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STATE OF NEW MEXICO  
BEFORE THE SECRETARY OF NEW MEXICO ENVIRONMENT DEPARTMENT

IN THE MATTER OF THE APPLICATION OF  
PHELPS DODGE TYRONE INC. FOR A  
SUPPLEMENTAL DISCHARGE PERMIT FOR  
CLOSURE AT THE TYRONE MINE FACILITY,  
DP-1341.

No. GWB 01-02

**TESTIMONY OF MARCY LEAVITT**

My name is Marcy Leavitt, and I am the Chief of the Ground Water Quality Bureau (GWQB) of the New Mexico Environment Department (NMED). I have been in this position for nine years.

I have a Bachelor's degree in Geology from the University of Cincinnati in Cincinnati, Ohio, and a Master's degree in Hydrology from the New Mexico Institute of Mining and Technology in Socorro, New Mexico.

Prior to taking my position as Bureau Chief, I was the Program Manager of the Ground Water Pollution Prevention Section within the GWQB. I previously worked as a scientist and manager for a hydrogeological consulting firm and as a staff scientist, supervisor, and program manager in the Underground Storage Tank Bureau of NMED.

As Bureau Chief of the GWQB my responsibilities include personnel and fiscal management; development of regulations, policies and guidelines; review and approval of ground water discharge permits, corrective action plans and abatement plans; review and approval of financial assurance instruments; coordination of all bureau activities including the Mining Environmental Compliance Program, the Voluntary Remediation Program, the Superfund Oversight Program, the Remediation Oversight Program, and the Ground Water Pollution Prevention Program. I have been involved in the issuance of



more than 700 ground water discharge permits, corrective action plans and abatement plans. My resume is GWQB Exhibit 5.

My testimony will provide an overview of the proposed Supplemental Discharge Permit for Closure of the Tyrone Mine Facility (Supplemental Discharge Permit) and the regulatory framework under which the permit is being issued. Other members of the GWQB will provide more detailed testimony on specific conditions in the proposed Supplemental Discharge Permit.

Notice of this hearing was published 30 days prior to the May 20, 2002 hearing in the Silver City Daily Press and the Albuquerque Journal. Notice was also provided by direct mailing to all persons on the GWQB's interested person mailing list. Affidavits certifying publication and mailing to the interested person mailing list are attached as GWQB Exhibit 3.

### **REGULATORY FRAMEWORK**

The Water Quality Control Commission (WQCC) Regulations were adopted in 1977 pursuant to the New Mexico Water Quality Act (WQA), NMSA Sections 74-6-1 through 74-6-17. The purpose of these Regulations is to protect ground and surface water quality. Water quality protection is achieved using two methods. The first method is through discharge permits which prevent exceedances of standards by controlling sources of contamination. The second method is through abatement plans which address cleanup of existing contamination. As chief of the Ground Water Quality Bureau, I supervise the implementation and enforcement of the WQCC Regulations.

In the WQCC Regulations, ground water discharge permit requirements are described in detail in Sections 20.6.2.3000 through 3114 NMAC, and abatement

requirements are described in detail in Sections 20.6.2.4000 through 4115 NMAC. My testimony will highlight a few key Sections of the WQCC Regulations to provide context for the requirements of DP-1341. The specific technical requirements of DP-1341 will be described in more detail by other GWQB staff.

**Purpose of the WQCC Regulations**

The ground water quality protection provisions of the WQCC Regulations are designed to ensure the long-term protection of New Mexico's ground water resources. These ground water resources are essential to sustaining the state's populace, its business and agriculture. They are essential to future growth and development. These resources must be preserved for both present and future generations. According to the United States Census Bureau, the population of New Mexico increased by more than 20 percent from 1990 to 2000. In Grant County, the population grew by 12 percent over the last decade. New Mexico encompasses some of the fastest growing areas in the United States. In fact, New Mexico's rate of population change ranks second in the nation. If these statistics hold true for the future, New Mexico's need for clean drinking water will increase each decade (GWQB Exhibit 6).

