

**STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION**

_____)
In the Matter of:)
)
)
PROPOSED AMENDMENT)
TO 20.6.2 NMAC (Copper Rule))
)
_____)

No. WQCC 12-01(R)

EXHIBIT BLANDFORD - 10



NEW MEXICO
ENVIRONMENT DEPARTMENT



Ground Water Quality Bureau

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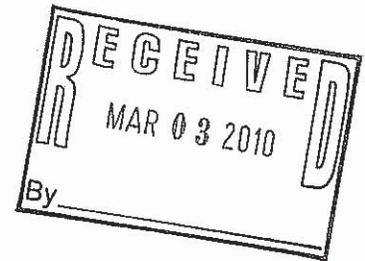
RON CURRY
Secretary

www.nmenv.state.nm.us
William C. Olson, Bureau Chief

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

February 26, 2010

Richard N. Mohr, Manager
Freeport – McMoRan Tyrone, Inc.
P.O. Drawer 571
Tyrone, New Mexico 88065



**RE: Discharge Permit Renewal and Modification, No. 3 Leach System, DP-286,
Freeport - McMoRan Tyrone, Inc.**

Dear Mr. Mohr:

The New Mexico Environment Department (NMED) issues the enclosed Discharge Permit Renewal and Modification, DP-896 to Freeport – McMoRan Tyrone, Inc. (Tyrone) pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-17, and the New Mexico Water Quality Control Commission (WQCC) Regulations, 20.6.2 NMAC.

The Discharge Permit contains terms and conditions that shall be complied with by Tyrone and are enforceable by NMED pursuant to WQCC 20.6.2.3104, WQA, NMSA 1978 § 74-6-5 and §74-6-10. Issuance of this Discharge Permit Renewal and Modification does not relieve Tyrone of its responsibility to comply with the WQA, WQCC Regulations, or any other applicable federal, state and/or local laws and regulations, such as zoning requirements and nuisance ordinances.

Pursuant to 20.6.2.3109.H.4 NMAC, this Discharge Permit Renewal and Modification shall expire on **February 26, 2015**. You must submit an application for renewal at least 120 days before the permit expiration date.

Richard N. Mohr, Tyrone
February 26, 2010
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Sincerely,



William C. Olson, Chief
Ground Water Quality Bureau

WCO:mam/clm/gl

Enclosure: Discharge Permit Renewal and Modification, DP-286

cc: Mary Ann Menetrey, Program Manager, MECS (encl)
Clint Marshall, MECS (encl)
Allyson Siwik, Gila Resources Information Project (encl)

**DISCHARGE PERMIT RENEWAL AND MODIFICATION
FREEPORT MCMORAN TYRONE, INC., DP-286
NO. 3 LEACH SYSTEM, 5A WASTE ROCK PILE and MILL SITE
February 26, 2010**

I. INTRODUCTION

The New Mexico Environment Department (NMED) issues this Discharge Permit, DP-286, to Freeport McMoRan Tyrone, Inc. (Tyrone) pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§ 74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission (WQCC) Regulations, 20.6.2 NMAC.

The NMED's purpose in issuing this Discharge Permit, and in imposing the requirements and conditions specified herein, is to control the discharge of water contaminants from the No. 3 Leach System, 5A Waste Rock Stockpile and Mill Site that may move directly or indirectly into ground and surface water, so as to protect ground and surface water for present and potential future use as domestic and agricultural water supply and other uses; to abate pollution of ground and surface water; and to protect public health. In issuing this Discharge Permit, NMED has determined that the requirements of 20.6.2.3109.C NMAC have been met.

Facility Description

The facilities that currently produce discharges that move directly or indirectly into groundwater are the No. 3A Leach Stockpile, No. 3B Waste Rock Stockpile (both referred together as the No. 3 Leach System), 5A Waste Rock Stockpile (also referred to as the 1D Waste Rock Stockpile), Tyrone Mill Site, No. 3 Pregnant Leach Solution (PLS) Pond, No. 3 PLS Overflow pond, Plant Oxidation Pond Effluent (POPE) Ponds, SPCC Pond and the 10 Canyon fiberglass tank. DP-286 covers approximately 815 acres, including the No. 3A Stockpile at 279 acres, 3B Waste Rock Stockpile at 176 acres, 5A Waste Rock Stockpile at 302 acres and the Tyrone Mill Site at 18 acres. Also included are the Light vehicle truck wash, Power Plant, Heavy Equipment Truck Shop, Heavy Equipment Wash Rack, and the Wash Rack Sump. The No. 1 Fuel Dock is located on the No. 3A Leach Stockpile and shall be closed under DP-1341.

The No. 3A Leach Stockpile is leached with sulfuric acid solutions (raffinate), and PLS and impacted storm water are collected at the toe of the No. 3A Leach Stockpile through a surface collection system and two subsurface collection systems. The shallow Alluvial Aquifer Interceptor System and the deeper Regional Aquifer Extraction System collect seepage at the toe of the No. 3A Leach Stockpile in eleven drainages, referred to as "canyons," using interceptor trenches and extraction wells. The 3B and 5A Waste Rock Stockpiles are waste rock stockpiles that are not leached, but contain acid generating material that has the potential to generate leachate.

Stormwater runoff from the No. 3A Leach Stockpile is collected in sumps or surface water collection systems located in Canyons 1 through 11. The sumps in Canyons 1 through 6 were modified in 2005/2006 to decrease impacts from stockpile rock slides covering the sumps and

resulting in sediments entering the No. 3 PLS Pond and Solvent Extraction/Electrowinning (SX/EW) plant. Using a French drain or sump design, existing sumps were excavated and lined with HDPE, backfilled with quartzite rip rap and covered with geotechnical cloth and soil. All PLS and impacted water collected in the alluvial, regional and surface water collections systems is transferred via pipeline to the No. 3 PLS pond (double HDPE lined) and to the SX/EW plant.

The POPE ponds are two sewage evaporation ponds with a combined capacity of 295,280 gallons. The POPE ponds are clay lined (2 feet) on the bottom and concrete lined (4 inches) on the sides. When the POPE ponds reach the 295,280 gallon level, excess effluent is pumped to the SPCC pond. The SPCC pond has a capacity of 3.7 million gallons and is HDPE (80 mil.) lined. In addition to overflow from the POPE ponds, water from the truck wash and light vehicle wash, stormwater runoff from power plant fuel tank secondary containment system, and No. 5A Waste Rock Stockpile stormwater discharges into the SPCC Pond. Excess water from the SPCC pond is pumped to the top of the No. 3A Leach Stockpile as process water.

During upset conditions, overflow from the SPCC pond discharges into the No. 3 PLS Overflow pond and PLS from the No. 2A West PLS overflow line is piped to the No. 3 PLS pond.

The 10 Canyon fiberglass tank receives impacted water from regional extraction wells and the No. 1 Series lined receiving pond. The impacted water is pumped to the No. 1 raffinate tank. When the pump is not operating, the impacted water gravity flows through a HDPE pipe to the 10 Canyon surface collection system and weir, which reports to the No. 3 PLS pond.

The mill site was closed during the 2nd Quarter of 2007 and is monitored for erosion under DP-1341.

A portion of the acid rock drainage, residual leaching solution and sump water from the No. 3 Leach System and 5A Waste Rock Stockpile moves directly or indirectly into groundwater. The seepage has caused groundwater contamination.

Discharge Permit Modification Description

DP-286 is modified under this Discharge Permit to include the 5A Waste Rock Stockpile, the 3B Waste Rock Stockpile, former Mill Site, POPE ponds, SPCC pond and the mine support facilities listed above in the facility description.

Location of Discharge

The No. 3 Leach System, 5A Waste Rock Stockpile and Mill Site are located approximately 10 miles southwest of Silver City in T19S, R15W, Sections 10, 11, 13, 14, 15, 23 and 24, Grant County, New Mexico.

