Freeport-McMoRan Cobre Mining Company
2014 Continental Mine
Closure/Closeout Plan Update

December 2014

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SOLUTIONS • INCORPORATED

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Signature Page

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List of Acronyms and Abbreviations

AGP	Acid-generating Potential
AMSL	Above Mean Seal Level
ANP	Acid-neutralizing Potential
BLM	Bureau of Land Management
CCP	Closure/Closeout Plan
CDM	Camp Dresser & McKee Inc.
Chino	Freeport-McMoRan Chino Mines Company
CHR	Cobre Haul Road
Cobre	Freeport-McMoRan Cobre Mining Company
CQA	Construction Quality Assurance
CQC	Construction Quality Control
DBS&A	Daniel B. Stephens and Associates, Inc.
DP	Discharge Permit
EOY	End of Year
Golder	Golder Associates
LG WRF	Low Grade Waste Rock Facility
M3	M3 Engineering & Technology Corp.

MGTI	Magnetite Tailings Impoundment
MMD	Mining and Minerals Division, New Mexico Energy, Minerals and Natural Resources Department
MTI	Main Tailings Impoundment
MWMP	Meteoric Water Mobility Procedure
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMMA	New Mexico Mining Act
NMSA	New Mexico Statutes Annotated
NNP	Net Neutralization Potential
NOBS	North Overburden Stockpile
NPAG	Not Potentially-acid Generating
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
OB	Overburden
OSE	Office of the State Engineer
PLS	Pregnant Leachate Solution
PMLU	Post-Mining Land Use
SSE	self-sustaining ecosystem
SMI	Shepherd Miller, Inc.
SWRDF	South Waste Rock Disposal Facility
SWPPP	Storm Water Pollution Prevention Plan
SX/EW	Solution Extraction/Electrowinning
Telesto	Telesto Solutions, Inc.
TDS	Total Dissolved Solids
USSR&M	United States Smelting, Refining, and Mining Company
WQCC	Water Quality Control Commission
WRF	Waste Rock Facility
URS	URS Corporation

1.0 INTRODUCTION

Freeport-McMoRan Cobre Mining Company (Cobre) owns and operates an existing mining operation (The Continental Mine) authorized under State issued mining permit No. GR002RE. The Continental Mine is located northeast of Santa Clara, New Mexico (Figure 1). Active mining and milling of copper ore ceased in 1999. Cobre is planning to resume mining activities in the near future and continue for approximately 10 years.

An existing Closure/Closeout Plan (CCP) is approved for the Continental Mine operation under Permit No. GR002RE, issued by the Mining and Minerals Division (MMD) of the New Mexico Energy, Minerals, and Natural Resources Department, and under Discharge Permit-1403 (DP-1403), issued by the New Mexico Environment Department (NMED). The CCP describes measures to close and reclaim the Continental Mine if the closure/closeout work had to be performed by a third-party contractor. This 2014 CCP includes an updated cost estimate for the closure/closeout measures and post-closure/closeout maintenance.

1.1 Purpose

This 2014 CCP Update is written to satisfy the requirements of:

1. MMD Permit Revision 12-1 to Permit No. GR002RE (GR002RE 12-1, Section 9.EE)
2. Copper Mine Rules [New Mexico Administrative Code (NMAC) 20.6.7]

This CCP Update is also intended to update the pending DP-1403 renewal application with more current information.

The 2014 CCP Update also conforms to all applicable mine reclamation regulations set forth by the U.S. Bureau of Land Management (BLM; 43 CFR 3809). The land that is planned to be disturbed by future mining is either managed by the BLM or owned by Cobre.

This CCP provides a conceptual plan for closure and reclamation of the site and a cost estimate to implement the plan. This estimate is the basis for establishment of financial assurance in accordance with the State of New Mexico and BLM guidelines.

The total estimated closure/closeout cost in this CCP is $25.6 million in nominal dollars. The cost estimate is based on the facility conditions anticipated for end of year (EOY) 2019. Capital costs, operating costs and maintenance costs are included in this estimate, as well as contingency and indirect costs.

1.2 Organization

The overall organization of this 2014 CCP Update is:

- **Section 1.0** provides an overview of the 2014 CCP update and history
- **Section 2.0** summarizes Cobre's permit and discharge plans, and permitted facilities
- **Section 3.0** describes the existing mine facilities, land use, and environmental setting
- **Section 4.0** presents completed reclamation projects
- **Section 5.0** describes the performance objectives and general reclamation design for each facility type
- **Section 6.0** describes the post mining land use designations
- **Section 7.0** describes the post-closure monitoring, reporting, and contingency plans
- **Section 8.0** presents a summary of the capital and operation and maintenance (O&M) cost estimates
- **Section 9.0** presents a closeout schedule
- **Section 10.0** lists the references used in preparation of this 2014 CCP Update
- **Tables**
- **Figures**
- **Drawings** are reclamation design drawings
- **Appendix A** includes the facility characteristic forms
- **Appendix B** includes the earthwork cost estimate summary report
- **Appendix C** includes the water management cost estimate summary report
- **Appendix D** includes an electronic copy of this 2014 CCP Update report as well as the excel files of the cost estimate

1.3 Regulatory Authority

In 1993, the New Mexico legislature enacted the New Mexico Mining Act (NMMA) requiring that closeout plans be put into place for applicable mines within the state. Rules to implement the conditions of the NMMA were promulgated in 1994. This plan was prepared to comply with all applicable regulations and conditions stipulated in the NMMA, the Mining Act Rules for Existing Mining Operations, (19.10.5 NMAC), the New Mexico Water Quality Act, and the New Mexico Water Quality Control Commission (WQCC) Regulations (20.6 NMAC, Parts 2 and 7). In 2013, NMED adopted new rules for the copper mining industry. Applicable conditions of these new rules (Copper Mine Rules 20.6.7 NMAC) have been addressed in this 2014 CCP Update.

1.3.1 The New Mexico Mining Act and Administrative Rules

The NMMA established a goal of promoting responsible utilization and reclamation of lands impacted by mining while also recognizing that mining is vital to New Mexico's economy. The program is administered by the MMD, and approved existing mine permits apply for the life of the operation. The Continental Mine is regulated as an "existing mine" under the NMMA because it produced marketable minerals for a total of at least two years between January 1, 1970 and the effective date of the NMMA.

1.3.2 Closeout Planning

The MMD's Mining Act Rules (Rules) and advisory Closeout Plan Guidelines provide a foundation for the development of closeout plans. The Rules state that, "*closeout plans shall be based on site-specific characteristics and the anticipated life of the mining operation. Site-specific characteristics include, but are not limited to, disturbances from previous mining operations, past and current mining methods utilized, geology, hydrology and climatology of the area*" (19.10.5.506.A NMAC). The MMD guidelines recognize that each site presents a unique set of circumstances and that many of the existing mines subject to closure conditions were largely developed prior to the NMMA without the condition for reclamation.

Closeout must be designed to achieve a "self-sustaining ecosystem" (SSE), unless achieving an SSE is not consistent with the contemplated post-mining land use (PMLU), which must be approved by the Director of the MMD. PMLUs include, but are not limited to, agricultural (e.g. cropland, grazing land, or forestry), commercial, industrial, or ecological uses that would comply with applicable laws and regulations. Specific mine areas may also be granted a waiver from achieving a SSE. Specific closeout requirements are described in Permit GR002RE, which identifies the currently-approved PMLUs. Determining future land-use is the first step in developing a closeout plan and establishing financial assurance for the site. The PMLU applicable to the Continental Mine and its facilities are wildlife habitat and industrial. The CCP is designed to achieve a SSE for areas with an approved wildlife habitat PMLU, but not for areas with an approved industrial PMLU. The Continental Pit was granted a conditional waiver from achieving a SSE.

1.3.3 Closure Planning

In addition to the NMMA and Rule requirements for closeout, this CCP is designed to meet the closure requirements under the New Mexico Water Quality Act and the Water Quality Control Commission Regulations. Cobre's current closure requirements are specified in DP-1403. Additional closure requirements have recently been adopted as part of the Copper Mine Rule, 20.6.7.33 NMAC. Those requirements have not yet been incorporated into Cobre's discharge permits; however, this plan has been prepared to meet those requirements. Permitted activities are further described in DP-181 and DP-1056. In general, closure of the Continental Mine involves mine process water management, earth work and revegetation designed to establish a SSE and to achieve a wildlife habitat PMLU for the waste rock stockpiles, tailing impoundments, and other facilities, except for areas with an approved industrial PMLU or subject to the conditional waiver.

Cobre has conducted a broad range of specialized environmental studies directed under Permit GR002RE and the discharge permits related to groundwater, stormwater drainage, slope stability, airborne material, cover design and test plots, and water treatment to evaluate the economic and environmental impacts of various closure considerations. Environmental and closure studies were formally started in 1993 (CDM, 1994).

