and a final Decision Document ("DD") issued by

NMED in 1998, which approved the RI and the FS. The RI required, among other things, characterization of the PMOU, including the extent of groundwater and surface water contamination. The RI is functionally equivalent to and meets the requirements of a Stage 1 Abatement Plan as described in the WQCC's abatement regulations, at 20.6.2.4106.C NMAC. According to the RI, the primary source of the contaminants was the exposed waste rock piles, which contain multiple metals and acid-generating minerals. The RI indicated that infiltration of precipitation through, and runoff from, the waste rock piles was the primary mechanism for transport of contaminants to downgradient soils, sediments, surface water, and groundwater (Stoller, 1996).

The FS (prepared by CAMC) and the DD (issued by NMED) are functionally equivalent to and serve the same purpose as a Stage 2 Abatement Plan, as described in the abatement regulations at 20.6.2.4106.D NMAC. The DD presents the remedy approved by NMED for the PMOU based on the RI, the FS, and public comment. The selected remedy was implemented by CAMC between 1999 and 2004. NMED has reviewed and approved the reclamation and remediation work that has been completed as required under the AOC and DD. The reclamation and remediation measures are functioning as intended.

V. PROPOSED ALTERNATIVE ABATEMENT STANDARDS

Petitioner has proposed alternative abatement standards for the PMOU of 4.0 mg/L for barium, 0.10 mg/L for cadmium, 0.10 mg/L for cobalt, 2.0 mg/L for fluoride, 40 mg/L for iron, 8 mg/l for manganese, 1,700 mg/l for total dissolved solids ("TDS"), and 40 mg/L for zinc. A figure depicting the area for which alternative abatement standards are proposed is marked as NMED Exhibit 4. The alternative standards are requested in perpetuity to facilitate site closure and

development, with institutional controls proposed to ensure that the shallow and regional aquifers are not used as a potable water supply in the future.

VI. STATUTORY AND REGULATORY REQUIREMENTS FOR AAS PETITIONS

Alternative abatement standards fall within the Commission's authority to grant a variance from any regulation of the Commission, pursuant to NMSA 1978, Section 74-6-4(H), of the Water Quality Act. The Commission's abatement regulations at 20.6.2.4104.F NMAC provide that a responsible person may submit a petition for approval of alternative abatement standards any time after submission of a Stage 2 abatement plan. NMED reviews petitions for alternative abatement standards and makes a recommendation to the Commission regarding approval based on the criteria in 20.6.2.4103.F(1) NMAC:

> (a) compliance with the abatement standard(s) is/are not feasible, by the maximum use of technology within the economic capability of the responsible person; OR there is no reasonable relationship between the economic and social costs and benefits (including attainment of the standards set forth in Section 20.6.2.4103 NMAC) to be obtained;
>
> (b) the proposed alternative abatement standard(s) is/are technically achievable and cost-benefit justifiable; and
>
> (c) compliance with the proposed alternative abatement standards will not create a present or future hazard to public health or undue damage to property.

A petition for alternative abatement standards must provide the information required under Subsection 20.6.2.4103.F(2) of the abatement regulations, as well as that required for variance petitions under Subsection 20.6.2.1210.A NMAC. 20.6.2.1210.A NMAC requires that the petition:

> (1) state the petitioner's name and address;

(2) state the date of the petition;

(3) describe the facility or activity for which the variance is sought;

(4) state the address or description of the property upon which the facility is located;

(5) describe the water body or watercourse affected by the discharge;

(6) identify the regulation of the commission from which the variance is sought;

(7) state in detail the extent to which the petitioner wishes to vary from the regulation;

(8) state why the petitioner believes that compliance with the regulation will impose an unreasonable burden upon his activity; and

(9) state the period of time for which the variance is desired.

Subsection 20.6.2.4103.F(2) NMAC requires that a petition for alternative abatement standards also specify the water contaminant(s) for which alternative standards(s) is/are proposed, the alternative standard(s) proposed, the three-dimensional body of water pollution for which approval is sought, and the extent to which the abatement standard(s) set forth in Section 20.6.2.4103 NMAC is/are now, and will in the future be, violated.