Quantity, Quality, and Flow Characteristics of the Discharge

The No. 3A Leach Stockpile is leached with a sulfuric acid solution (raffinate) which removes metals from the mined ore as it passes through the stockpile. In addition to leaching, the No. 3A

Leach Stockpile, the 3B Waste Rock Stockpile, and the 5A Waste Rock Stockpile contain sulfide minerals which, when oxidized, generate acid solutions. These acid solutions react with in situ minerals, which produces acid rock drainage (ARD) and associated metals and sulfate contamination. The leachate from ARD and from the leaching process has moved directly or indirectly into surface and ground water. The regulated discharges under this Discharge Permit include raffinate and its copper-bearing equivalent PLS, stockpiled ore, waste rock, ARD and domestic wastewater. The PLS has a TDS concentration up to 100,000 mg/l. The raffinate, PLS and ARD exceed the water quality standards under WQCC Regulations in Section 20.6.3103.A NMAC for Arsenic, Cadmium, Chromium, Fluoride, and Lead; Section 20.6.2.3103.B for Copper, Iron, Manganese, pH, Sulfate, TDS, and Zinc; and Section 20.6.2.3103.C for Aluminum, Cobalt and Nickel. The maximum permitted discharge rate of raffinate applied to the No.3 Stockpile is approximately 23,000,000 gallons per day (gpd) (15,972 gallons per minute (gpm)). The maximum permitted discharge rate of PLS from the No. 3 PLS Ponds to the SX/EW Plant is approximately 21,000,000 gpd (14,583 gpm).

Characteristics of Groundwater

There are two aquifers located beneath the No. 3 Leach System, a shallower alluvial aquifer and a deeper regional aquifer. Regional and alluvial groundwater generally flow northwestward under the northern portion of the No. 3 Leach System and regional ground water flows southward toward the main pit under the southern portion the No. 3 Leach System. Regional ground water generally flows westward toward the main pit in the vicinity of the 5A Waste Rock Stockpile. Alluvial ground water beneath the 5A Waste Rock Stockpile flows eastward. Depth to alluvial ground water below the discharge site is approximately 20 to 50 feet below ground surface. The total dissolved solids concentration in alluvial groundwater in the area of DP-286 is 500-600 milligrams per liter (mg/l). Depth to regional groundwater below the discharge site is approximately 50 to 300 feet below ground surface. The total dissolved solids concentration in regional groundwater in the area of DP-286 is 200 to 300 milligrams per liter (mg/l).

General

Tyrone's Discharge Plan for the No. 3 Leach System, 5A Waste Rock Stockpile and Mill Site consists of the Discharge Permit application submitted on December 18, 2006, letter on March 26, 2007, email on July 18, 2007, electrical conductivity isopleth map on September 28, 2007, System Monitoring Permit Renewal Information Report on April 8, 2008, and emails on September 12, 2008 and September 22, 2008. In addition, the Discharge Plan includes applicable information and materials submitted as part of the original discharge plan approved on January 24, 1985, and renewed on January 24, 1990 and January 24, 1995. The discharge shall be managed in accordance with the Discharge Plan as conditioned by this Discharge Permit.

Pursuant to 20.6.2.3109.E NMAC, NMED reserves the right to modify permit requirements in the event NMED determines that the requirements of 20.6.2 NMAC are being, or may be, violated or standards of 20.6.2.3103 NMAC are being, or may be, violated at a place of withdrawal of water for present or reasonably foreseeable future use due to a discharge regulated under this Discharge Permit. This may include a determination by NMED that operational practices approved under this Discharge Plan are not protective of ground and surface water

quality, and that a modification is necessary to protect water quality or abate water pollution. Permit modification may include but is not limited to lining or relining impoundments, changing discharge locations, changing waste and leachate management practices, expanding monitoring requirements and/or implementing abatement of water pollution.

Issuance of this Discharge Permit does not relieve Tyrone of its responsibility to comply with all conditions or requirements of the WQA, WQCC Regulations, and any other applicable federal, state, and/or local laws and regulations such as zoning requirements and nuisance orders.

II. FINDINGS

In issuing this Discharge Permit, NMED finds:

1. Tyrone is discharging effluent or leachate from the No. 3 Leach System & 5A Waste Rock Stockpile so that such effluent or leachate may move directly or indirectly into groundwater within the meaning of 20.6.2.3104 NMAC.
2. Tyrone is discharging effluent or leachate from the No. 3 Leach System & 5A Waste Rock Stockpile so that such effluent or leachate may move into groundwater of the State of New Mexico which has an existing concentration of 10,000 milligrams or less of total dissolved solids within the meaning of 20.6.2.3101.A NMAC.
3. The discharge from the No. 3 Leach System, 5A Waste Rock Stockpile and Mill Site is not subject to any of the exemptions of 20.6.2.3105 NMAC.

III. PERMIT CONDITIONS

Tyrone shall comply with the following conditions, which are enforceable by NMED.

OPERATIONS

1. Tyrone shall conduct the operational requirements set forth below, including investigations, in accordance with the WQCC Regulations at Sections 20.6.2.3106.C and 3107 NMAC to ensure compliance with 20.6.1 and 20.6.2 NMAC.

Facility Design

2. The 3A Leach Stockpile, 3B Waste Rock Stockpile & 5A Waste Rock Stockpile shall not exceed the land surface areas of 279, 176 and 302 acres respectively. Tyrone may only expand the footprint or land surface area of the 3A Leach Stockpile, 3B Waste Rock Pile & 5A Waste Rock Stockpile for purposes of stockpile closure as approved through the Supplemental Discharge Permit for Closure DP-1341, or through a permit modification to DP-286. [20.6.2.3106 and 3107 NMAC].

Discharge Authorization

3. Tyrone is authorized to manage permitted discharges as follows. [20.6.2.3106 NMAC][20.6.2.3109 NMAC]
 - a. Tyrone is authorized to discharge a maximum of 23,000,000 gpd (15,972 gpm) of acidic leach solution (raffinate) to the 3A Leach Stockpile for the purpose of extracting copper.
 - b. Tyrone is authorized to discharge a maximum of 21,000,000 gpd (14,583 gpm) of PLS from the base of the No. 3A Leach Stockpile through the PLS collection system and to the No. 3 PLS collection ponds.
 - c. Tyrone is authorized to discharge domestic sewage to the POPE ponds with a maximum of 750 employees utilizing the system.
 - d. Tyrone is authorized to discharge a maximum of 230,400 gpd of impacted water from the SPCC Pond to the No 3A Stockpile.

Seepage Collection Systems

4. Tyrone shall operate the Alluvial Aquifer Interceptor System and the Regional Aquifer Extraction System in order to collect acidic seepage solutions and contaminated ground water that bypass the PLS collection systems at the toe of the No. 3A Leach Stockpile. Tyrone shall take all necessary actions to ensure that the seepage collection systems are operating as efficiently as possible at all times in order to minimize impacts to ground water. Tyrone shall expand or add seepage collection systems as needed to address new areas of contamination when ongoing ground water monitoring indicates such measures are needed. [20.6.2.3109 NMAC]

Pipelines

5. Upon discontinuing the operation of a pipeline, all PLS or process water within each pipeline shall be released to an authorized discharge location or otherwise properly contained, transferred or disposed of in a manner that does not result in discharges to non-authorized areas. After emptying, each pipeline shall be rinsed or sectioned and thoroughly drained to ensure residual contaminants are removed. Discharges of PLS and process water from pipelines in non-authorized areas must be reported under 20.6.2.1203 NMAC. All changes in pipeline operations that result in removal of pipeline fluids in unauthorized discharge areas must be reported semi-annually in accordance with Condition 22 below. [20.6.2.3109 NMAC]
6. Within 180 days of issuance of this Discharge Permit, Tyrone shall install an overflow line from the SPCC Pond to the No. 3 PLS Pond to contain flows under upset conditions. As-built plans and specifications shall be submitted to NMED within 60 days of completion. [20.6.2.3109 NMAC]