Approximately 90 percent of the total population of New Mexico depends on ground water for drinking water. Nearly 80 percent of the population is served by public systems with water derived from ground water sources. At least 10 percent of the State's population depends on private wells for drinking water. According to the Office of the State Engineer's WATERS database, there are more than 130 domestic wells registered to owner's other than Phelps Dodge in the Township and Ranges occupied by the Tyrone Mine Facility (GWQB Exhibit 7).

Nearly half of the total water annually withdrawn for all uses in New Mexico, including agriculture and industry, is ground water, the only practical source of water in many areas of the State, including the area surrounding the Tyrone mine. In drought years such as this one, the state depends even more heavily on ground water to sustain the state's residential population and business community.

In 1998 the U.S. Farm and Ranch Irrigation Survey indicated that the most prevalent cause of diminished crop yields resulting from irrigation interruption in New Mexico was a shortage of surface and ground water. More than half of New Mexico's farms reported impacts from water shortages that year (GWQB Exhibit 8). In November 1998, U.S. News and Water Online reported that population growth in parts of New Mexico are expected to outpace the water supply by 2025, despite conservation and reclamation projects (GWQB Exhibit 9). Last month the U.S. Natural Resource Conservation Service's National Water and Climate Center reported that snowpack and stream runoff forecasts for the Mimbres River have been reduced to just 10 percent of average. Flows in the San Francisco and Upper Gila River are expected to be 15 to 30 percent of average (GWQB Exhibit 10). These statistics are just a few of the indications that scarcity of fresh water is and will continue to be one of the biggest issues facing New Mexico.

The ground water discharge permit requirements of the WQCC Regulations are the State's primary tool for protecting ground water quality. Therefore, it is critical that the Tyrone Mine closure permit be truly protective of ground water quality. NMED cannot approve a permit that allows continued contamination of ground water from uncontrolled sources for tens, or hundreds of years based on the hope that long-term

pumping may be effective in keeping ground water contamination from spreading further. Future generations will continue to depend on the limited ground water resources of the Mimbres and Gila Basins to sustain life, so the decisions made through this hearing process must incorporate those future needs. And, although the basins' ground-water resources are limited in volume, they are of very high quality, and should not be unnecessarily degraded.

The Tyrone mine operates pursuant to 9 operational discharge permits which have had varying degrees of success in preventing ground water contamination. An additional operational permit is pending. The permit that is the subject of this hearing is Supplemental Discharge Permit 1341 (DP-1341) that specifically addresses site-wide closure of the Tyrone Mine. Consideration of DP-1341 is pursuant to the permitting provisions in Sections 20.6.2.3000 through 3114 NMAC of the WQCC Regulations. NMED's Supplemental Discharge Permit addresses ongoing and potential sources of contamination that could result in further degradation of ground water quality after mining ceases. Additionally, NMED's Supplemental Discharge Permit requires the submission of an abatement plan designed to remedy existing ground and surface water contamination.

#### **Provisions of the WQCC Regulations**

Section 20.6.2.3101 NMAC states that the purpose of the ground water discharge permitting provisions of the WQCC Regulations "is to protect all ground water of the State of New Mexico which has an existing concentration of 10,000 mg/l or less TDS [total dissolved solids], for present and potential future use as domestic and agricultural water supply,..." Section 20.6.2.3101 NMAC further requires protection of "surface

waters which are gaining because of ground water inflow, for uses designated in the New Mexico Water Quality Standards". Section 20.6.2.3103 NMAC sets ground water quality standards and 20.6.4 NMAC sets surface water standards that must not be exceeded.

Section 20.6.2.3104 NMAC requires that a person shall not cause or allow effluent or leachate to discharge so that it may move directly or indirectly into ground water unless such person has obtained a ground water discharge permit.