VII. THE PETITION MEETS THE REGULATORY REQUIREMENTS

I have reviewed the CAMC AAS Petition and, based on my review, I conclude that the Petition meets the statutory and regulatory requirements under the Water Quality Act and the Commission's regulations, as discussed below.

A. Compliance with Abatement Standards is Not Feasible

The Petitioner has demonstrated that compliance with the abatement standards in 20.6.2.4103.B NMAC is not feasible, pursuant to 20.6.2.4103.F(1)(a) NMAC. The remedy that was implemented has successfully minimized the contact between water and acid generating mine waste as evidenced by the elimination or significant reduction in discharge from seeps that were present prior to implementation of the remedy, and through a significant reduction in contaminant concentrations observed in groundwater beneath and downgradient of the Site. Surface water quality in the Pecos River shows no impacts from discharges associated with the Site following implementation of the remedy. Due to the low yield of the bedrock aquifer and the constraints due to the geographic location of the Site, groundwater extraction and treatment is likely infeasible. In addition, construction of such a system would compromise the effective source control remedy that has been effectively implemented. There is no reasonable relationship between the cost of implementing such measures and the benefits associated with treating a small volume of impacted groundwater essentially in perpetuity.

B. The Proposed AAS are Technically Achievable and Cost-Benefit Justifiable

The proposed AAS are based on the Petitioner's statistical evaluation conducted to quantitatively determine observed trends in constituent concentrations through time. The results of the statistical analysis indicate that water quality trends have stabilized for most constituents following decreasing trends in the years following implementation of the remedy.

Significant resources have been expended to implement the remedy which has proven to be an effective source control measure, and as discussed above, implementation of pump and treat remedial alternatives are not feasible. Therefore, the proposed AAS are technically achievable and cost-benefit justifiable, as required by 20.6.2.4103.F(1)(b) NMAC.

C. Compliance with the Proposed AAS Will Not Create a Present or Future Hazard to Public Health or Undue Damage to Property

In accordance with 20.6.2.4103.F(1)(c) NMAC, Petitioner has demonstrated that compliance with the proposed AAS will not create a present or future hazard to public health or undue damage to property. Exposure to barium, cadmium, cobalt, fluoride, iron, manganese, TDS, or zinc impacted groundwater will be prevented by the institutional and administrative controls outlined below. The following controls will eliminate the potential human exposure pathways and render the proposed alternative abatement standards protective of public health:

1. The surface area of the PMOU is owned by the NMDGF and consists of the waste rock pile, reclaimed Willow Creek, and reclaimed wetlands; the area extends to the Pecos River on the western boundary. Even if NMDGF desired to install a water production well, it would not be feasible to do so based on the constraints of the site. NMDGF is aware of the alternative abatement standards process associated with the PMOU and concurs with the proposal to restrict well drilling in the affected aquifers, as described next. *See* NMED Exhibit 5, Letter of Support from NMDGF.

2. If the AAS are approved by the Commission, the Department will petition the New Mexico Office of the State Engineer ("OSE") to issue an Order under 19.27.5.13.A NMAC prohibiting construction of a well in the affected shallow and regional aquifers. The Petition includes the necessary information and documentation for the Department to prepare its recommendation for the Order under 19.27.5.13.A NMAC if the Commission approves the Petition. As demonstrated in a letter from the Office of the State Engineer dated April 26, 2017, a process has been defined between the two state agencies for implementation of a prohibition on well drilling, as appropriate. *See* NMED Exhibit 6, April 26, 2017 Letter from State Engineer's

Office. OSE has previously granted such Orders for aquifers, or portions of aquifers, to ensure protection of human health.