Monitoring Well Installation

7. Tyrone has installed 25 North Perimeter regional extraction wells identified in Table 7, and 32 North Perimeter regional monitoring wells identified in Table 8. Within 180 days of issuance of this Discharge Permit, Tyrone shall install the pumps and electricity to the north perimeter regional extraction wells: 286-2006-01, 286-2006-05, 286-2007-21, 286-2007-23, 286-2007-25, 286-2007-27, 286-2007-29, 286-2007-31, 286-2007-33, 286-2007-35, 286-2007-37, 286-2007-47, 286-2007-49, 286-2007-50 and 286-2007-51. Extraction wells 286-2007-47 and 286-2007-51 are stand-by wells that will be put into operations if data indicates they are needed. NMED may require Tyrone to install the pumps and electricity in some or all of the remaining ten north perimeter regional extraction wells if future ground water monitoring data indicates that WQCC ground water standard are or may be exceeded.
[20.6.2.3107 NMAC]
8. Within 180 days of issuance of this Discharge Permit, Tyrone shall install the following monitoring wells.
 - a. A replacement well for monitoring well P-13A.
 - b. Two new regional monitoring wells, both located in Canyon 11. One well shall be located between the northern perimeter extraction system and the toe of the No. 3A Stockpile and the other well shall be located downgradient of monitoring well 286-2005-02.
 - c. Two alluvial monitoring wells, one down gradient of monitoring well C11-6 and the other well down gradient of the Canyon 5 interceptor trench.
 - d. An alluvial monitoring well down gradient of the POPE ponds. The well shall be screened at the alluvium – Gila contact.

The location of the new wells shall be approved by NMED prior to installation. The monitoring wells shall be constructed according to *NMED Monitoring Well Construction and Abandonment Guidelines* or an alternate method approved by NMED. Construction and lithologic logs shall be submitted to NMED within 30 days of well completion. For good cause shown, Tyrone may request for NMED's approval an extension of time to complete the activities described in this section. Tyrone shall notify NMED when New Mexico Office of the State Engineer grants the water rights transfer for the 15 North Perimeter extraction wells and subsequent start-up dates. [20.6.2.3107 NMAC]

Monitoring Well Replacement

9. Tyrone shall provide NMED at least 30 days notification of the anticipated destruction or removal of any monitoring wells required under DP-286. In the event of unintentional well destruction or damage requiring well abandonment, Tyrone shall notify NMED as soon as possible. The notification shall include a description of monitoring well abandonment procedures and propose a replacement well location for NMED approval. Monitoring well

abandonment shall be performed in accordance with *NMED Monitoring Well Construction and Abandonment Guidelines* or alternate method approved by NMED. [20.6.2.3107 NMAC]

10. Within one year of issuance of this Discharge Permit Renewal and Modification, Tyrone shall submit a proposal for NMED approval to investigate ground water quality below the recently closed mill site. [20.6.2.3107 NMAC]

MONITORING, REPORTING AND OTHER REQUIREMENTS

11. Tyrone shall conduct the following monitoring, reporting, and other requirements set forth below. A summary of monitoring requirements is attached to this Permit as Table 1. Monitoring schedules are attached as Tables 2 through 4. Complete lists of existing alluvial and regional monitoring wells are provided in Tables 5 and 6. [20.6.2.3107 NMAC].

Monitoring Well Sampling

12. Alluvial Ground Water Monitoring Wells. Tyrone shall conduct monitoring of the alluvial ground water monitoring wells as follows. The monitoring wells listed in Table 5, and all other alluvial wells required by NMED to be installed at the Tyrone Mine, identify locations at which Tyrone's discharges' effects on ground water shall be measured. [20.6.2.3107 NMAC]
 - a. Tyrone shall sample alluvial groundwater monitoring wells C6-1, C6-9, C6-10, C7-38, C8-24, C8-46, C8-49, C10-53, C10-62, C11-6 and MV-4 (Table 2), in addition to new monitoring wells to be installed in accordance with this Discharge Permit for electrical conductivity, temperature and pH. Field electrical conductivity shall be corrected to 25° Celsius. Analytical results, electrical conductivity, temperature and pH shall be reported as required in Conditions 20 through 23 below.
 - b. Tyrone shall measure water levels to the nearest hundredth of a foot in the existing alluvial groundwater monitoring wells specified in Tables 1 and 5, in addition to alluvial monitoring wells to be installed in accordance with this Discharge Permit. Depth to water and elevation above mean sea level (msl) shall be recorded to the nearest hundredth of a foot (0.01 ft). Depth to water and elevation above msl measurements shall be reported as required in Conditions 20 through 23 below.
 - c. Tyrone shall sample monitoring wells MV-1, MV-2, MV-4 and MV-5 semi-annually for total petroleum hydrocarbons (TPH) and the volatile organic compounds (VOC) listed in Group 4 of Condition 18. If VOC's are detected, the semi-volatile compounds listed in Group 4 shall be sampled in the specific well in subsequent sampling rounds.
 - d. Tyrone shall sample the new alluvial monitoring well down gradient of the POPE Ponds for nitrate as nitrogen (NO₃-N), total Kjeldahl nitrogen (TKN) and Chloride (Cl) as listed in Group 5 of Condition 18. Analytical results shall be reported as required in Conditions 20 through 23.

13. Regional Ground Water Monitoring Wells – Tyrone shall conduct monitoring of the regional ground water monitoring wells as follows. The monitoring wells listed in Table 6 and all other monitoring wells required by NMED to be installed at the Tyrone Mine, identify locations at which Tyrone's discharges' effects on ground water shall be measured. [20.6.2.3107 NMAC]

- a. Tyrone shall conduct semi-annual monitoring of the regional groundwater monitoring wells specified in Tables 1, 2 and 6 in addition to regional monitoring wells to be installed in accordance with this Discharge Permit. Electrical conductivity, temperature and pH shall be recorded. Field electrical conductivity shall be corrected to 25° Celsius. Analytical results, electrical conductivity, temperature and pH shall be reported as required in Conditions 20 through 23 below.
- b. Tyrone shall measure water levels to the nearest hundredth of a foot in the existing regional groundwater monitoring wells specified in Tables 1 and 6, in addition to regional monitoring wells to be installed in accordance with this Discharge Permit. Depth to water and elevation above msl shall be recorded to the nearest hundredth of a foot (0.01 ft). Depth to water and elevation above msl measurements shall be reported as required in Conditions 20 through 23 below.
- c. Tyrone shall sample monitoring wells 32, 33 and 48 semi-annually for total petroleum hydrocarbons (TPH) and the volatile organic compounds (VOC) listed in Group 4 of Condition 18. If VOC's are detected, the semi-volatile compounds listed in Group 4 shall be sampled in the specific well in subsequent sampling rounds. Analytical results shall be reported as required in Conditions 20 through 23.
- d. Tyrone shall sample the regional monitoring well P-76 for nitrate as nitrogen (NO₃-N), total Kjeldahl nitrogen (TKN) and Chloride (Cl) as listed in Group 5 of Condition 18. Analytical results shall be reported as required in Conditions 20 through 23.

