TETRA TECH

Tucson Office
3031 West Ina Road
Tucson, AZ 85741
Tel 520.297.7723 Fax 520.297.7724
www.tetratech.com

Technical Memorandum
Partial Backfill Alternative
Noise Analysis

To:	Kathy Arnold	**From:**	Robert Sculley
Company:	Rosemont Copper Company	**Date:**	January 23, 2010
CC:	Jamie Sturgess (Rosemont); David Krizek; Michael Dieckhaus (Tt)	**Doc #:**	028/10-320871-5.3

1.0 Introduction

This Technical Memorandum was prepared by Tetra Tech and presents a Noise Analysis for the Partial Backfill Alternative being considered in the US Forest Service Environmental Impact Statement (EIS) for the proposed Rosemont Copper Project (Project). This analysis assesses the potential impacts that the Partial Backfill Alternative will have on noise conditions.

Tetra Tech published a comprehensive Supplemental Noise Study Report in April of 2009 that was based on the facility layouts in the Mine Plan of Operations (MPO). The Noise Study provided data on existing noise levels in the vicinity of the Project and noise levels measured at an active copper mine such as blasting and other operational activities. Modeling of the blasting vibrations was also performed. Noise effect contouring in the April 2009 study was based on the MPO facility layouts.

The Partial Backfill Alternative is assumed to have a basic facility footprint similar to that of the Barrel and McCleary Alternative. The Partial Backfill Alternative would differ from the MPO and the other alternatives by including an Open Pit partial backfill phase of activity after cessation of mining operations. The following provides a comparison between the MPO and the Partial Backfill Alternative facility layouts:

- The top surface of the Dry Stack Tailings Facility would be about 5,250 feet above mean sea level (amsl) for both the MPO and Partial Backfill Alternative.
- The top surface of the Waste Rock Storage Area would be about 5,450 feet to 5,470 feet amsl for the MPO and the Partial Backfill Alternative, respectively.
- The Heap Leach Pad for the MPO would be constructed in two (2) phases. The leach pad for the Partial Backfill Alternative would be constructed in one (1) phase with a smaller total footprint. In both cases, the closed leach pad(s) would eventually be covered with waste rock.

ROSEMONT COPPER
A Bridge to a Sustainable Future.

Memorandum

To: Beverly Everson

Cc: Tom Furgason

From: Kathy Arnold

Doc #: 003/10 – 15.3.5

Subject: **Transmittal of Technical Memoranda and Pit Lake Report**

Date: February 8, 2010

Rosemont Copper is pleased to transmit the following twenty technical memoranda and one report:

1. Rosemont Hydrology Method Justification, a Tetra Tech memo dated January 7, 2010;
2. Barrel Only alternative –
    a. Noise Analysis, a Tetra Tech memo dated January 15, 2010
    b. Traffic Analysis, a Tetra Tech memo dated January 8, 2010
    c. Geochemical Characterization of Facilities, a Tetra Tech memo dated January 10, 2010
    d. Lighting, an M3 memo dated December 2009
3. Barrel and McCleary alternative –
    a. Noise Analysis, a Tetra Tech memo dated January 9, 2010
    b. Traffic Analysis, a Tetra Tech memo dated December 15, 2009
    c. Geochemical Characterization of Facilities, a Tetra Tech memo dated December 16, 2009
    d. Lighting, an M3 memo dated December 2009
4. Scholefield Tailings and McCleary Waste alternative –
    a. Noise Analysis, a Tetra Tech memo dated January 15, 2010
    b. Traffic Analysis, a Tetra Tech memo dated January 12, 2010
    c. Geochemical Characterization of Facilities, a Tetra Tech memo dated January 10, 2010
    d. Lighting, an M3 memo dated January 2010
5. Sycamore Tailings and Barrel Waste alternative –
    a. Noise Analysis, a Tetra Tech memo dated January 15, 2010
    b. Traffic Analysis, a Tetra Tech memo dated January 9, 2010
    c. Geochemical Characterization of Facilities, a Tetra Tech memo dated January 10, 2010
    d. Lighting, an M3 memo dated January 2010
6. Partial Backfill alternative –
    a. Noise Analysis, a Tetra Tech memo dated January 23, 2010
    b. Traffic Analysis, a Tetra Tech memo dated January 9, 2010
    c. Geochemical Characterization of Facilities, a Tetra Tech memo dated January 10, 2010
7. Geochemical Pit Lake Predictive Model, prepared by Tetra Tech and dated February 2010

As per your request, I am transmitting three hardcopies and two disks (disks contain tech memos only) directly to the Forest Service and two copies and one disk directly to SWCA. The Pit Lake report includes a copy of the report on a CD on the inside of the back cover of each report.

- The combined footprints of the Waste Rock Storage Area and Dry Stack Tailings Facility under the Partial Backfill Alternative (about 2,505 acres) would be slightly smaller than the combined footprints under the MPO (about 2,870 acres). The general facility footprints, however, are in the same basic location as in the MPO.