Section 20.6.2.3106 NMAC requires that any person who is discharging any of the water contaminants listed in Section 20.6.2.3103 NMAC or any toxic pollutants so that they may move directly or indirectly into ground water must submit a discharge plan.

Pursuant to Section 20.6.2.3107.A(11) NMAC, the discharge plan must include a closure plan to prevent the exceedance of standards after cessation of operations. The components of the closure plan are: a description of closure measures; maintenance and monitoring plans; post closure maintenance and monitoring plans; financial assurance; and other measures necessary to prevent and abate contamination.

Section 20.6.2.3109 NMAC describes the discharge permit approval process. Subsection B requires the Secretary to approve, approve with conditions or disapprove the proposed plan based on the administrative record. Section 20.6.2.3109 NMAC also describes the demonstration that the discharger must make in order for the Secretary to issue a discharge permit. Among other things, the discharger must demonstrate that issuance of the discharge permit will not result in concentrations in excess of the standards of Section 20.6.2.3103 NMAC or the presence of a toxic pollutant at any place of withdrawal of water for present or reasonably foreseeable future use. One question that arises in making this determination is how to evaluate whether a source of ground

water has a reasonable potential to be used in the future. Ever since the ground water regulations became effective in 1977, NMED and its predecessor agencies have consistently taken the position that every place that is underlain by ground water that has a naturally occurring concentration of 10,000 mg/l or less of total dissolved solids is a place of foreseeable future use of water. This is necessary because ground water is a very scarce, yet life sustaining, precious resource in New Mexico.

Water in New Mexico is also owned by the state, so it is not appropriate to allow a property owner to contaminate a subsurface public resource. If one were to equate property boundaries with “a place of reasonably foreseeable future use” as Tyrone has suggested, then dischargers could move their property boundaries further and further out, polluting larger and larger quantities of water. NMED has never interpreted the Water Quality Act as giving dischargers the right to pollute ground water beneath their property. Furthermore, Section 74-4-D of the Water Quality Act requires the commission to adopt regulations to “prevent or abate water pollution in the state or in any specific geographic area, aquifer or watershed of the state or in any part thereof, or for any class of waters”.

Section 20.6.2.4101 NMAC requires the abatement of surface and ground water pollution. The detailed requirements of the abatement plan process are described in Sections 20.6.2.4103, 4104, 4106, 4107 and 4108 NMAC. Section 20.6.2.4103 NMAC, sets forth the standards that the abatement plan must achieve. Section 20.6.2.4103.F NMAC also allows Tyrone to petition the WQCC for approval of alternative abatement standards, which are a type of variance from the numerical WQCC ground water quality standards. Section 20.6.2.4103.F NMAC identifies the information that must be

submitted to support the petition and the demonstration that must be made by the petitioner for the WQCC to be able to approve the petition.

### **Overview DP-1341 Permit Conditions**

Now I will provide an overview of the terms of the proposed Supplemental Discharge Permit. Some of my staff will follow with more detailed testimony on specific conditions in the permit.

Surface Regrading and Stormwater Management. The proposed Supplemental Discharge Permit requires regrading of the slopes of Waste Rock Piles and Leach Ore Stockpiles to an angle of 3 to 1, except in situations where the slope will intersect a designated surface water of the State or a highway. In those situations regrading would be to a slope angle of no steeper than 2.5 to 1. Additionally, slopes of stockpiles currently located in open pits would not need to be regraded, pending completion of a feasibility study for the open pits. By contrast, Tyrone has proposed to leave all the slopes of Waste Rock Piles and Leach Ore Stockpiles at the angle of repose and uncovered. Kevin Myers will testify on the importance of regrading.

The proposed Supplemental Discharge Permit requires source control to address ongoing contamination of ground water. Source control is required by the WQCC Regulations and is consistent with the manner in which NMED regulates other discharging facilities; whether they are dairies, trailer parks, wastewater treatment plants or mines. The WQCC Regulations do not allow a discharger to cause ongoing exceedances of water quality standards because they have installed a system to pump out the contamination after the fact. In most cases, including the Tyrone mine, it is very difficult to restore an aquifer once it has been contaminated. If NMED is going to

preserve clean ground water supplies for future generations, we must consistently implement effective source control to prevent and mitigate ongoing contaminant sources.