Collection Ponds

14. No. 3 PLS Pond and No. 3 PLS Overflow Pond – Tyrone shall sample the No. 3 PLS Pond and No. 3 PLS Overflow pond annually pursuant to the schedule in Tables 1 and 2. PLS and water samples shall be analyzed for the parameters in Groups 2 and 3 as listed in Condition 18. Analytical results shall be reported as required in Conditions 20 through 23. [20.6.2.3107 NMAC]

15. No. 3 PLS Pond Leak Detection System (O-6) - Tyrone shall sample semi-annually the PLS collected between the No. 3 PLS pond liners in the leak detection well O-6 as required in Tables 1 and 2. PLS samples shall be analyzed for the parameters in Groups 2 and 3 of Condition 18. Additionally, Tyrone shall remove all PLS from well O-6 daily. Tyrone shall record the gallons of PLS pumped out daily from between the liners. Analytical results and PLS volumes shall be reported as required in Conditions 20 through 23. [20.6.2.3107 NMAC]

16. POPE Ponds & SPCC Pond - Tyrone shall sample the POPE Ponds & SPCC Pond semi-annually as required in Tables 1 and 2. The POPE Pond shall be sampled for the parameters listed in Group 5 of Condition 18. The SPCC pond shall be analyzed for the parameters listed in Groups 2, 3, 4 and 5 of Condition 18. Analytical results shall be reported as required in Conditions 20 through 23 below. [20.6.2.3107 NMAC]

Discharge Volumes

17. Tyrone shall measure the following discharge volumes using appropriate metering devices and/or calculation methods. Discharge volumes and dates shall be reported semi-annually as required in Conditions 20 through 23. [20.6.2.3107 NMAC]
- a. The daily volume of raffinate (gpd) discharged to the top of the No. 3A Leach Stockpile.
 - b. The daily volume of PLS (gpd) pumped from the No. 3 PLS Pond to the SX/EW plant.
 - c. The estimated volume of process water pumped from the SPCC Pond to the top of the No. 3A Leach Stockpile using a method of measurement approved by NMED.
 - d. The monthly volume of impacted ground water pumped from the Alluvial Aquifer Interceptor System to the No. 3 PLS Pond. The gallons of impacted ground water pumped shall be recorded separately for each canyon and line of wells as required in Table 3.
 - e. The monthly volume of impacted ground water pumped from the Regional Aquifer Extraction System. The gallons of PLS and gallons of impacted water pumped shall be recorded separately for each canyon and line of wells as required in Table 4.

Analysis

18. Tyrone shall analyze samples of ground water and samples from collection ponds for the specific parameters listed below and based on the schedule attached in Tables 1 and 2. Samples of surface water from the SPCC Pond and No. 3 PLS Pond shall be analyzed for total and dissolved concentrations of the metal parameters and general chemistry parameters listed below and shall exclude field parameters. Samples of groundwater from monitoring wells shall be analyzed for dissolved concentrations of the metal parameters and general chemistry parameters listed below. [20.6.2.3107 NMAC]

Group 1: Field parameters (to be performed in the field): water level, temperature, pH and electrical conductivity.

Group 2: General chemistry parameters: calcium, sulfate, magnesium, alkalinity-carbonate, and bicarbonate, fluoride, sodium, potassium and total dissolved solids.

Group 3: Metal parameters: aluminum, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel and zinc.

Group 4: Organic compounds: Total Petroleum Hydrocarbons (TPH), and Benzene, Ethyl Benzene, Toluene and Xylene (BTEX) using EPA method 8260B. Acenaphthene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Total Naphthalenes, Phenanthrene and Pyrene using EPA method 8270 or 8310 during the subsequent rounds if Method 8260B detects elevated levels of VOCs.

Group 5: Nitrogen/Chloride: Nitrate as Nitrogen, total Kjeldahl nitrogen and Chloride.

Methodology

19. Unless otherwise approved in writing by NMED, Tyrone shall conduct sampling and analysis in accordance with the most recent editions of the following documents.
 - a. American Public Health Association, *Standard Methods for Examination of Water and Wastewater*.
 - b. U.S. Environmental Protection Agency, *Methods for Chemical Analysis of Water and Waste*.
 - c. U.S. Geological Survey, *Techniques for Water Resource Investigations of the U.S. Geological Survey*.
 - d. American Society for Testing and Materials, *Annual Book of ASTM Standards, Part 31, Water*.
 - e. U.S. Geological Survey, et al., *National Handbook of Recommended Methods for Water Data Acquisition*.
 - f. Surface water monitoring must also be conducted according to test procedures approved under Title 40 CFR Part 136. [20.6.2.3107 NMAC]

Reporting

20. Tyrone shall submit to NMED semi-annual monitoring reports containing information collected during the preceding six months from July 1st to December 31st by February 15th and from January 1st to June 30th by August 15th of each year. The annual seepage investigation report shall be submitted as an addendum to the February 15th semi-annual monitoring report. [20.6.2.3107 NMAC]
21. Semi-annual monitoring reports shall include results of all semi-annual monitoring tasks described in Conditions 11 through 17 above, the information in Condition 22 below, and Tables 1 through 5. [20.6.2.3107 NMAC]

22. Tyrone shall submit the semi-annual reports (both paper and electronic copies) that include but are not limited to the information summarized below. [20.6.2.3107 NMAC]
- a. A summary of all activities related to the discharges during the preceding six months. Examples include Section 20.6.2.1203 NMAC reportable spills, general operations, discharge volumes, changes in daily flow rates, maintenance, repairs, well installation and abandonment, storm water management, facility construction, water quality and water level trends, and precipitation patterns.
 - b. A groundwater analysis and water level table that includes a summary of monitoring well data (referred to as the data table) and a map of the No. 3 Leach System & 5A Waste Rock Stockpile showing the location of all wells. The data table will be in the format described, as follows. A single table in a paper and electronic format (EXCEL spreadsheet) of water quality data with only those parameters analyzed and water levels measured during a single event (calendar quarter) shown in columns. Tabulated electrical conductivity shall include the measured field values and corrected values to 25° Celsius. Monitoring sites shall be shown in rows. Values exceeding standards shall be bolded. Any parameter not analyzed for particular site shall be shown as "NA", any site not sampled shall be shown as "NS" with an associated reason, and any site not measured for water levels shall be shown as "NM" with an associated reason. Copies of signed laboratory analyses sheets shall be maintained at the site and made available to NMED staff upon request.
 - c. Hydrocarbon analyses for the SPCC pond, regional monitoring wells 22, 33 and 48 and alluvial monitoring wells MV-1, MV-2, MV-4 and MV-5. Nitrogen and chloride analyses for the POPE Ponds, SPCC Pond, regional monitoring well P-76 and new alluvial monitoring well required in Conditions 8d and 12d above.
 - d. The number of employees currently staffed at facilities that utilize the domestic wastewater system that reports to the POPE ponds.
 - e. A report describing pipeline movement, removal or closure of pipelines greater than 12 inches in diameter. Details must include the date, approximate location and length of the affected pipeline.
 - f. Alluvial aquifer potentiometric map incorporating semi-annual water level data from monitoring wells listed in Table 5.
 - g. Regional aquifer potentiometric map incorporating semi-annual water level data from monitoring wells listed in Table 6.
 - h. Raffinate volumes discharged (gpd) to the No. 3A leach stockpile and PLS volumes pumped (gpd) from the No. 3 PLS Pond to the SX/EW Plant for the previous six months.

- i. Monthly volumes pumped from the alluvial aquifer interceptor system and regional aquifer extraction system for the previous six months. Pumping volume totals for each canyon shall be reported.
 - j. Estimated volume of process water pumped from the SPCC pond to the top of the No. 3A Leach Stockpile for the previous six months.
 - k. Dates when the No. 3 Overflow Pond receives discharges of process water from the SPCC pond during upset conditions.
23. Tyrone shall submit the annual seepage investigation progress report that includes, but is not limited to, the information summarized below.
- a. A detailed evaluation of the effectiveness of the alluvial aquifer and regional aquifer extraction systems with potential deficiencies emphasized.
 - b. A single table formatted as described in Condition 22b above that includes all available water quality data to date shall be submitted annually. For each monitoring well, the name of the well shall be entered in the far left column and sampling date in the second column. Sampling events, beginning with the earliest event first, shall be entered in subsequent rows with the corresponding analytical data in columns to the right. Each new sampling event shall be added as an additional row to the existing spreadsheet with the date of the sampling event noted in the second column.
 - c. Electrical conductance corrected to 25° C and pH for all regional monitoring wells listed in Table 6 presented in tabular format and plotted in graphical format showing changes over time.
 - d. A regional aquifer electrical conductance isopleth map presenting the most recent field electrical conductance corrected to 25° C.
 - e. Construction and lithographic logs for all newly installed wells.
 - f. Maps showing all monitoring wells, pumping wells, soil borings, and seepage control systems for each canyon.
 - g. Pounds per ton of sulfuric acid added to the ore replaced on the No. 3A Leach Stockpile.