Environmental studies have continued through the present day. The salient points of the studies are that:

- Deep groundwater north of the confluence of Poison Spring Drainage is captured by the Continental Mine underground workings and Continental Pit
- The Continental Pit will function as a hydrologic evaporative sink
- Existing seeps at the toes of Waste Rock Facilities (WRFs) are:
  - sourced from precipitation
  - manageable with existing infrastructure
  - will cease after reclamation when the vegetative cover system is in place
- The Main Tailings Impoundment (MTI) is in a draindown condition and will reach an equilibrium in a minimum of 30 to 50 years after tailings deposition cessation (last deposition: 1999)
- Adequate cover materials exist on site to meet reclamation conditions for current disturbance, planned mine expansion, and unconstructed facilities

In addition to the findings from these ongoing comprehensive studies, Cobre is currently developing a groundwater abatement (GWA) plan to identify and address potential impacts to groundwater. Stage 1 of the GWA plan includes investigation of the site and Stage 2 provides an evaluation and proposal of appropriate abatement measures. Cobre submitted a Stage 1 GWA plan in February 2005 (Telesto, 2005a) followed by an addendum in June 2005 (Telesto, 2005b). An interim Stage 1 GWA plan was submitted to NMED in 2011 (Telesto, 2011) which described the general characteristics of the groundwater system associated with the Continental Mine facilities. Cobre and NMED personnel have met on several occasions to review the GWA approach. After completion of an analysis of analyze site wide background water quality, a final Stage 1 GWA report will be submitted. Once approved, Cobre will prepare Stage 2 of the GWA plan.

Cobre continues to conduct closure studies, monitoring, and data collection in accordance with MMD and NMED permits. In the future, these ongoing efforts may show that other alternatives are available for closure. The Copper Mine Rule is designed to encourage and allow for these advancements. Thus, Cobre reserves the right to update the CCP as studies, monitoring data, and reclamation science and technology improve.

1.3.4 Office of the State Engineer

The Office of the State Engineer (OSE) Water Rights Division administers New Mexico public waters use under the authority of the New Mexico Statutes Annotated (NMSA) 1978, Chapter 72. The OSE administers Cobre's seven water rights, which allow an average of 2,167 acre-feet per year of withdrawal, through monitoring and permitting points of withdrawal. The OSE also issues permits for drilling new wells, including wells used for monitoring and remediation of impacted groundwater, as well as the closure of wells and exploration holes.

Additionally, the OSE is responsible for public safety associated with dams and water retention structures that are over 25-feet high with a capacity to contain more than 15 acre-feet of storage (i.e., jurisdictional dams). The OSE regulates jurisdictional dams through a registration program. The two tailings impoundments at Cobre's Continental Mine are jurisdictional dams registered with the OSE.

1.4 History of CCP Submittal

The following section presents the chronology of CCP submittals and other CCP related documents for Cobre:

- In 1994, Cobre submitted a mining operations site assessment and an existing mining operation permit application. The permit application was approved by the MMD on December 3, 1996
- Cobre submitted a preliminary CCP for constructed and unconstructed facilities in June of 1998
- An addendum CCP for mining at Hanover Mountain, the North WRF, and the Union Hill portion of the South WRF was submitted by Cobre in October 1998
- An addendum CCP for the Fierro Leach Pad was submitted in 1998
- Also in 1998, Cobre submitted a closure-plan supplement for Cobre's proposed Humbolt leach facility
- Cobre submitted a closure/closeout conceptual design summary report for constructed and unconstructed facilities in November 1999
- In November 1999, Cobre submitted a conceptual design summary for its proposed Fierro Leach Pad and Pregnant Leachate Solution (PLS)/Raffinate Pipeline

- In April 2001, Cobre submitted an End-of-Year 2001 through Year 2006 CCP (M3, 2001)
- In February 2001, Cobre submitted a waste rock handling plan for Hanover Mountain which included Continental Pit material (Geotrans, 2001)
- In January 2005, Cobre submitted an update to the 2001 CCP including reclamation cost estimates (Telesto, 2005c)
- In June 2005, Cobre submitted a Closure Plan for mining at Hanover Mountain, Condition 21, DP-1403 (Telesto, 2005d)
- In December 2005, Cobre submitted a standby permit application to the MMD and an interim plan (related to standby) to the NMED, approved respectively by NMED (2006) and MMD (2007)
- In August 2009, Cobre submitted the 2009 Cobre CCP (Telesto, 2009a)
- In January 2012 Cobre applied for a renewal of standby status and received conditional approval on November 21st, 2013. One of the conditions of approval included the development and submission of this CCP
- In August 2014, Cobre submitted a new unit application for the Cobre Haul Road (CHR), which included a slight modification to the MMD permit boundary and a closeout plan; both are incorporated herein

1.5 Description of Updated Plan

The MMD and NMED require that existing mines prepare a CCP and the entity responsible for the mine must put into place financial assurance, "sufficient to assure the completion of the performance requirements of the permit, including closure and reclamation, if the work had to be performed by the director or a third party contractor."

Facility characteristics, reclamation designs, and the reclamation cost estimate presented in this 2014 CCP Update are based on projected conditions at the Continental Mine by EOY 2019. The planned configuration and reclamation of the mine at EOY 2019 is depicted in Drawing Sheets 1 through 10. The configuration for EOY 2019 is the year with the greatest area of disturbance requiring reclamation. Consequently, the cost estimate for closure and closeout measures for the period between 2015 and 2019 would be highest at EOY 2019, hypothetically assuming that the CCP would be implemented for conditions existing at EOY 2019. The NMED and MMD approved using the EOY 2019 configuration for the 2014 Updated CCP on October 23, 2014.

Cobre's 2014 mine expansion plan anticipates first constructing the CHR, then proceeding with active mining for approximately 10 years with the potential to extend the mine life to accommodate advances in technology or additional copper resources in the area. In general, the plan consists of constructing the CHR between the Continental Mine and Freeport-McMoRan Chino Mines Company's Chino Mine (Chino) where beneficiation of ore will occur, mining Hanover Mountain and the Continental Pit, constructing the North Overburden Stockpile (NOBS), expanding the South Waste Rock Disposal Facility (SWRDF), and relocating various infrastructure.

In August 2014, Cobre submitted an application to the MMD to revise GR002RE to expand the approved permit boundary and design limits for the construction of the CHR. Figure 2 shows the proposed MMD permit boundary. The application was declared administratively complete on October 7, 2014 and is currently undergoing review by the MMD. The 2014 CHR Closeout Plan is attached in Appendix B.4 of this document and was submitted as Appendix A in the application to revise Cobre's mining permit.

1.6 History of the Continental Mine

The area referred to herein as the Continental Mine is reported to have produced commercial amounts of copper since 1858 (Hart, 1984) with approximately one million pounds of copper ore produced between 1858 and 1861 (Forrester, 1972). In addition to copper, iron ore has also been mined at the site. Iron ore production reached its peak (200,000 tons per year) between the years 1916 and 1931 (Forrester, 1972), when the mine was owned and operated by the Hanover Bessemer Iron and Copper Company, an eventual subsidiary of U.S. Smelting, Refining and Mining Company (USSR&M). The mine was subsequently operated by a series of lessees until additional copper mineralization was discovered around 1947. Following this discovery, copper ore was produced at the rate of 250 tons per day and processed at the USSR&M's Bullfrog Mill, located approximately six miles south of the present day Continental Mine.

The establishment of the Continental Mine has been dated to 1964, commencing with the construction of a production shaft and underground workings (Hart, 1984). The No. 1

flotation mill was completed in 1967 with a 4,000 ton-per-day capacity and was designated primarily to process underground ore. A second flotation mill (No. 2 Mill), with an 8,000 ton-per-day capacity, was completed in 1973 to process ore derived from the newly constructed Continental Pit. From 1974 to 1992, the mine was owned by a series of companies including U.V. Industries, Sharon Steel, and Bayard Mining Corporation. Cobre Mining Company acquired the property in the early 1990s and re-initiated mining operations. A subsidiary of Phelps Dodge Corporation acquired Cobre Mining Company in 1998 and active mining and milling of copper ore ceased in 1999. Following the 2007 merger of Phelps Dodge Corporation and Freeport-McMoRan Copper & Gold Inc., Cobre Mining Company was renamed as Freeport-McMoRan Cobre Mining Company.

The majority of the mine operations are located on patented mining claims and private lands; however, isolated parcels of BLM land lie within the mine permit area. A portion of the property immediately surrounding Cobre's holdings is public land managed by the BLM and U.S. Forest Service.

2.0 PERMIT AND DISCHARGE PLANS

Cobre holds several federal and state permits and authorizations as an existing mining operation. Table 1 lists Cobre's permits and Table 2 summarizes permitted facilities and identifies which permit each facility is listed in. The following sections briefly summarize each permit. Mining at Hanover Mountain is permitted under the facility name Hanover Mountain Mine. This document refers to the Hanover Mountain Mine as the Hanover Mountain Deposit.

2.1 Mining Act Permit

The MMD issued Permit GR002RE 01-1 to Cobre on March 4, 2005, which incorporates Cobre's April 2001 CCP (M3, 2001) and an earthworks cost estimate update (Telesto, 2005c). Permit GR002RE requires submittal of a revised CCP every five years after the initial submittal and submittals to correspond to the renewal of DP-1403. In recognition of the five-year term of discharge permits issued by NMED, Cobre's 2014 CCP Update

identifies and is based upon currently-planned changes in mining operations over the next five years. Permit GR002RE specifies the conditions required to mitigate and reclaim disturbed areas and establish a SSE, except for areas designated as Industrial PMLU or areas that have been granted a waiver.