3. OSE regulations contain provisions that prevent construction of a water supply well in contaminated groundwater. *See* 19.27.4.29 NMAC (requiring wells to be constructed to prevent contamination, inter-aquifer exchange of water, flood water contamination of aquifer, and infiltration of surface water); 19.27.4.29.D NMAC (requiring that all wells be set back from potential sources of contamination in accordance with NMED regulations and other applicable ordinances and regulations); 19.27.4.30.A NMAC (requiring annular seals when necessary to prevent flow of contaminated or low quality water); 19.27.4.30.A(4) NMAC (requiring annulus sealing and proper screening in wells which encounter non-potable, contaminated, or polluted water at any depth to prevent commingling of such water with any potable or uncontaminated water).

Because of the nature of the contaminants and the hydrology of the shallow and regional aquifers, it is apparent that no effort and no reasonable cost are likely to achieve to the standards in 20.6.2.3103 NMAC. Therefore, an arrangement whereby comprehensive institutional and administrative controls are in place and fully documented is both protective of human health and beneficial to intended future land use. The future land use of the PMOU is that of a mine waste repository with no other potential land use. As the landowner, the NMDGF will be responsible for long term maintenance of the PMOU in perpetuity. The proposed alternative abatement standards will allow NMED to administratively close this operable unit of the Tererro AOC.

VIII. COMPLIANCE WITH 20.6.2.1210.A NMAC AND 20.6.2.4103.F(2)

Based on my review, the Petition sufficiently sets forth the required information in 20.6.2.1210.A NMAC for variance petitions. *See* Petition at pp. 5-6. The Petition further contains

the required information under 20.6.2.4103.F(2) NMAC for alternative abatement standard petitions as follows:

- The contaminants for which alternative abatement standards are proposed are barium, cadmium, cobalt, fluoride, iron, manganese, TDS, and zinc.
- The three-dimensional body of water pollution for which approval is sought is defined as the shallow and regional aquifer extending to a depth of approximately 1900 feet below ground surface within the area defined by the polygon of the affected property including: 35.760 degrees north and -105.670 degrees west; 35.759 degrees north and -105.668 degrees west; 35.754 degrees north and -105.673 degrees west. This also defines the extent to which the standards of 20.6.2.4103 NMAC will be exceeded in the future.
- The standards of 20.6.2.4103 NMAC incorporate the standards in 20.6.2.3103 NMAC. Thus, the 20.6.2.4103 NMAC standards will be increased as follows:
    - The barium standard of 1.0 mg/l will be increased to 4.0 mg/l
    - The cadmium standard of 0.01 mg/l will be increased to 0.10 mg/l
    - The cobalt standard of 0.05 mg/l will be increased to 0.10 mg/l
    - The fluoride standard of 1.6 mg/l will be increased to 2.0 mg/l
    - The iron standard of 1.0 mg/l will be increased to 40 mg/l
    - The manganese standard of 0.2 mg/l will be increased to 8.0 mg/l
    - The TDS standards of 1,000 mg/l will be increased to 1,700 mg/l
    - The zinc standard of 10.0 mg/l will be increased to 40.0 mg/l

IX. COMMUNITY OUTREACH

In addition to the WQCC public notice provisions, public notice has been provided via certified mail to the 26 property owners in the vicinity of the PMOU. Additional public notice has been provided through posting of the notice at the Tererro General Store, located one mile south of the PMOU at 1911 NM-63, Tererro, NM 87573.

This concludes my testimony.

Kurt M. Vollbrecht
E-mail: kurt.vollbrecht@state.nm.us

Education

M.S. in Geology, August, 1997, **New Mexico Institute of Mining and Technology**, Socorro, NM

B.S. in Geology, June, 1994, **California State University, Hayward (CSUH)**

Professional Experience

Program Manager, NMED Mining Environmental Compliance Section, NMED GWQB, 3/12-12/12 and 7/13-present: Manager of the Mining Environmental Compliance Section, including developing regulations, policies, and guidelines for mine related discharges; review and approval of discharge permits; assigning, directing, and tracking the work of current MECS technical staff and Team Leaders on permit development and enforcement actions; coordination with the United States Environmental Protection Agency regarding National Priorities List sites; conducting meetings with permittees, public members, and senior management.