ABATEMENT

24. Groundwater standards have been exceeded within and beyond the area covered under this Discharge Permit. An abatement plan to address this groundwater contamination shall be submitted to NMED for approval as part of the site-wide abatement plan required pursuant to the Supplemental Discharge Permit for Closure, DP-1341. Tyrone shall amend the site-wide abatement plan within 60 days of issuance of this permit to address any exceedences of

groundwater and surface water standards not currently addressed in the site-wide abatement plan. The abatement plan shall be conducted in two stages. Stage one of the abatement plan shall include a schedule to investigate all known areas of groundwater and surface water contamination within the area covered by DP-286 for the 3A Leach Stockpile, 3B Waste Rock Stockpile, 5A Waste Rock Stockpile, Mill Site and other associated facilities, and define the extent and magnitude of groundwater contamination in accordance with Sections 20.6.2.3109.E.1 or 20.6.2.4000 NMAC through 4115 NMAC. Stage two of the abatement plan shall address the selection of an abatement option to abate groundwater contamination and shall include an analysis of abatement alternatives pursuant to 20.6.2.4106.E NMAC. Pursuant to 20.6.2.3109E (1), NMED may require additional abatement activities under this Discharge Permit Renewal. [20.6.2.3109E(1) and 20.6.2.4000 through 4115 NMAC]

25. Tyrone shall operate the Alluvial Aquifer Interceptor System and the Regional Aquifer Extraction System continuously such that the existing contaminant plumes in the alluvial and regional aquifers are completely contained. The systems must be operational until monitoring indicates that the WQCC groundwater standards have been achieved and maintained for two consecutive years (eight quarters); unless an alternative system is required to abate groundwater contamination under Condition 24 of this Discharge Permit. If the groundwater monitoring indicates that complete capture and containment of the plume is not being attained, then Tyrone shall propose, for NMED approval, immediate measures to stop plume migration through increased pumping in current extraction wells or the addition of new extraction well(s), or other measures as necessary. NMED may require this system to be modified or expanded based on the result of the ongoing groundwater sampling, future investigations, or approval of the site-wide abatement plan required under the Supplemental Discharge Permit for Closure, DP-1341. [20.6.2.3106 NMAC]

CONTINGENCY MEASURES

Ground Water and Surface Water Exceedences

26. In the event that monitoring indicates groundwater or surface water standards are exceeded, or the extent or magnitude of existing groundwater contamination is significantly increasing, Tyrone shall collect a confirmatory sample from the monitoring well(s) within 15 days to confirm the initial sampling results. Within 30 days of the confirmation of groundwater or surface water contamination or significant increases in existing contamination, Tyrone shall submit to NMED for approval an abatement plan required in Condition 24, which includes a site investigation to define the source, nature and extent of contamination; a proposed abatement option, and a schedule for its implementation. The site investigation and abatement option shall be consistent with the requirements and provisions of Sections 20.6.2.4101, 4103, 4106, 4107, 4108 and 4112 NMAC. An abatement plan required under this condition may be incorporated into the abatement plan required in Condition 24 of this Discharge Permit. [20.6.2.3107.A (10) NMAC]

Operational Failures

27. In the event of a pipeline break, pump failure, pond overflow or other system failure associated with any facility covered under DP-286, all discharge water shall be contained, pumped and transferred to areas of the facility that impose minimal impacts to groundwater quality. Failed components shall be repaired or replaced as soon as possible and no later than 72 hours from the time of failure unless Tyrone obtains a written consent and a new timetable from NMED. [20.6.2.3107A (10) NMAC]
28. If NMED or Tyrone identifies any other failure or potential failure of this Discharge Permit or system not specifically noted above, NMED may require Tyrone to develop for NMED approval contingency plan and schedules to address such a failure. [20.6.2.3107 A (10) NMAC]

Spill Reporting

29. In the event of a discharge that is not authorized by this Discharge Permit, Tyrone shall initiate the notification and corrective actions as required in 20.6.2.1203 NMAC. Tyrone shall take immediate corrective action to contain and remove or mitigate the damage caused by the discharge. Within 24 hours of discovery of the discharge, Tyrone shall verbally notify the NMED and provide the information outlined in 20.6.2.1203.A.1 NMAC. Within seven days of discovering the discharge, Tyrone shall submit a written report to NMED verifying the oral notification and providing any additional information or changes. Tyrone shall submit a corrective action report within 15 days after the discovery of the discharge. [20.6.2.1203 NMAC]

CLOSURE

30. Tyrone shall maintain a closure plan for the 3A Leach Stockpile, the 3B Waste Rock Stockpile, the 5A Waste Rock Stockpile and associated facilities pursuant to the Supplemental Discharge Permit for Closure, DP-1341. Tyrone shall submit a revised closure plan for these facilities for incorporation into the Supplemental Discharge Permit for Closure (DP-1341) based on the results of the feasibility study required in DP-1341. In the event that Tyrone modifies or expands any facilities covered under this Discharge Permit in a manner that exceeds the scope of the closure plan, Tyrone shall propose changes to the closure plan accordingly. [20.6.2.3107 A (11) NMAC]

FINANCIAL ASSURANCE

31. Tyrone shall maintain financial assurance pursuant to the Supplemental Discharge Permit for Closure, DP-1341 for the 3A Leach Stockpile, the 3B Waste Rock Stockpile, the 5A Waste Rock Pile and associated facilities to cover the cost of a third party to implement the closure plan described in Condition 30. The financial assurance shall be incorporated pursuant to DP-1341 to ensure that funds will be available to implement the closure plan if at any time

Tyrone is unable, unwilling, or otherwise fails to implement closure of the facility. In the event that Tyrone modifies or expands any facilities covered under this Discharge Permit in a manner that exceeds the scope of the closure plan, Tyrone shall propose changes to the financial assurance accordingly. [20.6.2.3107 A (11) NMAC]

GENERAL TERMS AND CONDITIONS

32. Tyrone shall comply with the following general conditions, which shall be enforceable by NMED.

Record Keeping

33. Tyrone shall maintain at its facility a written record of all data and information on monitoring of groundwater, surface water, seepage, and meteorological conditions pursuant to this Discharge Permit including the following information. [20.6.2.3107.A NMAC]

- a. The date, exact time, and exact location of each sample collection or field measurement;
- b. The name and job title of the person who performed each sample collection or field measurement;
- c. The date of the analysis of each sample;
- d. The name and address of the laboratory and the name and job title of the person that performed the analysis of each sample;
- e. The analytical technique or method used to analyze each sample or take each field measurement;
- f. The results of each analysis or field measurement, including the raw data; and,
- g. A description of the quality assurance and quality control procedures used.

34. Such data and information as described in Condition 33, shall also be maintained on all split and duplicate samples, spike and blank samples, and repeat samples. [20.6.2.3107.A NMAC]

35. Tyrone shall maintain a written record of any spills, seeps or leaks of effluent, or process fluids not authorized by this Discharge Permit. [20.6.2.3107.A NMAC]

36. Tyrone shall maintain a written record of the operation, maintenance and repair of all facilities/equipment used to treat, store, or dispose of wastewater; to measure flow rates; to monitor water quality; or, to collect other data required by this Discharge Permit. This record shall include repair, replacement or calibration of any monitoring equipment and

repair or replacement of any equipment used in the conveyance of process waters throughout this permit area. [20.6.2.3107.A NMAC]

37. Notwithstanding any company record retention policy to the contrary, until such time as NMED determines that all closure measures have been completed in accordance with the requirements of this Discharge Permit, Tyrone shall retain copies of all data, records, reports, and other documents generated pursuant to this Discharge Permit. Such record retention period may be increased by the NMED at any time upon written notice to Tyrone. [20.6.2.3107.A NMAC]

38. All such data, records, reports, and other documents generated pursuant to this Discharge Permit, shall be provided to the NMED upon request. [20.6.2.3107.A NMAC]