2.2 Discharge Plans

DP-1403 was issued on December 10, 2004 and contains the closure conditions that address discharges of contaminants that may move into groundwater from Cobre's permitted facilities. The NMED has also issued two Operational Discharge Permits, DP-181 and DP-1056 (NMED, 2008). DP-181 was renewed on March 2, 2007 and covers existing facilities. DP-1056 was issued on September 19, 2008 and covers unconstructed facilities. Timely applications were submitted for the renewal of all three discharge plans at least 180 days prior to their respective due dates. The applications are currently under NMED review.

DP-181 and DP-1056 regulate discharges that may occur during mine operations from existing and proposed facilities, respectively. DP-1403 supplements DP-181 and DP-1056 and contains closure conditions for discharging facilities associated with the mine after closure. The DP-181 renewal application, submitted in 2011, proposed to restructure the existing discharge permits (DP-181 and DP-1056) to include 2014 mine plan permitted facilities in a single permit. The DP-1056 renewal application, submitted in 2013, included unconstructed permitted facilities, not planned in the 2014 mine expansion plan.

2.3 National Pollutant Discharge Elimination System Permit

Cobre maintains a Storm Water Pollution Prevention Plan (SWPPP) for the mine in accordance with the United States Environmental Protection Agency's National Pollutant Discharge Elimination System (NPDES) Multi-Sector General Permit (Table 1). The SWPPP details procedures and best management practices for managing stormwater discharge associated with industrial activities. The SWPPP is kept up to date and is available on site.

2.4 BLM Permitting

The Continental Mine includes several small pieces of land managed by the BLM and maintains a Mine Plan of Operations (Cobre, 2012) in accordance with BLM surface management regulation 43 CFR 3809. The Mine Plan of Operations Amendment No. 5 proposes to utilize approximately 36 additional acres of BLM land to resume operations at the Continental Mine. The Mine Plan of Operations was submitted in December 2012, and includes in part, a proposal by Cobre to utilize approximately eight acres of BLM land for the construction of the CHR. The CHR would be located to the east of the communities of Hanover and Fierro. The BLM is reviewing a draft Environmental Assessment for the Cobre MPO, Amendment No. 5.

2.5 Other Permits

Table 1 also lists other registrations and permits held by Cobre. Cobre and Chino constitute a single "source" under the federal Clean Air Act, as implemented by the State of New Mexico. Therefore, current and planned Cobre and Chino activities are unified in two types of air emissions permits to protect air quality: 1) Construction permit (typically known as New Source Review permit) and 2) a State Title V Operating permit.

The Continental Mine is in the process of preparing the necessary documentation to submit an application to the US Army Corps of Engineers for a nationwide permit relating to the construction of the CHR. Areas requiring a nationwide permit are associated with the CHR crossing Hanover Creek, a small drainage next to the Kearney Mine, and an existing road expansion in upper Grape Gulch.

3.0 FACILITIES AND CONDITIONS

The following sections describe the Continental Mine's existing facilities, planned facilities, past and current land uses, and environmental setting.

3.1 Description of Existing Mine Facilities

Figure 3 provides an overview of the facilities associated with the Continental Mine on an aerial base map. Figure 4 provides a similar overview of the Continental Mine area on a topographic base map and provides a location key for Figures 5 through 8. Figures 5 through 8 show existing topography, facilities, permit boundaries, and main mine components in more detail. The main mine components are described in the following Sections 3.1.1 through 3.1.11.

3.1.1 Main Tailings Impoundment

Construction of the Main Tailings Impoundment (MTI) began in 1967 and continued until production was temporarily halted in the spring of 1999. The impoundment currently covers approximately 142 acres including the Reclaim Pond, which covers an area of approximately 27 acres. The Reclaim Pond is located at the northern end of the impoundment and is separated from the main impoundment by a filter dike. Activities permitted under DP-181 allow the expansion of the MTI to the west and northwest to an area of approximately 269 acres, not to exceed 7,140 feet above mean sea level. The 2014 CCP Update assumes that the MTI will remain in its existing state, ready for future mine activity, through EOY 2019.

Tailings dam embankments run along the east and south sides of the impoundment for a distance of approximately 5,000 feet, with outslopes ranging from approximately 1.4:1 (horizontal: vertical) to approximately 2.5:1. The impoundment was built using upstream construction methods, with tailings spigotted upstream of raised berms composed of mine rock. Stability buttresses, which reinforce the tailings dam embankments, were constructed along portions of the east and south embankments in 2005 (URS, 2006), and is still stable (Golder, 2009a). The MTI is regulated by the OSE and meets or exceeds all of the regulatory criteria for structural stability.

The physical and chemical properties of tailings materials present in the MTI have been characterized and documented in multiple reports [(SMI, 1997), Daniel B. Stephens and

Associates, Inc.; (DBS&A, 1999a), (DBS&A, 1999b), (Geotrans, 2001), (Golder, 2004a), and (Golder, 2004b), (Telesto, 2005e), (Telesto, 2005f), (Golder, 2006), (Telesto, 2008a), (Telesto, 2009b)]. Tailings consist of finely ground material, generated in the milling of ore, composed of silicate material, with a considerable portion of carbonate bearing material with substantial neutralizing capacity (Telesto, 2008a). Tailings samples have been classified as Not Potentially-acid Generating (NPAG). GR002RE (Section 9.D.2.b) approves the upper foot of tailings material for use in a three-foot thick cover.

In 2007, a six-inch-thick rock cover was placed over approximately 90 percent of the impoundment surface, to alleviate wind-blown tailings. In accordance with DP-1403 (Condition 77), approximately 7.6 acres of reclamation test plots were constructed to evaluate cover performance, erosion rates, and vegetation success.

3.1.2 Magnetite Tailings Impoundment

The Magnetite Tailings Impoundment (MGTI) contains magnetite that was recovered from the milling process. The impoundment currently covers approximately 63 acres. The MGTI embankment was built using upstream construction methods that included tailings spigotted upstream of raised berms, which were composed of mine rock.

Production records indicate that approximately 2,881,000 tons of magnetite tailings were produced between 1969 and 1982. Current estimates of impounded tailings tonnage are based on a drilling and sampling program conducted in 2001 and records of ongoing sales. Ongoing sales of magnetite have removed approximately 598,000 tons of tailings through EOY 2013. The approximately 1,587,000 tons of magnetite remaining in the impoundment are considered marketable. The MGTI also includes approximately 172,000 tons of magnetite tailings mixed with rock/soil and approximately 379,000 tons of other non-magnetite solids (primarily embankment material). The MGTI is regulated by the Office of the State Engineer.

The physical and chemical properties of magnetite tailings materials have been characterized and documented in multiple reports [(SMI, 1999), (Telesto, 2005e), (Telesto,

2005f), (Telesto, 2008a), and (Telesto, 2009b)]. Magnetite tailings have been characterized as fine grained material with an iron oxide content ranging up to 70% by weight. The magnetite tailings are neither significantly acid generating nor strongly acid neutralizing.

Although sales of magnetite will continue, the area of disturbance and the defining features of the MGTI are not anticipated to substantially change by EOY 2019.

3.1.3 Continental Pit

Construction of the Continental Pit began in 1973 and was temporarily halted in the spring of 1999. The ore body was mined using a 20-foot high, multiple bench open-pit techniques and conventional drilling, blasting, excavating, and hauling methods to move ore and waste from the active mining area. Currently, the open pit comprises an area of approximately 143 acres and is 500 feet deep. After dewatering of the Continental Underground Mine ceased in August of 2000, the underground workings began to fill with groundwater. The water expressed itself in the bottom of the open pit in March 2012 and an open pit lake was visible by July 2012 and continues to expand. Predictions in Telesto 2008a and 2008e indicate that the open pit lake will be a hydrologic evaporative sink. Activities permitted under DP-181 allow expanding the Continental Pit to 262 acres. Per GR002RE, the Continental Pit has been granted a conditional waiver from achieving a SSE.

3.1.4 Waste Rock Facilities

The existing WRFs include five contiguous stockpiles permitted under DP-181: the East (82.2 acres), West (53.3 acres), Buckhorn (28.4 acres), and South and Union Hill (100 acres). Waste rock was last placed in 1999. Per DP-1403 (Condition 77), reclamation test plots were constructed on the East WRF (3.9 acre test plots) and the West WRF (8.5 acre test plots) to evaluate cover performance, erosion rates, and vegetation success. Activities permitted under DP-181 allow expanding the WRFs to approximately 400 acres.

The physical and chemical properties of waste rock present at Cobre's mines have been characterized and documented in multiple reports [(SMI, 1999), (DBS&A, 1999a),

(DBS&A, 1999b), (Geotrans, 2001), (Golder, 2004a), and (Golder, 2004b), (Telesto, 2005e), (Telesto, 2005f), (Golder, 2006), (Telesto, 2008a), (Telesto, 2009b)]. Approximately 400 samples were analyzed from 180 surface locations to characterize various waste rock types. Telesto (2008a) provides the most comprehensive summary of waste rock characteristics to date.

