



Freeport-McMoRan Chino Mines Company  
P.O. Box 10  
Bayard, NM 88023

**Sherry Burt-Kested**  
Manager, Environmental Services  
Telephone: 575-912-5927  
e-mail: sburtkest@fmi.com

**July 21, 2017**

**Certified Mail #70160750000113393608**  
**Return Receipt Requested**

Mr. Bruce Yurdin, Director  
New Mexico Environment Department  
Water Protection Division  
P.O. Box 5469  
Santa Fe, NM 87502

Dear Mr. Yurdin:

**Re: Vegetation Monitoring Report, Groundhog Mine Site and  
Small Stockpile Sites Interim Remedial Action,  
Hanover/Whitewater Creeks Investigation Unit – Chino AOC**

Freeport-McMoRan Chino Mines Company (Chino) submits under separate cover a document presenting responses to comments received in a letter dated June 13, 2017 from the New Mexico Environment Department (NMED). The comments address the *Vegetation Monitoring Report* for the Interim Remedial Actions at the Groundhog Mine Site and Small Historical Stockpile Sites under the Hanover/Whitewater Creeks Investigation Unit under the Chino Administrative Order on Consent (AOC), submitted to NMED on September 30, 2016. This response to comments document was submitted today to Mr. David Mercer, the NMED AOC Project Manager.

Please contact Ms. Pam Pinson at (575) 912-5213 if you have any questions regarding this quantitative vegetation survey report.

Sincerely,

Sherry Burt-Kested, Manager  
Environmental Services

SBK  
20170721-001

xc: David Mercer, NMED (via email)  
Joseph Fox, NMED (via email)  
Petra Sanchez, U.S. Environmental Protection Agency (via email)  
Alicia Voss, FCX (via email)

**Response to New Mexico Environment Department Comments  
on the Vegetation Monitoring Report, Groundhog Mine Site and Small Historic Stockpile Sites  
Interim Remedial Actions, Hanover/Whitewater Creeks Investigation Unit (HWCIU)**

This document presents Freeport-McMoRan Chino Mines Company's (Chino) response to comments received from the New Mexico Environment Department (NMED) in a letter dated June 13, 2017 on the Vegetation Monitoring Report, Groundhog Mine Site and Small Historic Stockpile Sites Interim Remedial Actions. The quantitative vegetation survey report was submitted to NMED on September 30, 2016 and documents overall vegetation re-establishment success in these remediated sites over the last 5 years per the completion report requirements (Golder, 2009a and 2009b).

**NMED Comment #1**

*A number of NMED's comments from draft document review August 9, 2016 on the Groundhog Mine Site Vegetation Monitoring Report requested clarifications on the statistics discussed in the report. These included Specific Comments #2, 3, 5, and 6. While some additional text was added to the report as indicated in the response to comments (September 12, 2016), the additions do not fully address the concerns raised in the comments. As written, it is not possible to verify the statements made in the report because insufficient information about the statistics used to make the statements is provided.*

*Statements such as 'there is a 90% probability that the true mean is within 10% of the sample mean' require more information to verify. It is our assumption that those statistics were derived by solving the sample adequacy equation provided in Section 2.4 for the t value in the equation. The probability (alpha) is then reported based on the probability provided by the Student's T distribution at that t value and based on the degrees of freedom in the data. Such an approach would be appropriate, but since that level of detail is not provided in the revised version of the text, it cannot be confirmed. Please verify that our assumption of the statistics is accurate and add the necessary information to the document to allow the readers to verify the statistics provided.*

**Response to Comment #1**

NMED's assessment of the probability statistic is correct. The statistic Golder calculated is based on the Student's t-distribution:

$$t = \frac{\bar{x} - \mu}{s / \sqrt{n}}$$

where  $\mu$  is the population mean,  $\bar{x}$  is the sample mean,  $s$  is the population standard deviation and  $n$  is the sample number. This equation is also the basis to calculate sample adequacy. By solving for the one-tailed t-value, Golder determine the probability for the Student t-distribution for the true mean to be within 10% of the sample mean given the degree of freedom for the sampling. Golder uses the probability statistic to better understand the confidence level for the sample mean when sample adequacy is not achieved. This information is provided as a convenience to aid in framing the statistical value of the data.