Inspection and Entry

39. Tyrone shall allow the Secretary or an authorized representative of NMED, upon the presentation of credentials to:

- a. Enter any property or premises owned or controlled by Tyrone at reasonable times upon Tyrone's premises or at another location where records are kept under the conditions of this Discharge Permit or any Federal or WQCC regulation.
- b. Inspect and copy, at reasonable times, records required to be kept under the conditions of this Discharge Permit or pursuant to State or Federal water quality regulations.
- c. Inspect, at reasonable times, any facility, equipment (including monitoring and control equipment for treatment works), practices or operations regulated or required under this Discharge Permit or under any Federal or WQCC regulations.
- d. Sample or monitor at reasonable times any effluent, water contaminant, or receiving water at any location before or after the discharge for the purpose of assuring compliance with this Discharge Permit or as otherwise authorized by the New Mexico Water Quality Act. [20.6.2.3107.D NMAC] [74-6-9.B and E WQA]

40. Nothing in this Discharge Permit shall be construed as limiting in any way the inspection and entry authority of the NMED under the WQA, the WQCC Regulations, or any other applicable law or regulation. [20.6.2.3107 NMAC]

Duty to Provide Information

41. Within a reasonable time after a request from the NMED, which time may be specified by the NMED, Tyrone shall provide the NMED with any relevant information to determine whether cause exists for modifying, terminating, or renewing this Discharge Permit, or to determine whether Tyrone is in compliance with this Discharge Permit. [20.6.2.3107.D NMAC] [74-6-9.B and E WQA]

42. Nothing in this Discharge Permit shall be construed as limiting in any way the information gathering authority of the NMED under the WQA, the WQCC Regulations, or any other applicable law or regulation. [20.6.2.3107.D NMAC] [74-6-9.B and E WQA]

Spills, Leaks and Other Unauthorized Discharges

43. This Discharge Permit authorizes only those discharges specified herein. Any discharge not authorized by this Discharge Permit or any other Tyrone Discharge Permit is a violation of the WQCC Regulations at 20.6.2.3104 NMAC. Tyrone must report any such discharge to the NMED, and it must take corrective action to contain and remove or mitigate the damage caused by the discharge in accordance with Section 2.6.2.1203 NMAC and, if applicable, Condition 24. [20.6.2.1203 NMAC]

Modifications and Amendments

44. Tyrone shall notify the NMED of any changes to its leachate or process water collection or disposal system, including any changes in the leachate or process water flow rate or the volume of leachate or process water storage, or of any other changes to its mining operations or processes that would result in any significant change in the discharge of water contaminants. Tyrone shall obtain NMED approval, as a modification to this Discharge Permit pursuant to Section 20.6.2.3109.E, F, or G NMAC, prior to any increase in the quantity leachate or process water discharged, or any increase in the concentration of water contaminants discharged, above those levels approved in this Discharge Permit. [20.6.2.3107 NMAC]

Enforcement

45. Any violation of the requirements and conditions of this Discharge Permit, including any failure or refusal to allow the NMED to enter and inspect records or facilities, or any refusal or failure to provide the NMED with records or information, may subject Tyrone to an enforcement action. Pursuant to WQA § 74-6-10(A) and (B), such action may include a compliance order requiring compliance immediately or in a specified time, assessing a civil penalty, suspending or terminating the Discharge Permit, or any combination of the foregoing; or an action in district court seeking injunctive relief, civil penalties, or both. Pursuant to the WQA §§ 74-6-10(C) and 74-6-10.1, civil penalties of up to \$15,000 per day of noncompliance may be assessed for each violation of the WQA § 74-6-5, the WQCC regulations, or this Discharge Permit, and civil penalties of up to \$10,000 per day of noncompliance may be assessed for each violation of any other provision of the WQA, or any regulation standard, or order adopted pursuant to such other provision. For certain violations specified in the WQA § 74-6-10.2, criminal penalties may also apply. In any action to enforce this Discharge Permit, Tyrone waives any objection to the admissibility as evidence of any data generated pursuant to this Discharge Permit. Tyrone does not waive any argument as to the weight such evidence should be given. [74-6 WQA]

Compliance with Other Laws

46. Nothing in this Discharge Permit shall be construed in any way as relieving Tyrone of its obligation to comply with all applicable Federal, State, and local laws, regulations, permits, or orders. [74-5-5.K WQA]

Liability

47. The approval of this Discharge Permit does not relieve Tyrone of liability should the operation result in actual pollution of surface or groundwater which may be actionable under other laws and/or regulations. [20.6.2.1220 NMAC]

Right to Appeal

48. Tyrone may file a petition for a hearing before the WQCC on this Discharge Permit. Such petition must be made in writing to the WQCC within thirty (30) days after Tyrone receives this Discharge Permit. Unless a timely petition for a hearing is made, the decision of NMED shall be final. [74-6-5.N WQA]

Transfer

49. Prior to any transfer of ownership, control, or possession of the permitted facility or any portion thereof, Tyrone shall notify the proposed transferee in writing of the existence of this Discharge Permit and include a copy of this Permit with the notice. Tyrone shall deliver or send by certified mail to the NMED a copy of the notification and proof that such notification has been received by the proposed transferee. [20.6.2.3111 NMAC]

Term

50. The effective date of this Discharge Permit is the date it is issued and signed by the Chief of the Groundwater Quality Bureau. The term of this Discharge Permit is five (5) years, and the Permit will automatically expire five (5) years from the date it is issued. To renew this Discharge Permit, Tyrone must submit an application for renewal at least 120 days before that date. [74-6-5.H and 20.6.2.3109.H NMAC]

Issued this 26th day of February 2010



William C. Olson, Chief
Groundwater Quality Bureau
New Mexico Environment Department

Under authority delegated by the Secretary of the New Mexico Environment Department

Table 1: Summary of Monitoring Requirements.

Annual Sampling Frequency	Annual Reporting Frequency	Number of Sites	Sampling Description
2	2	149	Water levels semi-annually in up to 149 alluvial aquifer monitor wells
4	2	13	Field parameters quarterly in up to 13 alluvial aquifer monitor wells located downgradient of seepage collection systems
2	2	126	Water levels and field parameters semi-annually in up to 126 regional aquifer monitor wells
4	2	12	General chemistry (alk-HCO ₃ , Ca, alk-CO ₃ , Cl, F, Mg, K, Na, SO ₄ , TDS) and metals (Al, As, Cd, Cr, Co, Cu, Fe, Pb, Mn, Ni, and Zn) quarterly in up to 12 regional aquifer monitor wells
2	2	21	General chemistry (alk-HCO ₃ , Ca, alk-CO ₃ , F, Mg, K, Na, SO ₄ , TDS) and metals (Al, As, Cd, Cr, Co, Cu, Fe, Pb, Mn, Ni, and Zn) semi-annually in up to 21 regional aquifer monitor wells
4	2	1	General chemistry (alk-HCO ₃ , Ca, alk-CO ₃ , F, Mg, K, Na, SO ₄ , TDS) and metals (Al, As, Cd, Cr, Co, Cu, Fe, Pb, Mn, Ni, and Zn) quarterly at the O-6 leak detection well
2	2	7	Organics benzene, ethylbenzene, toluene, xylene, TPH - full range, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, Chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, total naphthalenes, phenanthrene, and pyrene semi-annually in up to 7 monitoring wells
2	2	2	Raffinate volumes discharged to the No. 3A leach stockpile (gpd) and PLS pumped from the No. 3 PLS pond to the SXEW plant (gpd).
2	2	2	Nitrate as nitrogen (NO ₃ -N), total Kjeldahl nitrogen (TKN) and Chloride (Cl) semi-annually in regional monitoring well P-76 and new alluvial monitoring well installed downgradient of the POPE pond.