3.1.5 Other Stockpiles

Other stockpiles at the Continental Mine include: the Low Grade Waste Rock Facility (LG WRF), High-Grade Ore Stockpile, No. 3 Shaft Stockpile, overburden (OB) stockpiles 1 through 5, East OB stockpile, and a Topsoil Stockpile (Figure 3). The LG WRF consists of two adjacent stockpiles located along the eastern edge of the Continental Pit (Figure 3). The LG WRF was initially developed between 1967 and 1970, and has changed in configuration throughout time. The High-Grade Ore Stockpile is located northeast of the Continental Pit, north of the Poison Springs Drainage, and west of the No. 2 Mill. No. 3 Shaft Stockpile is located southeast of Mill Building #1, near the No. 3 Shaft. The No. 3 Shaft Stockpile is composed of non-ore material produced from the construction of the Continental No. 3 Shaft. The materials in the High-Grade Ore Stockpile will be sent to the Chino Mill and the No. 3 Shaft stockpile will be mined or incorporated into a haul road prior to EOY 2019.

OB Stockpiles 1, 2, 3, and 5 are composed largely of Colorado Formation leach cap from Hermosa Mountain that has been stockpiled for use as cover material. The origin of the materials in the Topsoil Stockpile and OB Stockpile 4 is from stripping operations at the start of the Continental Pit. The East OB Stockpile is located on top of the East WRF and is composed of carbonate material from the Continental Pit.

As part of the 1999 CCP studies, DBS&A (1999b) conducted a borrow materials investigation, which has been since supplemented by Golder (2006). The principal finding of this study was that traditional topsoil resources were limited in the vicinity of the Continental Mine. Area soils found were considered marginally suitable, mainly because they are shallow and/or occur on steep slopes. Salvaging and stockpiling identified the

limited topsoil resources within the footprints of planned facility expansions is included in the plan, where practicable. There are adequate volumes of reclamation cover material at the Continental Mine for all existing and planned operations. Borrow materials are further described in Section 5.2.

3.1.6 Haul and Exploration Roads

Approximately five miles of haul road have been constructed between the Continental Pit, WRFs and the mill facilities. These roads vary from 80 to 120 feet wide.

Previous exploration projects have occurred in areas at the Continental Mine including: Hanover Mountain, the area to the west of the MTI, and areas on Hermosa Mountain west of the Continental Pit. The exploration drilling program included approximately 20 miles of 12-foot wide exploration roads and drill pads. The exploration roads associated with Hanover Mountain are anticipated to be mined out by EOY 2019, leaving approximately 15 miles of exploration roads near the MTI and Hermosa Mountain.

3.1.7 Surface Impoundments

The Continental Mine water management system utilizes surface water impoundments to control stormwater and collect seepage (Figure 5 through Figure 8). Collected stormwater and seepage are sent through the Bullfrog Pipeline to Chino for inclusion in the Chino water management system. A list of surface impoundments with their type and status at EOY 2019 can be found in Table 3.

3.1.8 Mine Shafts and Underground Workings

Historical underground workings adjacent to the Continental Pit include the Continental Underground Mine, Pearson-Barnes Mine, and Union Hill Mine located to the north, southwest, and east of the Continental Pit. The Continental Underground Mine was mined until 1998 and was dewatered until August of 2000. Prior to 1964, historical dewatering occurred in several shafts. During 1964, the No. 3 Shaft was created and became the main dewatering shaft (SMI, 1997). The No. 2 Shaft was mined out as the Continental Pit

expanded and became the No. 2 Portal (north side of the Continental Pit). During operations, ore was removed from the underground workings through the No. 2 Portal and the No. 3 Shaft. The No. 2 Portal was also used for ventilation for the underground workings. The No. 3 Shaft, which is located near the mine office, was used for ventilation and served as the principal service and production hoisting shaft. The No. 4 Shaft, located east of the No. 3 Shaft, was sunk as an emergency escape and ventilation shaft. Later in mine life, the 11-T-2 Borehole Shaft (located southwest of the No. 3 Shaft) was installed to enhance ventilation. Dewatering activities were suspended in August 2000.

3.1.9 Hanover-Empire Zinc Mine Area

Hanover-Empire Zinc (Figure 2) is a historical mine area located southwest of the Continental Pit. A reclamation plan for the area was implemented and completed in 2007, with additional constructed channel work completed in 2008. Cobre received Financial Assurance release for the Hanover-Empire Zinc Mine Area in January 2010 (NMED, 2010).

3.1.10 Pearson-Barnes Mine Area

The Pearson-Barnes Mine Area (Figure 3) is a historical mine area located southwest of the Continental Pit. Initial reclamation of the Pearson-Barnes Mine Area was completed in 2005 and additional reclamation efforts were necessary to address diversion channel issues soon after (Telesto, 2008b). Subsequent to the channel repairs, the Pearson-Barnes reclamation site underwent subsidence in the fills placed as part of reclamation. As a result, Cobre replaced the damaged channels, addressed the cover erosion, and is utilizing ongoing monitoring and yearly maintenance to ensure the cover and channels stay intact. In the 2014 mine expansion plan the Pearson-Barnes Mine Area will be included in the SWRDF. However, by EOY 2019 the Pearson-Barnes Mine area will likely still be in its existing configuration and would require additional reclamation efforts in accordance with established closure agreements (MMD, 2011).

3.1.11 Other Ancillary Facilities, Buildings and Systems

Other smaller ancillary facilities requiring consideration at closure include pipelines; electrical distribution systems, buildings, and wells. Buildings as well as their existing and EOY 2019 PMLU are shown in Figure 9 and Table 4.

3.2 Description of Planned Mine Facilities

Planned activities include:

- Mining at the Hanover Mountain Deposit
- Expanding the existing WRFs into the expanded SWRDF
- Creation of the NOBS
- Management of overburden material for stockpile salvage (e.g., South OB Stockpile)
- Development of new internal haul roads and the CHR (Drawing Sheet 2)

The Hanover Mountain Deposit is planned to be mined from 2016 through 2020. At the planned extent, the mine will encompass an area of approximately 156 acres. At the end of mining, the area will be reclaimed and stormwater will drain to the south. However, by EOY 2019 that final excavation will not have occurred and stormwater would be contained within the Hanover Mountain excavation area.

Waste rock mined from Hanover Mountain and the Continental Pit will be added to the five existing WRFs to form the expanded SWRDF (approximately 340 acres at full capacity). It is anticipated that by EOY 2019 approximately half of the proposed SWRDF material will be placed. Where practicable, non-acid generating Hanover Mountain material and any topsoil scavenged from with WRF expansion deemed suitable for cover will be hauled to the proposed NOBS and South OB Stockpile. These stockpiles are anticipated to be in place by EOY 2019. At closure the stockpiles will be used as a source of cover material.

By EOY 2019, expanded haul roads located between facility footprints will total approximately 3 miles in length with an approximately 120 foot wide driving surface. A

proposed haul road (CHR) will be used by haul trucks to transport ore from the Continental Mine to Chino and will be in place by EOY 2019. The CHR includes disturbances that will cover approximately 105 acres, including approximately 91 acres of land controlled by Cobre, 8.7 acres of BLM administered land, and 5 acres of land controlled by Chino.

3.3 Past and Current Land Uses

As shown in Figure 11, several historical mines surround the Continental Mine. Mining has been the primary land use and economic support for the area. Surrounding lands have a variety of uses including residential, grazing, timber, aggregate mining, and recreation.

3.4 Environmental Setting

The description of environmental setting includes topography, geology, climate hydrology, soils, vegetation, and wildlife.

3.4.1 Topography

The Continental Mine is bounded by the Piños Altos mountain range to the north and by Hermosa and Humbolt Mountains to the west. The undulating topography of the Santa Rita Hills forms the eastern boundary. These highlands delineate a watershed drained by Hanover Creek. South of the Continental Mine, this drainage network forms a relatively low-lying, north-south trending valley (Figure 11).

The mountainous areas to the north and west rise to an elevation of approximately 8,000 feet above mean sea level (AMSL). The elevation steadily decreases to the south, following the gradient of Hanover Creek, to an elevation of 6,200 feet AMSL downgradient of the crossing at Highway 152.

3.4.2 Regional Geology

The Continental Mine is located within the Santa Rita Quadrangle, which lies in a broad transitional zone between the Colorado Plateau and the Basin and Range Province (Jones, et al., 1967). To the south and southwest of the quadrangle, Paleozoic to Mesozoic

sedimentary rocks and younger volcanic rocks are exposed in northwest-trending ranges. To the north, sedimentary formations thicken and form the broad highlands of the Colorado Plateau (Figure 12A–12C).

Within the Santa Rita Quadrangle, northwest-trending faults (the Mimbres and Silver City Faults) and northeast-trending faults (the Barringer, Nancy, and Groundhog Faults) define a broad area of uplift in the region called the Santa Rita Horst. The Santa Rita Horst has a surface area of approximately 40 square miles (Hillesland, et al., 1995).

3.4.3 Local Geology

Jones et al. (1967) provides a comprehensive chronology of structural and igneous events of the district. Locally, the features most relevant to the ore at the Continental Mine are the Barringer Fault and the Hanover-Fierro Stock.