NMED Mining Environmental Compliance Section Operational and Closure Team Leader, NMED GWQB 12/12-3/14: Responsible for evaluating, drafting and ensuring consistency and compliance with Ground Water Discharge Permits, specific to hard rock mine sites in New Mexico for protection of groundwater pursuant to the NM Water Quality Act and WQCC Regulations. Supervision of several NMED technical staff including Tyrone Mine, Chino Mine and Continental Mine permit leads, AOC, and uranium mine permit lead.

Mining Act Team Leader, NMED GWQB, 9/05-3/12: Responsible for coordination with the Mining and Minerals Division (MMD) in implementation of the NM Mining Act and providing comments and environmental determinations to MMD pursuant to the NM Mining Act. Evaluate and ensure compliance with Ground Water Discharge Permits specific to hard rock mine sites in New Mexico for protection of ground water pursuant to the NM Water Quality Act and WQCC Regulations. Evaluate reclamation practices and water quality issues at hard rock mine sites pursuant to the NM Mining Act. Supervise 3 technical staff.

Industrial Waste Team Leader, NMED GWQB, 7/04-9/05: Lead facility-type team by identifying, prioritizing, and implementing ways to improve program effectiveness in regulating facilities including development of policies, guidelines, templates and regulations. Provide technical and regulatory guidance to staff to ensure compliance with domestic, agricultural, and industrial Ground Water Discharge Permits for protection of groundwater pursuant to the NM Water Quality Act and WQCC Regulations. Supervise 3 technical staff.

Geoscientist A, NMED GWQB, 7/00-7/04: Evaluate and ensure compliance with domestic, agricultural, and industrial Ground Water Discharge Permits for protection of groundwater pursuant to the NM Water Quality Act and WQCC Regulations. Supervise 3 technical staff as

above. Assistant to Domestic Waste Team Leader for oversight of 600+ domestic waste discharge permits.

Water Resource Specialist, NMED GWQB, 10/98 – 7/00: Technical staff member responsible for review of a large, diverse caseload including domestic, agricultural, mining, and industrial Ground Water Discharge Permits. Duties include technical review of existing Ground Water Discharge Permits, review of new, renewal, and modification applications for Ground Water Discharge Permits, and evaluation of technical submittals to ensure compliance with NM Water Quality Act and WQCC Regulations.

***Exploration Field Geologist*:** Havilah Mining, Houston, Texas. 9/97 - 6/98, Mapping of potential ore body in southwest Texas, on-sight supervision of drilling program, core logging, splitting, and sample preparation for assay. On-site supervision of an exploratory placer operation in Sonora, Mexico. Duties included field mapping of veins and placer deposits, selection of sample locations to properly characterize potential deposit, overseeing operation of sluice and mineral separation equipment. *Supervisor:* Al Wadsworth, Consulting Geologist.

***Masters Research*:** New Mexico Tech, Socorro, NM. 9/94 - 9/97, In-depth study of Precambrian rocks including: detailed field mapping, structural analysis, petrographic study, microprobe analysis, and $^{40}Ar/^{39}Ar$ and U/Pb dating of igneous and metamorphic rocks. *Supervisor:* Dr. Laurel Goodwin.

***Assistant Manager*:** 6/85 – 6/93, Buss Automotive Parts, Oakland, CA.

Teaching Experience

Teaching Assistant, Geologic Field Courses:

New Mexico Tech, assisted students in detailed mapping of structurally complex Precambrian rocks in northern New Mexico. *Supervisors:* Drs. Steve Ralser and Maureen Wilks. Summer, 1996 and 1997.

CSUH advanced field course with emphasis on field mapping and study of Cascade Range volcanoes and associated deposits. *Supervisor:* Dr. Elwood R. Brooks. Summer, 1995.