Annual Sampling Frequency	Annual Reporting Frequency	Number of Sites	Sampling Description
12	2	9	Monthly alluvial aquifer extraction volumes (Canyon 1, Canyon 4, Mangas Wash, Canyon 5, Canyon 6, Canyon 7, Canyon 8, Canyons 10 and 11, Lower Canyons)
12	2	9	Monthly regional groundwater extraction volumes (Canyon 4, Canyon 6, Canyon 7, Canyons 8 and 9, Canyons 10 and 11, Trestle, Mangas Flats, L Line, North Perimeter)
2	2	3	General chemistry (alk-HCO ₃ , Ca, alk-CO ₃ , F, Mg, K, Na, SO ₄ , TDS) and metals (Al, As, Cd, Cr, Co, Cu, Fe, Pb, Mn, Ni, and Zn) semi-annually in the No. 3 PLS Pond, No. 3 PLS Overflow Pond and SPCC Pond.
2	2	1	Organics: benzene, ethylbenzene, toluene, xylene, TPH - full range, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, Chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, total naphthalenes, phenanthrene, and pyrene semi-annually in the SPCC Pond
2	2	2	Nitrate as nitrogen (NO ₃ -N), total Kjeldahl nitrogen (TKN) and Chloride (Cl) semi-annually in POPE ponds and SPCC pond.
Daily	2	1	PLS level in leak detection well 0-6 measured and pumped daily and gallons pumped recorded (gpd).
1	1	1	Pounds per ton of sulfuric acid added to the material placed on the No. 3A leach stockpile
2	2	1	Estimated volume of process water pumped from the SPCC Pond to the top of the No. 3A Leach Stockpile
N/A	2	1	Dates when overflow from the SPCC pond (during upset conditions) is discharged to the No. 3 PLS Overflow pond

Table 2: Monitoring Schedule for Monitoring Wells, Ponds and Trenches

Site ID*	1 st Quarter	2 nd Quarter	3 rd Quarter	4 th Quarter
Monitoring Wells				
Alluvial Aquifer				
All Alluvial Wells	Water Level		Water Level	
New Well Canyon 5	Group 1	Group 1	Group 1	Group 1
C6-1	Group 1	Group 1	Group 1	Group 1
C6-9	Group 1	Group 1	Group 1	Group 1
C6-10	Group 1	Group 1	Group 1	Group 1
C7-38	Group 1	Group 1	Group 1	Group 1
C8-24	Group 1	Group 1	Group 1	Group 1
C8-46	Group 1	Group 1	Group 1	Group 1
C8-49	Group 1	Group 1	Group 1	Group 1
C10-53	Group 1	Group 1	Group 1	Group 1
C10-62	Group 1	Group 1	Group 1	Group 1
New Well Canyon 11	Group 1	Group 1	Group 1	Group 1
C11-6	Group 1	Group 1	Group 1	Group 1
MV-1	Group 4		Group 4	
MV-2	Group 4		Group 4	
MV-4	Groups 1 & 4	Group 1	Groups 1 & 4	Group 1
MV-5	Group 4		Group 4	
New Well Downgradient of POPE Pond	Group 5		Group 5	

Table 2: Monitoring Schedule for Monitoring Wells, Ponds and Trenches (continued).

Regional Aquifer				
Site ID*	1 st Quarter	2 nd Quarter	3 rd Quarter	4 th Quarter
All Regional Wells	Group 1		Group 1	
6-2R	Groups 1, 2, & 3			
P-3	Groups 1, 2, & 3	Groups 1, 2 & 3	Groups 1, 2 & 3	Groups 1, 2 & 3
P-5	Groups 1, 2, & 3	Groups 1, 2, & 3	Groups 1, 2 & 3	Groups 1, 2 & 3
P-6B	Groups 1, 2, & 3	Groups 1, 2, & 3	Groups 1, 2 & 3	Groups 1, 2 & 3
P-10A	Groups 1, 2, & 3	Groups 1, 2, & 3	Groups 1, 2 & 3	Groups 1, 2 & 3
P-13AR	Groups 1, 2, & 3	Groups 1, 2, & 3	Groups 1, 2 & 3	Groups 1, 2, & 3
P-14A	Groups 1, 2, & 3	Groups 1, 2, & 3	Groups 1, 2 & 3	Groups 1, 2, & 3
P-11	Groups 1, 2, & 3		Groups 1, 2, & 3	
P-12A	Groups 1, 2, & 3		Groups 1, 2, & 3	
P-23A	Groups 1, 2, & 3		Groups 1, 2 & 3	
32	Group 4		Group 4	
33	Group 4		Group 4	
48	Group 4		Group 4	
P-49	Groups 1, 2, & 3	Groups 1, 2 & 3	Groups 1, 2, & 3	Groups 1, 2 & 3
P-58	Groups 1, 2, & 3		Groups 1, 2, & 3	
P-65	Groups 1, 2, & 3			
P-76	Group 5		Group 5	
P-166	Groups 1, 2, & 3		Groups 1, 2, & 3	
P-185	Groups 1, 2, & 3		Groups 1, 2, & 3	
P-203	Groups 1, 2, & 3		Groups 1, 2, & 3	
P-209	Groups 1, 2, & 3		Groups 1, 2, & 3	
P-217	Groups 1, 2, & 3		Groups 1, 2, & 3	
C9-5	Groups 1, 2, & 3		Groups 1, 2, & 3	
C10-8	Groups 1, 2, & 3		Groups 1, 2, & 3	
C11-1	Groups 1, 2, & 3		Groups 1, 2, & 3	
286-2005-02	Groups 1, 2, & 3			
286-2006-02	Groups 1, 2, & 3		Groups 1, 2, & 3	
286-2007-01	Groups 1, 2, & 3		Groups 1, 2, & 3	
286-2007-02	Groups 1, 2, & 3		Groups 1, 2, & 3	
286-2007-04	Groups 1, 2, & 3		Groups 1, 2, & 3	
286-2007-05	Groups 1, 2, & 3		Groups 1, 2, & 3	
286-2007-13	Groups 1, 2, & 3		Groups 1, 2, & 3	
286-2007-24	Groups 1, 2, & 3		Groups 1, 2, & 3	
286-2007-28	Groups 1, 2, & 3		Groups 1, 2, & 3	
286-2007-34	Groups 1, 2, & 3		Groups 1, 2, & 3	
New Cyn 11 Well #1	Groups 1, 2, & 3	Groups 2 & 3	Groups 1, 2, & 3	Groups 2 & 3
New Cyn 11 Well #2	Groups 1, 2, & 3	Groups 2 & 3	Groups 1, 2, & 3	Groups 2 & 3

Table 2: Monitoring Schedule for Monitoring Wells, Ponds and Trenches (continued).

Collection Ponds				
No. 3 PLS Pond	Groups 2 & 3			
No. 3 PLS Overflow Pond	Groups 2 & 3			
Leak Detection Well O-6	Groups 2 & 3		Groups 2 & 3	
Well O-6: PLS level	Note 2	Note 2	Note 2	Note 2
POPE Ponds	Group 5		Group 5	
SPCC Pond	Groups 2,3,4 & 5		Groups 2,3,4 & 5	

Group 1: Field parameters (to be performed in the field): water level, temperature, pH and electrical conductivity.

Group 2: General Chemistry Parameters: calcium, sulfate, magnesium, alkalinity-carbonate, alkalinity-bicarbonate, fluoride, sodium, potassium and total dissolved solids.

Group 3: Metal parameters: aluminum, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel and zinc.

Group 4: Total Petroleum Hydrocarbons (TPH), and Benzene, Ethyl Benzene, Toluene and Xylene (BTEX) using EPA method 8260B. Acenaphthene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Total Naphthalenes, Phenanthrene and Pyrene using EPA method 8270 or 8310 during the subsequent rounds if Method 8260B detects elevated levels of VOCs.

Group 5: Nitrogen/Chloride: Nitrate as Nitrogen, total Kjeldahl nitrogen and Chloride.

Q1 = January, February, March

Q2 = April, May, June

Q3 = July, August, September

Q4 = October, November, December

Note 1: As sites are abandoned they will be dropped from the monitoring plan. New monitoring sites will be planned and installed as part of the reclamation project with NMED approval. As new monitoring sites are required, those sites shall be inserted into the monitoring plan, as appropriate to the site's Sampling Description, as indicated in Table 2.

New wells may be required by NMED depending on mine activities including reclamation. In the event that new wells are required, those wells are to be inserted in to the monitoring plan a shallow or regional wells, as appropriate.