Sedimentary Rocks

The stratigraphic section in the Continental Mine area includes approximately 2,400 feet of Paleozoic sedimentary rocks and 1,200 feet of Mesozoic sedimentary rocks located above Precambrian gneiss and schist. Lower Paleozoic formations are dominated by limestone and dolomite and include the Bliss Formation, the El Paso Limestone, and the Montoya and Fusselman Dolomites. The Montoya and Fusselman Dolomites are indistinguishable in the Continental Mine area (Jones, et al., 1967). Upper Paleozoic units contain mostly limestone and include the Percha Shale, the Lake Valley Limestone, and the Oswaldo, Syrena, and Abo Formations. The Syrena and Abo Formations are often indistinguishable in the area. Mesozoic formations, including the Beartooth Quartzite and the Colorado Formation, consist largely of fine- to medium-grained clastic units and are overlain by up to a few hundred feet of andesitic breccia and tuff (Hillesland, et al., 1995). The Continental Pit exposes mainly Paleozoic rocks, while Hanover Mountain contains mainly Mesozoic rocks (Cobre, 1997).

Igneous Rocks

More than 30 distinct varieties of intrusive rocks are found within the Santa Rita Quadrangle, with ages between the Late Cretaceous period and the Miocene epoch. Intrusive rocks found in the area include the Hanover-Fierro Stock (granodiorite), mafic stock, and mafic dikes, syenodiorite, and quartz diorite porphyries. Volcanic rocks include andesite breccia, among other tertiary units (Hillesland, et al., 1995).

Structure

The Barringer Fault, and associated extension fractures and conjugate shears, are the most important structural features at the Continental Mine as they contain economic mineralization and the faults act as barriers to groundwater flow. The Barringer Fault trends approximately N40°E across the entire Continental Mine site. Dips range from 55 to 75 degrees to the northwest. Vertical displacement along the Barringer Fault ranges from 1,200 to 1,600 feet (Jones, et al., 1967). In the Continental Pit, the fault zone is up to 200 feet wide and is associated with strong iron-oxide staining (Hillesland, et al., 1995). The Barringer Fault is stopped by northeast-trending lobes of the Hanover-Fierro Stock. The Barringer Fault does not offset the northwest contact of the Hanover-Fierro Stock, indicating that the Stock postdates most movement of the fault (Jones, et al., 1967).

3.4.4 Climate

The Continental Mine is located in a semi-arid region of New Mexico. Meteorological data are collected at the Fort Bayard, New Mexico, National Weather Service Station. This station is located approximately five miles southwest of the Continental Mine and is considered to be representative of the area, including:

- Mean annual precipitation of 15.7 inches per year (Fort Bayard; 1897–1993)
- Mean annual temperature of 54.9 degrees F (Fort Bayard)
- Mean minimum temperature of 25 degrees F during the month of January and mean maximum temperature of 86.7 degrees F during the months of June and July (Fort Bayard)
- Mean annual pan evaporation rate of 79.7 inches per year (Chino)

Precipitation measurements from the Fort Bayard National Weather Service Station show a distinct wet season during the months of July through September. Pan evaporation is greater than precipitation throughout the year, even during the cooler winter months.

Two weather stations are located at the Continental Mine. One is located at the Surge Tank, and second on the East WRF. These weather stations monitor average hourly wind speed, wind direction, temperature, relative humidity, solar radiation, and rainfall. Approximately 15 years of data is available from the Continental Mine weather stations. The mean annual precipitation at the Continental Mine is approximately 18.3 inches per year, estimated to range from 14 inches per year at lower elevations to 24 inches per year at higher elevations.

3.4.5 Surface Water Hydrology

The Continental Mine is located within the Hanover Creek drainage area. The elevation of the drainage area ranges from approximately 6,000 feet where Hanover Creek enters Whitewater Creek, to 7,820 feet north of Hanover Mountain in the Piños Altos Range. Hanover Creek flows only in response to substantial precipitation events.

The total drainage area of Hanover Creek is 10.9 square miles, of which approximately 70 percent is located downstream of mining activities (Telesto, 2008c). Figure 3 shows the main ephemeral tributaries within or adjacent to the mine including: Grape Gulch, Poison Spring Drainage, and Buckhorn Gulch.

3.4.6 Groundwater Hydrology

Local groundwater flow is controlled by the geology in the area of the Continental Mine. Perched groundwater exists ephemerally along upper Buckhorn Gulch, lower Poison Spring Drainage, lower Grape Gulch, and along Hanover Creek where alluvium or highly weathered bedrock (granodiorite) is present [(SMI, 1997), (Telesto, 2008c) and (Telesto, 2011)]. Deeper groundwater exists in three flow systems:

1. North Paleozoic Aquifer
2. South Paleozoic Aquifer
3. Cretaceous Aquifer

Figure 13 through Figure 15 provide groundwater elevations projected in the first quarter of 2014 for each of the aquifers.

The Cretaceous Aquifer (shallow) and North Paleozoic Aquifer (deep) both exist north of the Barringer Fault. These aquifers are separated by low-permeability units of the Colorado, Beartooth and Abo formations. (Telesto, 2008c). Groundwater in these systems is sourced through meteoric water recharge and either discharged through evaporation or captured by the hydrologic evaporative sink associated with the Continental Mine Underground Workings and Continental Pit (Telesto, 2011). Water in the South Paleozoic Aquifer is sourced from meteoric recharge south of the Barringer Fault. A groundwater divide exists in the South Paleozoic Aquifer (Figure 14). Groundwater in the northern South Paleozoic Aquifer discharges to the Continental Mine underground workings and groundwater in the southern South Paleozoic Aquifer likely discharges to the Santa Rita Open Pit (Chino).

3.4.7 Vegetation

The distribution of vegetation is locally complex and reflects the combined influences of variations in soils and climate, disturbance histories (drought, floods, fire, and wildlife), and management practices. Five vegetation cover types have been identified within the areas of disturbance for activities in the 2014 mine expansion plan. These vegetation cover types include: Madrean Plateau Piñon Juniper Woodland, Rocky Mountain Ponderosa Pine Woodland, Madrean Juniper Savannah, Inter Mountain Basins Semi Desert Grassland, and Riparian. Detailed descriptions of these areas are available in the Administrative Draft Cobre EA (BLM, 2014). Special status plant surveys were conducted; however, no sensitive plant species was observed [(ENSR, 1995), (ENSR, 1996), and (Metric Corporation, 1997)].

3.4.8 Wildlife

Diverse habitats are found in the valley systems, mountain slopes, and drainages surrounding the mine area and these areas support a variety of wildlife species. Mule deer are the principal big game species in the area, with limited populations known to occur in

the immediate mine vicinity (Hayes, 1995). No designated seasonal ranges or important migration corridors are present in the vicinity of the mine (BLM, 1993). Other mammals potentially occurring in the project area include: elk, white-tailed deer, black bear, coyote, bobcat, javelina, badger, raccoon, porcupine, and black-tailed jackrabbit [(CDM, 1994), and (ENSR, 1995)]. Mountain lion are prevalent in the area and have been reported in the town of Fierro during periods of drought (Hayes, 1995). Resident bats comprise a component of the small-mammal community in the vicinity of the mine (ENSR, 1996).

Resident and migratory birds are also found in the area including the red-tailed hawk, Cooper's hawk, great horned owl, long-eared owl, wild turkey, Montezuma quail, Western kingbird, Cassin's kingbird, band-tailed pigeon, plain titmouse, and chipping sparrow. No active raptor nests have been documented in the mine area or surrounding vicinity (CDM, 1994). Other bird species observed during a reconnaissance of the mine area on April 27, 1994, included the American robin, dark-eyed junco, mourning dove, scrub jay, turkey vulture, western bluebird, and white-throated swift (CDM, 1994).

No water bodies exist that can support fisheries mainly due to the lack of perennial waters, limited flows in small stretches that are perennial, and lack of connectivity with other perennial waters. Aquatic species observed near the mine include caddis fly larvae, mayfly larvae, damselfly and dragonfly adults and larvae, water striders, diving beetles, water boatmen, and canyon tree frogs.

4.0 DESCRIPTION OF COMPLETED RECLAMATION PROJECTS

Ongoing and completed reclamation projects since 2001 include the Hanover-Empire Zinc Mine Area, Pearson-Barnes Mine Area (Section 3.1.10), and numerous historical mine shafts and related structures. Areas where reclamation has been completed are assumed to require no additional capital expenditures, but include operations and maintenance costs.

Reclamation of the Hanover-Empire Zinc Mine Area was completed in 2007, with channel maintenance work completed in 2008. The site included over 55 historical mine shafts and

related structures, seven open pits, and numerous waste stockpiles. Approximately 3,000 feet of stream bank and bottom was reconstructed to handle the peak flow induced by a 100-year, 24-hour storm (Telesto, 2007).

Reclamation has also been completed for other numerous historical mine shafts and related structures (DP-1403, Condition 63c). In a letter to Mr. Lawrence Shore and Mr. James Hollen, dated March 13, 2009, (Cobre, 2009), Cobre notified NMED of the closure of approximately 83 historical mine shafts and related structures, and that Cobre considered the closure work to be complete. To date, Cobre has closed over 250 historical features.