Clint Marshall will provide testimony on the extensive contamination resulting from the Tyrone Leach Ore Stockpiles, Waste Rock Piles and Tailing Impoundments. Mr. Marshall will testify that the 1C Waste Rock Pile at Tyrone, *a pile that has never been leached*, is the source of ground water contamination. This pile has no cover and its slopes are at the angle of repose. Due to infiltration of precipitation through the waste material, the pile is leaching contaminants that have caused exceedances of standards in ground water. This is precisely the scenario that would be addressed by regrading and covering of Waste Rock Piles, Leach ore Stockpiles and Tailing Impoundments.

Even with extensive active pumping of the Tyrone open pits, discharges from Leach Ore Stockpiles and Waste Rock Piles have resulted in contamination above standards in both the shallow and regional aquifers in the Gila and Mimbres Basins. At the toes of the Leach Ore Stockpiles and Waste Rock Piles, the location where many of the contaminated seeps at Tyrone emanate, the shallow aquifer does not have a strong hydraulic connection with the regional aquifer. This means that *pumping the regional aquifer to dewater the Open Pit does not capture contaminants in the shallow aquifer* along the margin of the Mining Area. However, the shallow aquifer does ultimately recharge the regional aquifer at some distance downgradient of the Leach Ore Stockpiles and Waste Rock Piles, *so contamination in the shallow aquifer that migrates away from the Tyrone Mine Facility will ultimately impact regional ground water quality*. Clint Marshall will present more detailed testimony regarding hydrogeology of the Tyrone Mine Facility.

The proposed Supplemental Discharge Permit also requires a study to evaluate the effectiveness, from a water quality perspective, of regrading at different angles, including 2 to 1, 2.5 to 1 and 3 to 1. The closure permit will be modified, as necessary, based on the results of that study.

Cover and Revegetation. The proposed Supplemental Discharge Permit requires a minimum of 36 inches of alluvium, such as Gila Conglomerate, to be applied to cover the Waste Rock Piles, Leach Ore Stockpiles and Tailing Impoundments at the Tyrone Mine Facility. The covers are to be designed in order to minimize infiltration into underlying stockpile, waste rock and tailing materials and subsequent discharge of leachate into ground or surface water. Mike Reed will provide more extensive testimony on covers and revegetation.

Closure of Buildings and Cleanup Plan; Closure of Pipelines and Tailing Launderers. The proposed Supplemental Discharge Permit requires abatement of contaminated soils in and around buildings that are potential sources of ground or surface water contamination in accordance with the WQCC Regulations. The proposed Supplemental Discharge Permit also requires a structure removal plan to address potential discharges that could result in exceedances of ground water standards. Tyrone is also required to properly close tailing pipelines, launders and sumps in accordance with plans approved by NMED. Mike Reed will provide additional testimony on closure of buildings, abatement of contaminated soils and closure of tailings pipelines, launders and sumps.

Abatement of Ground Water Contamination. The proposed Supplemental Discharge Permit requires Tyrone to continue to operate existing ground water

interceptor and abatement systems, investigate known and potential areas of ground and surface water contamination at the Tyrone Mine Facility, and to propose appropriate abatement plans in accordance with the WQCC Regulations. Clint Marshall will provide testimony on abatement.

Water Treatment System. The proposed Supplemental Discharge Permit requires Tyrone to demonstrate the practicability of its proposed water treatment, dilution and discharge system, including an evaluation of the effects of dilution on the source water. As in Chino, NMED has a concern that using clean water to dilute contaminated water may not be an appropriate use of water. However, in general, the Office of the State Engineer has authority over water use and water rights, and NMED has authority over water quality. Therefore, consistent with the Office of the State Engineer regulations, a condition of the Supplemental Discharge Permit requires State Engineer approval of using the water for dilution. Mark Phillip of the GWQB staff will provide testimony on the water treatment system.