CSUH summer field course including mapping of Devonian-Pennsylvanian miogeoclinal rocks in eastern Nevada, Mesozoic sedimentary rocks of the northern Colorado Plateau, and folded Mesozoic strata in the Gros Ventre River Valley, Wyoming, structural analysis of mesoscopic features, Grand Teton Range, Wyoming, and tape and compass mapping of a Paleozoic dike complex, northern Sierra Nevada. *Supervisor:* Dr. Elwood R. Brooks. Summer, 1994.

Lab Instructor, Igneous and Metamorphic Petrology, Structural Geology, New Mexico Tech. *Supervisor:* Dr. Laurel Goodwin. 9/94 - 5/97.

Instructor, Beginning Rock Climbing, New Mexico Tech. Responsible for safety and instruction of a large group (20-25 students). 9/96 - 5/97.

Teaching Assistant, Igneous and Metamorphic Petrology, CSUH. *Supervisor:* Dr. Nancy Fegan. 1/94 - 3/94.

Awards and Scholarships

New Mexico Bureau of Mines and Mineral Resources Research Grant, 1997; Leon Redbone Scholarship, 1996; Geological Society of America Penrose Grant, 1995; New Mexico Tech Graduate Research Grant, 1995; Livermore Lithophiles Brunton Compass Award (outstanding field student), 1993; CSUH Dept. Scholarship, 1993.

ADMINISTRATIVE ORDER ON CONSENT

TABLE OF CONTENTS

ADMINISTRATIVE ORDER ON CONSENT

This Administrative Order on Consent ("Consent Order") is made and entered as of this 2nd day of December, 1992, by and between Amax Resource Conservation Company, a division of AMAX Inc., and the State of New Mexico (collectively "Respondents"); and the New Mexico Environment Department ("NMED"), an agency of the State of New Mexico.

I. **BACKGROUND/HISTORY.**

Amax Resource Conservation Company ("Amax") is a division of AMAX Inc., a New York corporation. Amax is the successor corporation to the American Metal Company Limited ("AMC"), a New York corporation.

In 1925, AMC and the Goodrich-Lockhart Company ("GLC"), formed a Delaware Corporation called the American Metal Company of New Mexico (AMCONM). AMCONM was held 51% by AMC, 48% by GLC and 1% by the Mining & Development Corporation.

From 1926 through 1939, AMCONM developed and operated a lead and zinc mine located approximately 16 miles north of the Village of Pecos at the confluence of Willow Creek and the Pecos River (the "Pecos Mine"), and a mill ("El Molino"), located about two miles northwest of the Village of Pecos which was used to mill the ore mined at the Pecos Mine .

In 1939 when the Mine and Mill were closed AMCONM transferred all its mineral rights and real property to Pecos Estates, Inc., a New Mexico corporation owned in substantially the same proportions

by the shareholders of AMCONM. Following this, AMCONM was dissolved in 1945.

On July 10, 1950 nominees of the New Mexico State Game Commission purchased all of the stock of Pecos Estates, Inc. After acquiring the stock of Pecos Estates, Inc., the nominees then transferred to the New Mexico State Game Commission all assets of Pecos Estates, Inc., including cash and real property but excluding mineral rights. Pecos Estates, Inc. was then dissolved. The New Mexico Department of Game and Fish ("NMDGF"), is the current owner of the land and of the mine and mill dumps that were transferred from Pecos Estates, Inc. prior to its dissolution.

Prior to the sale of the stock of Pecos Estates, Inc., a trust for the benefit of the then shareholders of Pecos Estates, Inc. was established naming Fred S. Norcross, Jr., Thomas G. Moore, and John Payne, Jr. as trustees and the mineral rights owned by Pecos Estates, Inc., were transferred to the trustees of the trust.

NMDGF and the New Mexico State Highway and Transportation Department ("NMSHTD"), are executive agencies of the New Mexico state government. Exclusive of the mineral rights held in trust, NMDGF is the current owner of the Pecos Mine , El Molino, and the Lisboa Springs fish hatchery located on Hwy. 63 approximately 3 miles north of the Village of Pecos.

At various times mine waste has been removed from the mine and mill areas for use as construction or maintenance material for roads, pads, campsites and the Lisboa Springs fish hatchery.