5.0 RECLAMATION DESIGN CRITERIA

This section summarizes the reclamation design criteria for the 2014 CCP Update at the Continental Mine. The reclamation plan was developed in consideration of the site-specific conditions that exist at the Continental Mine, including materials, geologic, hydrologic, ecological, operational, and economic constraints.

The key design criteria are described in Table 5 and Appendix B, and include outslope designs and gradients, channels, downdrains, and conveyance channels for each facility. Reclaimed areas will be revegetated in accordance with the standards presented in Permit GR002RE 01-1, Appendix C.

The planned configuration of the Continental Mine at EOY 2019 is depicted in Drawing Sheet 1. Drawing Sheet 3 shows the EOY 2019 reclaimed configuration. Design details of slopes and channel cross-sections can be found on Drawing Sheet 4. Sheet 5 illustrates conceptual cover haul routes. Reclamation designs for the MTI, MGTI, SWRDF, and Hanover Mountain Deposit are provided on Drawing Sheets 6 through 10. Further, detailed information can be found in Appendix B and C. The following sections describe the PMLU, reclamation performance objectives, cover design and materials, and water management and water quality monitoring.

5.1 Reclamation Performance Objectives

Performance objectives were developed with the intent of meeting criteria and conditions associated with the WQA, WQCC Regulations, NMMA, and Copper Rules. The following sections describe the performance objectives for the major facilities at the Continental Mine.

5.1.1 Tailings Impoundments

The performance objectives for the top surfaces and outslopes of the tailings impoundments are:

1. Establishment of a SSE
2. Control of fugitive dust
3. Control of runoff and erosion
4. Prevention of overtopping
5. Reduction of ponding and infiltration

Deposition of tailings to the MTI ceased in 1999, and Cobre does not have plans to resume deposition during the period covered by this plan. Although there is the ongoing sale and shipping of magnetite material, the previous MGTI reclamation plan, based on 2004 topography, is still valid. Therefore, the updated MGTI reclamation cost used here is based on 2004 topography.

Grading Plan and Stability

The MTI is a jurisdictional dam registered with the OSE and meets or exceeds all applicable regulatory stability criteria [(URS, 2005) and (URS, 2006)]. The MTI dam embankments that run along the east and south sides of the impoundment are composed of large rocks with naturally occurring vegetation in areas of finer grained soils. The MTI buttresses and embankments are stable [(URS, 2005), (URS, 2006) and (Golder, 2009a)] in their current configurations. The buttresses are consistent with a wildlife habitat PMLU (see Sections 6.1 and 6.5), and thus, will be left in their existing stable configuration (see Table 5 for reclamation slope angles) at closure/ post closure. Rock embankments around

the southeast side of the MTI will be graded to reclamation slopes as shown in Table 5. The southwest corner of the MTI will be left in its current configuration to:

- Preserve the exiting habitat associated with the Weber Pond area (Figure 6)
- Maintain stability associated with the rock face dam embankment
- Not encroach on the Continental Pit high wall

Due to its proximity with the Continental Pit, leaving the southwest corner of the MTI in its current configuration is consistent with the Continental Pit waiver. The MTI top surface, Reclaim Pond, and MGTI top and outslopes will be regraded according to the criteria in Table 5.

Tailings Impoundment Erosion and Drainage Control

Drainage and erosion control for both tailings impoundments will be achieved by providing stormwater conveyance mechanisms (i.e., sheet drainage and/or directed flow in appropriately armored channels), stable-slope configurations, and revegetation. The Reclaim Pond will be reclaimed along with the MTI (Drawing Sheet 6) and stormwater from the reclaimed surface of the MTI will be routed through channels and appropriate erosion controls. Channels will be added to the existing buttresses to control drainage and erosion. Surface Impoundments are discussed in more detail in Section 3.1.7. Water management for the MTI is described in Section 5.3.

Tailings Impoundment Cover and Revegetation

Cover material for the tailings impoundments will come from an overburden stockpile, nearby native soils or directly hauled from Hanover Mountain. As described in Permit GR002RE, Cobre will construct a cover for the tailings impoundment surface composed of both cover material and tailings (Table 5).

Regrading of tailings impoundment surfaces is required prior to cover placement. Specific grading criteria are provided in Table 5. Earth-moving equipment will be used to smooth the surfaces and facilitate access for supplemental cover placement, seeding, and drainage/stormwater management.

5.1.2 Stockpiles

The performance objectives for reclamation of the stockpiles are to establish a SSE; reduce infiltration; contain seeps and minimize sediment loading; maintain mass stability; and control runon, runoff, and discharge. The stockpile facilities at the Continental Mine include the WRFs combined into the expanded SWRDF by EOY 2019 and the LG WRF. GR002RE and DP-1403 provide conditions for reclamation of the stockpiles.

Grading Plan and Stability

Stability analyses of the existing stockpiles indicate that the waste rock piles will be stable in regraded configurations (Golder, 2009a). Similarly, the SWRDF material will be placed at the same slopes required for reclamation, the same slopes evaluated in the stability study, and will likewise remain stable under post-closure conditions.

Stockpile material will be composed of blasted rock placed on 40- to-50-foot high lifts through end-dumping at angle of repose, which results in benches at the required overall reclamation slopes with catch benches on each lift. Therefore, SWRDF material will be placed at the reclamation slopes during mining and will require minimal regrading to achieve proper drainage. The top surface will require grading at closure. Outslopes will require minor regrading for benches to facilitate cover placement and/or stormwater removal. Specific grading criteria are provided in Table 5.

Stockpile Erosion and Drainage Control

Erosion control for the stockpiles will be achieved by designing and placing outslopes at appropriate slope angles and slope lengths. Outslopes will be graded to be compatible with the cover material being utilized for each stockpile. The slope angles and slope lengths proposed for the SWRDF are outlined in Table 5. Appropriately armored channels will be used as necessary to convey stormwater off the stockpiles. Stockpile water management is described in Section 5.3.

Stockpile Cover and Revegetation

Cover material for the SWRDF is located in OB Stockpiles 1, 2, 3, and 4; Topsoil Stockpiles; the proposed South OB Stockpile, and the NOBS. Cover material for the LG WRF is located in an OB stockpile.

5.1.3 Continental Pit

The performance objectives for the open pit facility are safety, operational access, and groundwater control. Cobre will place a combination of chain link fences and berms around the circumference of the Continental Pit. Signs will be posted on the fencing at 500 foot intervals and at all access points, and will warn of potential hazards present (MMD, 2005). Berms will also be placed to prevent stormwater runon into the open pit. The proposed berm will be 5 feet high, with 2:1 sideslopes, and a 10-foot top width.

As described in Section 3.1.3, the Continental Pit has in the past and will in the future fill with water after pumping ceases and dewatering operations are halted. The open pit will be a hydrologic evaporative sink with respect to groundwater. Predictions in SMI 1999 were updated in 2008 (Telesto, 2008a) with additional information to enhance the prediction and make it more reliable. Consequently, the ground water quality standards of 20.6.2.3103 NMAC will not apply to water within the "area of open pit hydrologic containment." 20.6.7.33.D NMAC. Consequently, Cobre does not plan to pump water from the Continental Pit in the 2014 CCP Update.

5.1.4 Hanover Mountain Deposit

The performance objectives for closure are runon control, safety, operational access, and surface water and groundwater control. The topography will consist of 50-foot high benches that will be wide and relatively flat (Drawing Sheet 10). A combination of berms and fences will be placed along the perimeter of the area at closure.

Hanover Mountain Deposit Erosion and Drainage Control

Highwalls will be sufficiently stable due to the absence of fractures and faults. If materials are eroded from the highwalls, it will be deposited at the toe of the highwall and contained on the benches due to the shallow slope of the benches.

Hanover Mountain Deposit Cover and Revegetation

Accessible bench surfaces will be reclaimed. Accessible bench surfaces are defined as areas that can be accessed safely. This includes haul road driving surfaces and flat areas 50 feet or greater from a highwall for the purposes of the 2014 CCP Update. Accessible bench surfaces that are acid generating and safely accessible will be covered, ripped, and seeded. Other accessible bench surfaces will be ripped, and seeded. Where the benched surface is compacted, it will be ripped prior to cover placement to provide a roughened surface that will enhance seeding operations. Cover material for the accessible areas of the remaining benches will come from an OB stockpile.

5.1.5 Roads

Haul and exploration roads outside of PMLU area not needed for post closure access will be reclaimed. Performance objectives include creation of a SSE and erosion control. Performance objectives and reclamation criteria for the CHR are described in the 2014 Cobre Haul Road Closeout Plan, attached in Appendix B.4, which was submitted as Appendix A in the Revision to Mining Permit GR002RE Application (Cobre, 2014).

5.1.6 Borrow Areas

Performance objectives for any other disturbed area include creation of a SSE and erosion control. The topsoil stockpile, five OB stockpiles, NOBS, and South OB Stockpile are borrow areas and will likely be completely used for cover material. The footprints of the stockpiles will be left in a condition with stable slopes. Disturbed borrow areas will be ripped and seeded per Table 5 after facility reclamation is complete.