Closure and Post Closure Monitoring Reporting, Inspections and Other Requirements; Closure and Post Closure Maintenance. The proposed Supplemental Discharge Permit requires Tyrone to conduct closure monitoring from the date of cessation of operation until the date of Certification of Closure. After Certification of Closure, Tyrone is required to perform 100 years of post closure monitoring. The proposed Supplemental Discharge Permit also requires Tyrone to perform inspections and maintenance of all ground water abatement systems, closed areas and any other facilities whose failure may impact ground water quality. Clint Marshall will provide testimony on these topics.

Implementation of Closure. The proposed Supplemental Discharge Permit ties closure of Tyrone facilities to the defined term “Cessation of Operation”. NMED makes the final determination on when Cessation of Operations has occurred. Cessation of Operation means:

Any cessation of operation of the Tyrone Mine Facility that is not part of normal mining operations or is due to bankruptcy or abandonment and includes without limitation shut down of all or portions of facility operations.

The proposed Supplemental Discharge Permit also requires closure of inactive tailing facilities to begin as soon as practicable after the issuance of the permit and to be completed within 5 years. The schedule for implementing closure will be discussed in more detail by Mary Ann Menetrey.

Contingency Plan. The Supplemental Discharge Permit requires submission of a number of specific contingency plans to address issues such as failure of covers and relocation of monitoring wells and toe control systems. Tyrone is also required to submit general contingency plans for issues including failure of any component of the closure plan and discovery of significant increases in the extent or magnitude of contamination. Contingency plans will be discussed in more detail by Mary Ann Menetrey.

Additional Scientific Studies. Because we need more information to assist in refining the closure plan, the proposed Supplemental Discharge Permit requires Tyrone to conduct many additional scientific studies. The results of these studies will then be used to modify the closure plan as necessary to protect water quality. For example, the Proposed Supplemental Discharge Permit requires test plot studies to evaluate the effectiveness, from a water quality perspective, of placing cover systems on different

slope angles. The closure permit will be modified, as necessary, based on the results of those studies. Ms. Menetrey, Mr. Phillip, Mr. Myers, Mr. Marshall and Mr. Reed will testify regarding the specifics of individual additional studies.

Financial Assurance. The components of the proposed closure plan have been assigned costs. The total cost for the closure plan in the proposed Supplemental Discharge Permit in current dollars is approximately \$440 million. The proposed Supplemental Discharge Permit allows for two types of financial assurance packages: a surety bond or other financial instruments which in combination provide for annual cash payouts over the life of the permit; or a surety bond or other financial assurance instruments that in combination provide a lump sum payment which is the net present value of the current costs. Mark Phillip will provide more specific testimony on financial assurance.

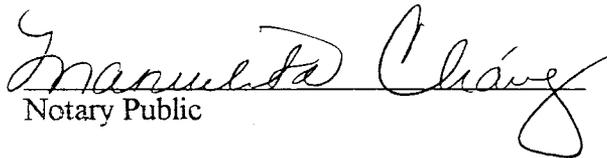
The remainder of the proposed Supplemental Discharge Permit is standard language that appears in all discharge permits issued by the NMED. The standard language covers areas such as record keeping, inspections, reporting of unauthorized discharges, enforcement, etc.

This concludes my direct testimony. A copy of my written testimony is GWQB Exhibit 4.

  
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MARCY LEAVITT, Chief  
Ground Water Quality Bureau  
New Mexico Environment Department  
Santa Fe, New Mexico

**ACKNOWLEDGEMENT**

Subscribed and sworn to before me this 17<sup>th</sup> day of May, 2002 by Marcy Leavitt.

  
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Notary Public

My commission expires:

February 6, 2002