Beginning in 1985 and continuing to the present, NMED and its

predecessor agency, the Environmental Improvement Division of the former New Mexico Health and Environment Department, have been investigating the Site. NMED detected elevated metals in seeps from the mine waste, in mill tailings, in surface and ground waters, and in seeps from the waste rock pile. Further investigation needs to be conducted to determine whether these levels pose actual harm to human health or the environment. Some mine and mill wastes are high in sulfides, and pose a risk of acid rock drainage. NMED discovered that the waste rock contains lead at concentrations which may be harmful to human health and the environment. Further investigation needs to be conducted to determine whether these levels pose actual harm to human health or the environment. Respondents dispute these contentions.

II. JURISDICTION AND AUTHORITY.

NMED contends that it has jurisdiction and authority over the subject matter of this Consent Order pursuant to and including without limitation, the following statutes and regulations:

A. The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA),

B. The Federal Water Pollution Control Act a/k/a the Clean Water Act,

C. The Resource Conservation and Recovery Act,

D. The New Mexico Water Quality Act,

E. The New Mexico Water Quality Commission Regulations,

F. The New Mexico Hazardous Waste Act and regulations,

G. The New Mexico Solid Waste Act and regulations,

H. The New Mexico Department of Environment Act, and

I. The New Mexico statutory and common law of nuisance.

Respondents admit that NMED has authority to issue and enforce this Consent Order but deny NMED's authority to enforce the foregoing statutes and regulations, and further deny that these statutes and regulations have any application whatsoever against them for alleged acts or omissions, past or present, occurring or having occurred at the Pecos Mine , El Molino or the Lisboa Springs fish hatchery. By entering into this Consent Order, Respondents do not admit any liability to NMED or to each other relating to contamination on or emanating from the Site. Nothing contained in this Consent Order shall affect any right, claim, cause of action or defense of any party hereto with respect to others not parties to this agreement.

III. **PARTIES BOUND**.

A. This Consent Order applies to and is binding upon NMED and upon Respondents and their successors and assigns and the obligations hereunder shall run with the land. Any change in ownership or corporate status of Respondents including, but not limited to any transfer of assets or real or personal property, shall in no way alter Respondents' responsibilities under this Consent Order.

IV. **DEFINITIONS**.

A. Whenever terms listed below are used in this Consent Order or in the attachments incorporated herein by reference, the following definitions shall apply:

1. **Administrative Record** shall mean the compilation of documents related to this Consent Order separately kept and maintained by NMED as an official record of the obligations and performance of obligations under this Consent Order.

2. **Advisory Group** shall be composed of the Secretary or her designee, and a designee of each of the Respondents.