5.2 Cover Design and Materials

A cover placement plan is provided in Permit GR002RE 01-1, Section 9, and DP-1403. Cover conditions include a minimum cover thickness of 36 inches for stockpiles and tailings impoundments, and provide for inclusion of in-place material as part of the 36-inch thickness. Cover material will consist of non-acid generating material, capable of supporting plant growth and have erosion resistant characteristics. The cover will comply with Copper Rules (20.6.7.33.F NMAC) and shall be a store and release cover system with a thickness of 36 inches, capable of sustaining plant growth without continuous augmentation, and have erosion resistant characteristics and will limit net percolation.

DP-1403, Condition 76, requires Cobre to perform a comprehensive cover performance evaluation; and Condition 77 requires a cover, erosion, and revegetation test plot study. Studies are ongoing to evaluate the cover potential of the carbonate and leach cap materials from various locations at the mine. To date, these studies have shown a propensity of carbonate materials to be an effective material for vegetation establishment, as demonstrated from East Stockpile test plots, which use carbonate material mined from the Continental Pit.

Other potential cover materials identified at the Continental Mine include native soils and leach cap material from Hanover Mountain, Hermosa Mountain, the Continental Pit, and the tailings in the MTI. The characteristics and suitability of these cover materials have previously been evaluated [(DBS&A, 1999b), (Golder, 2004a), (Golder, 2004b), and (Golder, 2006)]. Additionally, a compositional model of various waste rock stockpiles was developed by (DBS&A, 1999a), and the lithology of several WRFs was evaluated by (Geotrans, 2001).

The results of the borrow materials investigation and a subsequent assessment [(Golder, 2004a), (Golder, 2004b), and (Golder, 2006)] indicate that soils, non-acid generating OB, carbonate rock, tailings, and leach cap materials are adequate sources of cover for areas disturbed by mining activities. Where practicable, pre-stripping of native soils and regolith

prior to the construction at the SWRDF and Hanover Mountain Deposit will also enhance cover material availability.

The major facilities that require cover material at EOY 2019 are the MTI, MGTI, SWRDF, benches in the Hanover Mountain Deposit, Pearson-Barnes Mine Area, and the LG WRF. Currently there is approximately 2 million cubic yards of material available in the five OB Stockpiles, the East OB Stockpile, and Topsoil Stockpiles that are suitable as a cover material (Golder, 2006).

Additionally, the East WRF covers an area of approximately 62 acres and averages approximately 100 feet thick. Therefore, it is estimated to contain almost 10 million cubic yards of suitable material. Assuming that 75 percent of the material is associated with the carbonate rocks, the East WRF represents a potential cover source of approximately 7.5 million cubic yards (Golder, 2006). The East WRF will ultimately be incorporated into the SWRDF. Cover materials in the East OB Stockpile are still accessible by EOY 2019.

At EOY 2019, an additional 3.5 million cubic yards will be available in the NOBS and South OB Stockpile. Cobre has sufficient volume of cover to close existing facilities in the short term and will have adequate amounts of borrow once mining resumes and new facilities are constructed.

5.3 Water Management and Water Quality Monitoring

Reclamation plans are intended to meet applicable WQCC standards for groundwater and surface water at post-closure. The reclamation plan will meet the performance objectives by minimizing runon and by managing waters collected within the disturbed area that do not meet applicable standards for discharge as required by DP-1403 and the GWA process. Waters that meet applicable standards for discharge will be released to the watershed.

Tanks, small dams, and surface impoundments are described in Table 3 including their status at EOY 2019, and are shown in Figures 5 through 8. Surface Impoundment maintenance is included in Appendix C and surface impoundment reclamation in Appendix

B. A table including post reclamation use and closure schedule is included in Appendix C, Table C.1.

Water management includes the following:

- Hanover Mountain Deposit
  - Diversion of runon where feasible
  - Capture of runoff
- MTI and Reclaim Pond
  - Diversion of runon from the Upper Poison Spring Drainage into Grape Gulch
  - Conveyance of runoff from the reclaimed surface
  - Capture and conveyance of seepage from the south and east and drainage from the decant line is sent to Chino through the Bullfrog Pipeline (anticipated to cease flowing after reclamation; details located in Appendix C)
- Magnetite Tailings Impoundment
  - Conveyance of runoff from the reclaimed surface
  - Capture and conveyance of seepage to Chino through the Bullfrog Pipeline (anticipated to cease flowing after reclamation; details located in Appendix C)
- Waste Rock Facilities
  - Diversion of runon from upgradient drainages
  - Conveyance of runoff from the reclaimed surface
  - Capture and conveyance of seepage to Chino through the Bullfrog Pipeline (anticipated to cease flowing after reclamation; details located in Appendix C)
- Pearson-Barnes Mine Area and LG WRF
  - Diversion of runon from upgradient drainages
  - Maintain existing channels
- Continental Pit
  - Diversion of runon away from the open pit around the perimeter where feasible

Figure 10 portrays the relationships between components of the water management system. The water management collection systems and sediment controls built during mine operation will continue to be used for water management after closure and any additional required systems will be constructed during the reclamation period. The collection systems will remain in place as long as required to collect and contain water that does not meet applicable standards for discharge from disturbed areas as provided by DP-1403. Once

water meets applicable standards for discharge from disturbed areas, the associated collection systems will be removed and areas reclaimed.

The MTI seeps are expected to cease flowing after reclamation at approximately reclamation year 9. Seeps associated with waste rock facilities are currently sent to Chino through the Bullfrog Pipeline. Waste rock facility seeps are expected to decrease quickly and cease flowing after facility reclamation as predicted in Condition 83 (Golder, 2009b). Seep collection systems locations are shown in Figure 5 through Figure 8.

Stormwater runoff will be sent to detention basins for sediment control and then released. The anticipated flow rates for pre-reclamation are provided in Appendix C, Table C.2. Seepage is expected to cease flowing in reclamation year 5 for a most of the site and approximately in reclamation year 9 for the MTI (See Appendix C).

6.0 POST-MINING LAND USE DESIGNATION

The approved PMLUs for the permit area are wildlife habitat and industrial use. The Continental Pit was granted a conditional waiver from achieving a SSE. The following sections describe the PMLU for the Continental Mine.

6.1 Wildlife Habitat PMLU

Cobre proposed the wildlife PMLU as a practical target use for the reclaimed lands at the site, and the MMD has approved this PMLU for the reclaimed lands. Certain shop and processing structures, not designated for industrial PMLU, will be demolished and/or removed. Footings, slabs, walls, pavement, manholes, vaults, stormwater controls, and other foundations will be covered with a minimum of 36-inches of cover material, graded for stormwater control, and revegetated.

Achieving a wildlife PMLU involves the establishment of SSEs (e.g., native vegetation and habitat types compatible with the surrounding life zone and geo-hydrologic structure). The reclamation seed mixes from Permit GR002RE and proposed plant diversity standards are provided in Tables 6 and 7. The seed mix was selected to initiate achievement of plant

density and provide diversity, and includes cool and warm season grasses, perennial shrubs, and forbs. Additionally the seed mix includes a number of valuable, nutritious forage and browse species. Seed mix and rates are subject to change based on future investigations and availability. Alternate or substitute species lists are available in Permit GR002RE.

6.2 Industrial PMLU

The EYO 2019 buildings and their PMLU are listed in Table 4 and the MMD conditions for Industrial PMLU can be found in Permit GR002RE 01-1 J.1. Structures listed in Permit GR002RE 01-1, Appendix D, which have since been removed, are not included in Table 4. Several buildings located within planned haul road footprints or within the vicinity of the Hanover Mountain Deposit, are expected to be removed and some replaced by EOY 2019. Industrial PMLU areas have the infrastructure necessary to support a variety of future industrial uses. The buildings are currently being used, and are well maintained and have electrical power. Many buildings also have shop and warehouse storage capacity with highway and railroad access.

6.3 Continental Pit Waiver

In a letter from MMD dated February 23, 2005, the Continental Pit was granted a conditional waiver from achieving a SSE, subject to Permit GR002RE 01-1 (Section G). Studies and information collected since the conditional waiver was issued in 2005 support the assumptions and circumstances upon which the condition waiver approval was granted. As described in this CCP, Cobre has included the closeout measures required by conditions of the Conditional Waiver Approval.

6.4 Other Ancillary Facilities, Structures, and Systems

Pipelines, electrical distribution systems, wells, exploration holes, and underground mine access points exist at the Continental Mine. A majority of the water management pipelines will be removed at closure. The tailing pipelines will be flushed and buried. The approximately 40,000-foot long Bullfrog Pipeline, which is currently used to transfer water from the Continental Mine to Chino, will be used for Industrial PMLU. Electrical

distribution systems providing power to the Industrial PMLU area will be left in place. Electrical distribution systems providing power to pumps that are part of the water management system will be closed along with the pumps once they are no longer needed for water management. Water management is discussed in Section 5.3. Cobre currently maintains and monitors several monitoring wells, seven of which will be used for post-closure monitoring. All exploration holes have been closed in accordance with the OSE conditions with the exception of some located on Hanover Mountain, which will be mined out by EOY 2019.