**NMED Comment #2**

*In Section 1.1-Background, the growth medium is described as "A 6 to 12-inch thick layer from a local borrow source". Please describe the location of the borrow source and the composition of the growth medium. Was this source amended with manure or other organic material? If the growth medium was amended, would this account for the higher densities in shrubs on the remediated site?*

### **Response to Comment #2**

As described in the Groundhog and the Small Stockpiles completion reports (2009a and 2009b, respectively), soil cover materials were excavated from areas adjacent to the stockpiles. Those reports describe the materials as "colluvium with tuff and granodiorite rock fragments up to several inches in diameter with a clayey sand matrix." No soil amendments or fertilizers were applied to the cover materials prior to or after seeding. In general, Chino has avoided the use of fertilizers and amendments because these products have the potential to promote weedy species at the detriment to the more desirable perennial vegetation.

### **NMED Comment #3**

*In Section 4.2 –Shrub Density, it is reported that the remediated sites have substantially higher shrub densities compared to the reference area. Please discuss why the remediated site might have a higher density of shrubs. Were there shrubs included in the seed mix used in hydro-seeding? Would the growth medium be a factor that contributed to higher densities of shrubs in the remediated site?*

### **Response to Comment #3**

Shrubs were included in seed mix that was used in the remediated areas. Seed germination and plant establishment is primarily contingent on the precipitation regime in the first few years after seeding. Other factors affecting plant establishment included seedbed preparation, adequate soil-seed contact, seed placement, seed predation, herbivory, seed viability and the date of seeding. The precise reason for more shrubs in the reclamation compared to the reference area is unknown. In general, shrubs tend to be more prevalent in soils with moderate levels of rock fragments and grasses tend to be more prevalent in somewhat finer textured soils. The rock fragment content of the cover materials in this area may partially explain the shrub response on this site.

### **NMED Comment #4**

*In Section 4.3 -Plant Diversity, the report states "The viability of achieving the cool season grass requirement on the reclamation in this region is becoming increasingly unlikely based on this and other studies (i.e. Chino Test Plot cover suitability demonstration, Tyrone vegetation monitoring) conducted over the past several years". Please discuss why the cool season grasses are unlikely to be present? Please describe the Chino Test Plot sites where these grasses are not returning. Could changes in temperature averages affect the return of cool season grasses?*

### **Response to Comment #4**

In general, warm season grasses are better adapted to the prevailing precipitation and temperature regime of southern New Mexico than cool-season grasses, which are more prevalent in the sagebrush dominated communities in Northern Mexico. Cool season grasses have been observed in the reclamation at Tyrone and Chino in the first several years after seeding, but tend to decline over time. Because cool season grasses respond favorably to winter precipitation, the severe droughts in 2011 and 2012 may have contributed to the poor response of cool-season grasses. However, overall this response is consistent with the general lack of cool-season grasses in this region at the lower to mid-elevations. Thus, the cool season grass requirement for the plant diversity performance standard proposed in the late 1990's is being reconsidered by Chino and the MMD on the basis of ecological

incompatibility of cool-season grasses in this region.

**NMED Comment #5**

*In Section 5.0-Closing, the report states "all of these sites are intersected by mine infrastructure and are not isolated from mining activities". Please describe how infrastructure impacts the growth of vegetation and the impact of mining activities on this area. What is the duration of monitoring anticipated for this area?*

**Response to Comment #5**

In general, mine infrastructure does not affect plant growth at Groundhog and the small historic stockpile sites. As documented in the subject vegetation monitoring report, the remediated area vegetation within the Groundhog and the small historic stockpile sites surveys as successfully meeting the MMD requirements. Since the date of this report, vegetation continues to show improvement. However because the remediated areas exist among mine facilities (pipelines, haul roads, utility corridors, etc.), the sites could be disturbed by necessary mine operation and maintenance activities. These AOC remediated sites due to their location are also under operational discharge permit requirements and the Closure/Closeout Permit.

The vegetation monitoring schedule and reporting requirements have been met per the approved completion reports (2009a and 2009b). However, Chino continues to regularly inspect the sites for erosion and stability as per the completion report requirements pending resolution of the Record of Decision, under which vegetation monitoring may be performed to update current status.

**REFERENCES**

- Golder Associates Inc (Golder). 2009a. Completion report interim remedial action Groundhog Mine Stockpile Hanover and Whitewater Creeks investigation unit. Prepared for Chino Mines Company. June 2009.
- Golder. 2009b. Completion report interim remedial action Osceolla, CG Bell, and Tenderfoot B Stockpiles Hanover and Whitewater Creeks investigation unit. Prepared for Chino Mines Company. October 2009.