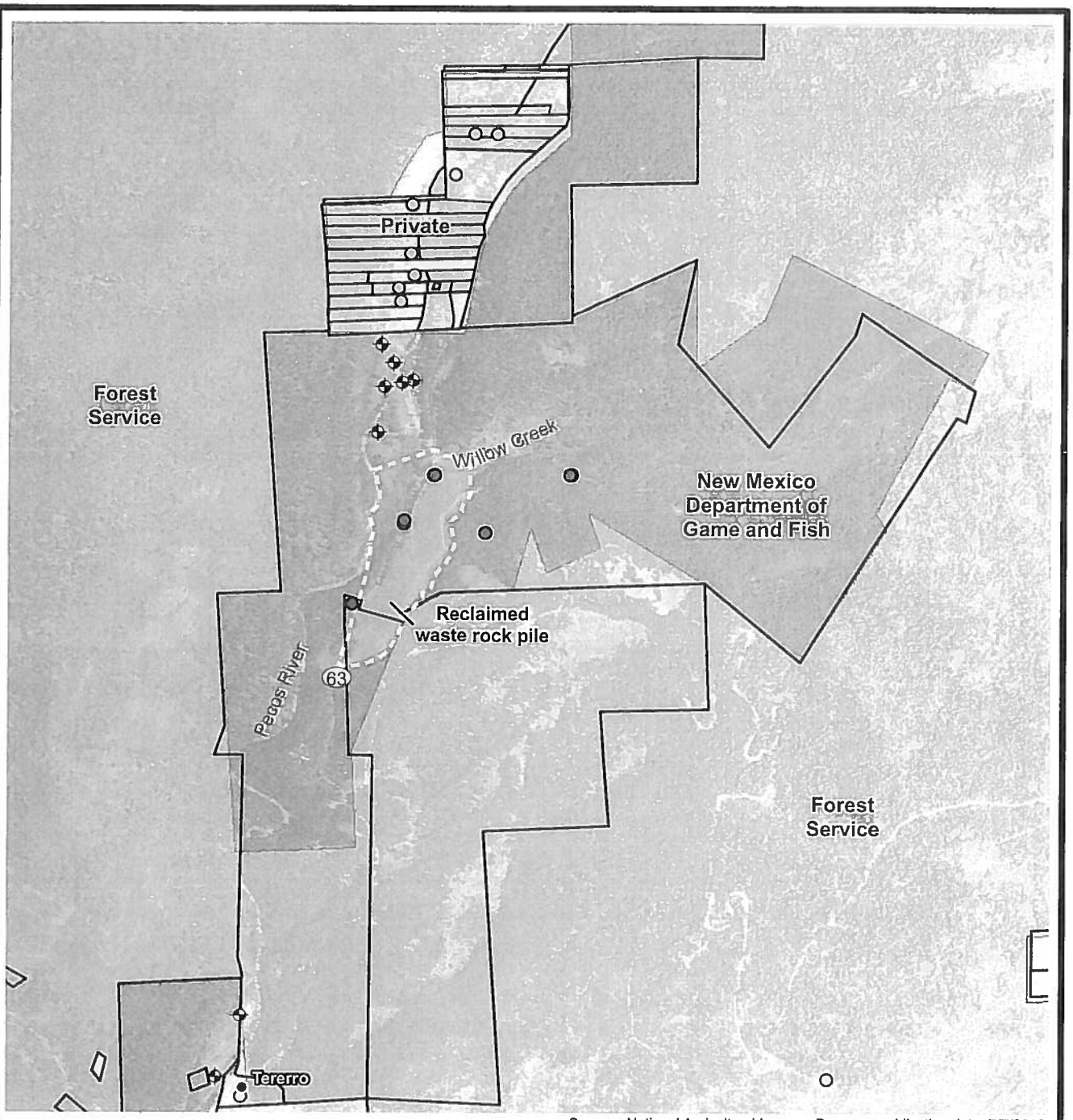
3. **Consent Order** shall mean this Order and all attachments , including without limitation, ATTACHMENT A (STATEMENT OF WORK), ATTACHMENT B (COST ALLOCATION AGREEMENT), ATTACHMENT C (NOTICE OF EQUITABLE SERVITUDE), and such other and further attachments as may later be incorporated by reference into this Consent Order pursuant to Section XII.E.

4. **Day** shall mean a calendar day unless expressly stated to be a working day.

5. **Mine Waste** shall include nonmineralized and low-grade mineralized waste rock removed either from above or adjacent to the ore body, wherever such material is presently found or has come to be located. The term "mine waste" includes tailings generated at the El Molino mill site wherever they are presently found or have come to be located.

6. **NMED** shall mean the New Mexico Environment Department and any successor department or agency of the State.

7. **Parties** shall mean NMED and the Respondents.



Source: National Agricultural Imagery Program, publication date: 7/7/2016

N

0 750 1500 Feet

Explanation

- NMDGF campground well
- Private well
- PMOU monitor well
- Proposed area of alternative abatement standards
- San Miguel County parcel
- Forest Service
- New Mexico Department of Game and Fish
- Private

EXHIBIT 4

PECOS MINE OPERABLE UNIT

Proposed Alternative Abatement Standard Area

Daniel B. Stephens & Associates, Inc.