Note 2: PLS level shall be measured and pumped daily.

Table 3: Pumping Rate Schedule for Alluvial Aquifer Interceptor System (Interceptor Wells and Interceptor /Barrier Trenches).

Location	Catchment Well ID	Trench Well ID	Frequency
Canyon 1	C1-15, C1-18, C1-19, C1-22, C1-23, C1-25, C1-28, C1-30, C1-33		Monthly
Canyon 4		C4-24, C4-25, C4-28	Monthly
Mangus Wash		C4-30, C4-31, C4TU-1, C4TU-2	Monthly
Canyon 5		C5-9, C5-10	Monthly
Canyon 6	C6-11, C6-15, C6-16, C6-20, C6-63, C6-65	C6-34, C6-35, C6-36, C6-45, C6-46, C6-53	Monthly
Canyon 7	C7-15		Monthly
Canyon 8	C8-9, C8-10, C8-11, C8-48		Monthly
Canyons 10 & 11	C10: C10-17, C10-18 C11: C11-16		Monthly
Lower Canyons		C7-34 (7 Trench), C8-33, C8-34, C8-43 (8 Trench), C10-55, C10-58 (Upper 10 Trench)	Monthly

Table 4: Pumping Rate Schedule for Regional Aquifer Extraction System.

Location	Well ID	Frequency
Canyon 4	P-13A	Monthly
Canyon 6	P-12A, P-165, P-182, P-188, P-189, P198	Monthly
Canyon 7	P-174, P-177, P-194, P-196, P-209, P-211, P-212	Monthly
Canyons 8 & 9	C8: P-178, P-185, P-192, P-195, P-205, P-206, P-210, P-220, P-221 & P-235 C9: P-234	Monthly
Canyons 10 & 11	C10: P-215, P-216, P-217, P-236 C11: P-203, P-237, P-238, P-239, P-240, P-241	Monthly
Trestle	P-30, P-39, P-40, P-41, P-42, P-53, P-76, P-162, P-164	Monthly
Mangas Flats	P-29, P-33, P-38	Monthly
L Line	P-54, P-55, P-56, P-57, P-70	Monthly
North Perimeter	286-2006-01, 286-2006-03, 286-2006-05, 286-2007-01, 286-2007-02, 286-2007-15, 286-2007-17, 286-2007-19, 286-2007-21, 286-2007-23, 286-2007-25, 286-2007-27, 286-2007-29, 286-2007-31, 286-2007-33, 286-2007-35, 286-2007-37, 286-2007-39, 286-2007-41, 286-2007-43, 286-2007-45, 286-2007-47, 286-2007-49, 286-2007-50, 286-2007-51	Monthly

Table 5: Existing Alluvial Monitoring Wells

C1-4	C5-10	C7-1	C8-46
C1-5	C5-14	C7-2	C8-47
C1-10	C5-15	C7-4	C8-48
C1-13	C5-New	C7-9	C8-49
C1-14	C6-1	C7-10	C8-50
C1-15	C6-2	C7-13	C9-3
C1-18	C6-4	C7-14	C10-12
C1-19	C6-5	C7-15	C10-14
C1-22	C6-6	C7-16	C10-15
C1-23	C6-9	C7-27	C10-16
C1-25	C6-10	C7-33	C10-17
C1-28	C6-11	C7-34	C10-18
C1-30	C6-14	C7-35	C10-26
C1-31	C6-15	C7-36	C10-40
C1-33	C6-16	C7-37	C10-41
C2-4	C6-17	C7-38	C10-50
C2-11	C6-18	C7-39	C10-51
C2-12	C6-19	C8-4	C10-52
C3-1	C6-20	C8-5	C10-53
C3-11	C6-33R	C8-8	C10-55
C3-13	C6-34	C8-9	C10-57
C4-4	C6-35	C8-10	C10-58
C4-5	C6-36	C8-11	C10-59
C4-6	C6-43	C8-12	C10-62
C4-24	C6-44	C8-14	C11-6
C4-25	C6-45	C8-22	C11-13
C4-26	C6-46	C8-23	C11-14
C4-28	C6-47	C8-24	C11-15R
C4-29	C6-48	C8-26	C11-16
C4-30	C6-53	C8-27	C11-17
C4-31	C6-59	C8-30	C11-19
C4TU-1	C6-60	C8-33	C11-20
C4TU-2	C6-61	C8-34	C11-New
C5-3	C6-62	C8-36	MV-1
C5-4	C6-63	C8-39	MV-2
C5-6	C6-64	C8-43	MV-4
C5-9	C6-65	C8-44	MV-5

Table 6: Existing Regional Monitoring Wells

26	286-2007-40	P-43	P-183
27	286-2007-42	P-44	P-184
29	286-2007-44	P-47	P-185
286-2005-01	286-2007-46	P-49	P-187
286-2005-02	286-2007-48	P-50	P-188
286-2005-03	P-3	P-45	P-189
286-2006-02	P-4A	P-46	P-192
286-2006-04	P-5	P-51	P-193
286-2006-06	P-6A	P-52	P-194
286-2007-03	P-6B	P-53	P-195
286-2007-04	P-6RRR	P-71A	P-196
286-2007-05	P-8A	P-72R	P-198
286-2007-06	P-10A	P-73	P-203
286-2007-07	P-10AR	P-74	P-205
286-2007-08	P-11	P-75	P-206
286-2007-09	P-12A	P-77	P-208
286-2007-10	P-13A	P-79	P-209
286-2007-11	P-14A	P-80	P-210
286-2007-12	P-16	P-81	P-211
286-2007-13	P-17A	P-82	P-235
286-2007-14	P-19	P-84	P-236
286-2007-16	P-21	P-85	P-237
286-2007-18	P-22	P-99	P-238
286-2007-20	P-23A	P-165	P-239
286-2007-22	P-24	P-166	P-240
286-2007-24	P-29	P-167	New (Cyn 11)1
286-2007-26	P-30	P-168	New (Cyn 11)2
286-2007-28	P-31	P-173	
286-2007-30	P-34	P-174	
286-2007-32	P-37	P-176	
286-2007-34	P-38	P-177	
286-2007-36	P-39	P-178	
286-2007-38	P-42	P-182	

Table 7
North Perimeter Extraction Wells

286-2006-01	286-2007-15	286-2007-25	286-2007-35	286-2007-45
286-2006-03	286-2007-17	286-2007-27	286-2007-37	286-2007-47
286-2006-05	286-2007-19	286-2007-29	286-2007-39	286-2007-49
286-2007-01	286-2007-21	286-2007-31	286-2007-41	286-2007-50
286-2007-02	286-2007-23	286-2007-33	286-2007-43	286-2007-51

Table 8
North Perimeter Monitoring Wells

286-2006-02	286-2007-08	286-2007-18	286-2007-34
286-2006-04	286-2007-09	286-2007-20	286-2007-36
286-2006-06	286-2007-10	286-2007-22	286-2007-38
286-2007-03	286-2007-11	286-2007-24	286-2007-40
286-2007-04	286-2007-12	286-2007-26	286-2007-42
286-2007-05	286-2007-13	286-2007-28	286-2007-44
286-2007-06	286-2007-14	286-2007-30	286-2007-46
286-2007-07	286-2007-16	286-2007-32	286-2007-48

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1. The first part of the experiment is to determine the molar mass of a polymer. This is done by measuring the osmotic pressure of a solution of the polymer in a solvent. The osmotic pressure is measured by a method known as the membrane osmometry. The polymer solution is separated from a pure solvent by a semi-permeable membrane. The osmotic pressure is the pressure that must be applied to the pure solvent to prevent it from flowing through the membrane into the polymer solution.

2. The second part of the experiment is to determine the degree of substitution of a polymer. This is done by measuring the change in the refractive index of a solution of the polymer in a solvent. The refractive index is measured by a method known as the refractometry. The refractive index of a solution is the ratio of the speed of light in a vacuum to the speed of light in the solution. The refractive index of a solution is a function of the concentration of the solution and the refractive index of the solvent.