The Continental Mine has several underground mine access points including the No. 2 Portal, the No. 3 Shaft, the No. 4 Shaft, and ventilation shafts. Entrances to the underground workings, including the No. 2 Portal, and ventilation shafts will be closed at the termination of mining activities. The No. 4 Shaft will be mined out during the mining of the Hanover Mountain Deposit. The No. 2 Portal and several ventilation shafts will be reclaimed in conjunction with building demolition using appropriate closure methods. The No. 3 Shaft will remain accessible for water supply use. All infrastructure not used will be removed and disposed of in an approved manner or stabilized prior to closing the access points. Cobre will safeguard all shafts, adits, and other underground mine openings within the Permit area as appropriate according to GR002RE 01-1 J.7 and previously established practices (Cobre, 2009).

6.5 Revegetation Success Guidelines

Areas designated as wildlife habitat PMLU (with exceptions noted below), will be revegetated in accordance with the revegetation standards presented in Permit GR002RE 01-1, Appendix C. Table 6 and Table 7 provide proposed seed mixes and plant diversity guidelines (respectively) as outlined in Permit GR002RE 01-1, Appendix C.

There are two primary areas approved as wildlife habitat PMLU that cannot be revegetated as described previously; however, these areas provide a valuable component in the wildlife habitat landscape. Highwalls of the Hanover Mountain deposit and areas near highwalls where safe access is not possible, as well as the minor portion of rocky MTI embankment

(to be left in its current configuration), provide valuable wildlife habitat. The highwalls, rocky areas adjacent to highwalls, and the unmodified portion of the MTI embankments mimic natural talus slopes and bluffed terrain common to the surrounding region. These areas may have sparse vegetation and will not meet revegetation success standards described above, however these areas provide a critical component of the overall SSE and provide valuable wildlife habitat diversity.

7.0 POST-CLOSURE MONITORING, REPORTING, AND CONTINGENCY PLANS

All closure and post-closure ground water, surface water, seep, spring, and piezometer monitoring data will be reported under the appropriate DP. Additionally, as specified under approved modifications to Condition 59 of DP-1403, Cobre submits semi-annual potentiometric maps based on monitoring well data to NMED. Cobre also submits seepage measurements taken at facility seeps to NMED. The annual test plot study reports are submitted to NMED and MMD in accordance with Condition 77 of DP-1403 and Permit GR002RE, respectively. The MMD guidelines require monitoring of revegetation during the 12-year post-closure vegetation monitoring period to evaluate revegetation success, and WQCC Regulation 3107.A.11 requires the development of post-closure monitoring and contingency plans that are consistent with the terms and conditions of the applicable DP. Additional closure and closeout monitoring and reporting associated with public health and safety, vegetation, wildlife, meteorology, erosion, and construction quality assurance (CQA)/construction quality control (CQC) plans are specific in Permit GR002RE and DP-1403. Closure and post-closure monitoring and reporting specified in the Copper Mine Rules include: CQA/CQC plans, seepage interceptor system inspections and reporting; water quality monitoring and reporting, and reclamation monitoring and reporting.

Post-closure inspections will continue until lands have been released under the NMMA. This section summarizes the general approach that will be used to meet these conditions.

7.1 Erosion Monitoring

Cobre will perform inspections when one or more inches of rain is received in a 24-hour period, as recorded by the Continental Mine weather stations, as well as monthly inspections for the first year, and quarterly inspections until vegetation is established. Cobre will monitor for erosion, including substantial rill, gully, or sheet erosion on the reclaimed facility surfaces. These areas will be inspected in accordance with nationally recognized standards of the U.S. Natural Resource Conservation Service or alternative, equivalent best management practices, per the permit conditions. As conditioned, Cobre will provide the MMD and NMED a report that describes substantial erosion features identified. A corrective action plan will be developed for substantial erosion features within 30 days of identification of the problem and the plan will be implemented as soon as practicable following approval.

7.2 Water Quality Monitoring

Cobre will conduct water quality monitoring according to Permit GR002RE and DP-1403, with cessation of specific monitoring requirements under the conditions specified in the permits. Samples will be collected at established intervals at all monitoring locations required in the NMED discharge permits. Cobre reserves the right to request amendments to the sampling frequency outlined in the permits based on water quality trends observed.

Contingency and emergency response plans have also been prepared that contain details for addressing potential failures of individual components in Cobre's water management system (Telesto, 2014). If an unapproved discharge occurs, Cobre will perform appropriate mitigation in accordance with Section 20.6.1203.A.9 NMAC or in accordance with DP-1403 if required by NMED. In addition, Cobre maintains a current SWPPP, described in Section 2.3 that monitors surface water quality around the perimeter of facilities.

7.3 Vegetation Success Monitoring

Cobre will conduct post-reclamation vegetation monitoring according Permit GR002RE 01-1 O.2. Areas where vegetation has not been successfully established will be reseeded

or inter-seeded. Revegetation monitoring will include canopy cover, vegetation diversity, and woody stem density. The canopy cover survey and woody stem density survey will be conducted using the survey techniques approved by MMD. The revegetation monitoring will be conducted in the third and sixth year after seeding and for two consecutive years prior to bond release. Cobre will submit a vegetation monitoring plan, for MMD approval, at least 90 days before vegetation monitoring is conducted. Results of the vegetation sampling will be provided to MMD.

7.4 Wildlife Monitoring

Pursuant to Permit GR002RE, Cobre will document wildlife use of reclaimed areas through monitoring, which include deer pellet group counts and bird diversity surveys. The results of the wildlife surveys will not be a condition of, or given consideration with regard to financial assurance release.

7.5 Public Health and Safety

Pursuant to Section G.2 of the MMD Permit, Cobre will submit written details and maps showing the locations of berms and fences that will be placed around the open pit to restrict access by unauthorized personnel and provide for public safety within 180 days of cessation of operations. Quarterly visual inspections will be conducted to monitor stability of the open pit walls to identify potential failure areas, which may adversely impact the environment and public health or safety. If such potential failure areas are identified through monitoring, Cobre will propose measures to mitigate the hazard within 30 days of identification for MMD approval.

7.6 Construction Quality Assurance Plan

Pursuit to Permit GR002RE, Cobre will submit a CQA Plan to MMD for approval no less than 180 days prior to regrading of a facility and placement of any cover material for final closure. The CQA Plan will be supplemented with a CQA Report to be submitted to the MMD within 180 days after completion of construction.

8.0 CAPITAL, OPERATION, AND MAINENANCE COST ESTIMATES

This section provides a description of the reclamation cost estimate that is used in determining the value of the financial assurance. The net present value calculation will be provided upon the agencies approval of the scope, and costs. Inflation and discount rates used in the net present value calculation will be proposed based on available agency guidance.

The costs associated with each facility are presented in Appendix A. In general, the reclamation cost estimate was broken down into two categories; earthwork, and water management. A detailed description of the cost estimate, assumptions, development, and basis can be found in the earthwork reclamation cost estimate in Appendix B and water management cost estimate in Appendix C, with an electronic copy of the cost estimate itself in Appendix D.

8.1 Earthwork

The Drawings depict reclamation based upon the EOY 2019 mine plan. The Drawings were used to develop reclamation quantities used in the reclamation cost estimate. All costs are 2014 current dollar costs based upon the most up to date unit rates.

8.1.1 Capital Costs

Earthwork capital costs are summarized in Table 8 and are based upon the reclamation design criteria in Table 5.

8.1.2 Operations and Maintenance Costs

Operations and Maintenance (O&M) costs include: erosion control, road maintenance, and revegetation maintenance (Table 9). Operations and maintenance costs are assumed to diminish with time:

- Erosion Control:
  - Reclamation Years 0–12: 12 days/year

  - Reclamation Years 13–39: 4 days/year
  - Reclamation Years 40–99: 1 day/year
- Road Maintenance:
  - Reclamation Years 0–19: 4 months/year at 24 hours/month
  - Reclamation Years 20–39: 2 months/year at 24 hours/month
  - Reclamation Years 40–99: 1 month/year at 24 hours/month
- Revegetation Maintenance:
  - Reclamation Years 0–11: Based on observations of previously reclaimed areas, the annual vegetation failure is conservatively estimated to be 2% failure every year for a total of 12 years, starting the year reclamation is completed.

8.2 Water Management

Water management costs are summarized in Table 10. The water management cost estimate is a time-series accounting of costs associated with the long-term maintenance of the water management system. The estimate includes costs related to ponds, pumps, pipelines, electrical systems, and water quality sampling. Nearly all the water management infrastructure required is currently in place or will be in place by EOY 2019 as a result of past and current operations. Capital water management costs include replacement or removal of infrastructure. The water management O&M costs account for the long-term operation of the water management infrastructure including: routine maintenance, electricity, fuel, and sampling.

9.0 RECLAMATION SCHEDULE

The anticipated duration for reclamation activities is shown in Table 11. The schedule is based on the estimated amount of labor, equipment and other resources that would be necessary to complete reclamation, sequential closure of the facilities, and the acreage to be reclaimed in the unlikely condition of forfeiture based on anticipated EOY 2019 configuration. The reclamation durations presented in Table 11 include reclamation through seeding. The estimated duration for reclamation of each facility does not include regulatory design review and approval processes.

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