2/7/2018

JN ES06.0038

S:\PROJECTS\ES06.0038_PMOU\GIS\MXDS\HOMEOWNERS_NOTICE.MXD

GOVERNOR
Susana Martinez

DIRECTOR AND SECRETARY
TO THE COMMISSION
Michael B. Sloane

DEPUTY DIRECTOR
Vacant

STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH

One Wildlife Way, Santa Fe, NM 87507

Post Office Box 25112, Santa Fe, NM 87504

Tel: (505) 476-8000 | Fax: (505) 476-8123

For information call: (888) 248-6866

www.wildlife.state.nm.us

24 August 2018

Kurt Vollbrecht, Program Manager
Mining Environmental Compliance Section
Ground Water Quality Bureau, New Mexico Environment Department (NMED)
1190 South Saint Francis Drive
Santa Fe, NM 87502

Dear Mr. Vollbrecht,

In the matter of the Petition For A Variance To Approve Alternative Abatement Standards (AAS) for the Pecos Mine Operable Unit [WQCC 18-03 (V)] by Cyprus Amax Minerals Company, the New Mexico Department of Game and Fish (Department), as owner of the subject property for the AAS, affirms that it has concurred with the filing of the Petition, and will rely on the technical expertise of NMED and the Water Quality Control Commission to ensure that any adopted alternative standards will not adversely impact public health or the environment. The Department also concurs with the request for the Office of State Engineer to issue an order restricting the construction of wells within New Mexico Department of Game and Fish property covered by the AAS to ensure that it will not create a present or future hazard to public health or property.

Sincerely,

Michael B. Sloane
Director

cc: Jeff Lewellin, Mining Act Team Leader, NMED

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER
CONCHA ORTIZ Y PINO BUILDING, 130 SOUTH CAPITOL, SANTA FE, NM 87501
TELEPHONE: (505) 827-6091 FAX: (505) 827-3806

TOM BLAINE, P.E.
STATE ENGINEER

Mailing Address:
P.O. Box 25102
Santa Fe, NM 87504-5102

April 26, 2017

New Mexico Environment Department (NMED)
Attn: Michelle Hunter
Chief Ground Water Quality Bureau
1190 Saint Francis Drive
Santa Fe, NM 87502

RE: NMED petitions to implement institutional controls per 20.6.2 NMAC

Greetings Ms. Hunter:

The NMED and Office of the State Engineer (OSE) have a long history of agency cooperation on statewide projects potentially affecting water quantity or water quality dating back many decades.

The respective bureaus within NMED work as expert witnesses and support Water Quality Control Commission (WQCC) petitioners who is seeking approval of alternative abatement standards for remediation of a contaminated site. The institutional controls needed to help prevent the contamination from moving during this period include the OSE placing restrictions on drilling or completing wells within a certain water bearing zone.

When an NMED bureau initially contacts the OSE that a petitioner will be requesting drilling restrictions, the OSE is then given the opportunity to review the WQCC hearing notice to ensure the proposal has provided adequate public notice. After the hearing, if the petitioner has gained WQCC approval, the NMED provides formal written request to the State Engineer to implement institutional controls. This can include restricting the drilling and completion of wells within the area of contamination, for perpetuity or a scheduled time determined either by NMED or the WQCC, **or** alternatively, issue a health advisory to those that do drill wells in an affected area. The OSE will then issue an order restricting the activity within the area of contamination and the area is added to the agency permit mapping system and also to maps on the OSE website alerting the public of the restriction.

We will continue these efforts with formal requests from NMED for specific areas of the state designated by NMED in order to protect the health and well being of the public.

Please let me know if further discussion would be helpful.

Sincerely,

John T. Romero, P.E.
Director, Water Rights Division

Email cc:

Bruce Yurdin, Director Water Protection Division
Ali Furmall, Manager of Remediation Oversight Section
Lara Katz, NMED Asst. General Counsel
Annie Maxfield, NMED Asst. General Counsel
Jerri L. Pohl, OSE Statewide Projects