- The location and size of the Open Pit would be the same under both the MPO and the Partial Backfill Alternative.

- Under the Partial Backfill Alternative, the Plant Site would have a slightly different configuration and footprint than under the MPO, but in both cases the Plant Site would be shielded from State Route 83 (SR 83) by the Waste Rock Storage Area and the Dry Stack Tailings Facility.

- The Primary Access Road would be in the same location under both the MPO and the Partial Backfill Alternative.

- After the end of mining operations, there would be a period of about three (3) years during which material would be removed from the Waste Rock Storage Area, transported to the Open Pit, and used for partial backfilling of the Open Pit. Pit backfilling activity would occur for two (2) work shifts per day during this period.

During the active mining period, the differences between the Partial Backfill Alternative and the MPO would be mostly matters of small details, not major features that would affect noise impacts. Consequently, the noise and vibration impact discussions, and the associated noise contour figures in the April 2009 Noise Study, would be applicable to the active mining period of the Partial Backfill Alternative. The Partial Backfill Alternative would add an additional period of on-site activity after the end of active mining operations. Activities during the Open Pit partial backfill period would be a relatively minor source of on-site noise that would not occur under the MPO or the other alternatives.

The following sections of this Technical Memorandum explain why the results of the April 2009 Noise Study are still applicable to the Partial Backfill Alternative. A discussion of noise conditions during the Open Pit partial backfill period is also provided.

2.0 Blast Noise and Blast Vibration Impacts

The Open Pit would be in the same location and operated in the same manner under both the MPO and the Partial Backfill Alternative. Blasting events would be limited to one (1) event per day. Daily explosives usage is also expected to be the same under both scenarios.

In addition, the footprints of the Waste Rock Storage Area and the Dry Stack Tailings Facility would be similar under both the MPO and the Partial Backfill Alternative, with similar final elevations. Consequently, blast noise generation and localized shielding effects would essentially be the same under both scenarios.

Because blasting events would be similar under both the MPO and the Partial Backfill Alternative, groundborne vibrations would be the same. Thus, the discussions and associated

noise contour figures for blast noise and blast-related vibrations, as presented in the April 2009 Noise Study, would be applicable to the Partial Backfill Alternative.

3.0 Construction Noise Impacts

Although the Plant Site would still be in the same general area, under the Partial Backfill Alternative the Plant Site would have a slightly different configuration and footprint than that of the MPO. However, there would be little if any difference in the construction activity noise levels between the MPO and the Partial Backfill Alternative. As noted in the April 2009 Noise Study, construction noise levels would attenuate to background noise levels over a relatively short distance and would not create any noise impacts at the nearest existing residences. Therefore, the discussions and associated noise contour figure for construction noise impacts presented in the April 2009 Noise Study would be applicable to the Partial Backfill Alternative.

4.0 Equipment Operation Noise Impacts

As discussed in the April 2009 Noise Study, operational noise levels from the Plant Site area would be similar to the maximum construction noise levels. Operational noise levels are expected to attenuate to background noise levels over a distance of about two (2) miles and would therefore not create any noise impacts at the nearest existing residences or along SR 83.

As indicated in Section 1.0, the combined footprints of the Waste Rock Storage Area and Dry Stack Tailings Facility under the Partial Backfill Alternative (about 2,505 acres) would be slightly smaller than the combined footprints under the MPO (about 2,870 acres). However, the final top elevations for both the waste rock and the dry stack tailings areas would be similar.

The southern end of the Waste Rock Storage Area would have a similar location and configuration under both the MPO and the Partial Backfill Alternative. Consequently, equipment operations on the Waste Rock Storage Area would occur at a similar distance from the nearest existing residences under both scenarios and would therefore have the same equipment operation noise contours.

Under the Partial Backfill Alternative, the northern end of the Dry Stack Tailings Facility would be slightly south of the location affected under the MPO, and thus would be slightly further from the residences along SR 83 to the northeast of the Project. However, the differences in location and configuration of the northern end of the Dry Stack Tailings Facility are not enough to appreciably alter the equipment operating noise contours presented in the April 2009 Noise Study. Thus, the discussions and noise contour figure for noise impacts from equipment operations, as presented in the April 2009 Noise Study, would be applicable to the Partial Backfill Alternative.

5.0 Traffic Noise Impacts

The Partial Backfill Alternative would not alter the basic employment level or operating material requirements for the Project as described in the MPO. In addition, this alternative would not alter the routing of the proposed Primary Access Road. Consequently, the MPO and the Partial

Backfill Alternative would be expected to have the same traffic generation, and thus the same resulting traffic noise impacts. Therefore, the discussions and noise contour figures, as presented in the April 2009 Noise Study, would be applicable to this alternative.

6.0 Open Pit Partial Backfill Activities

The Partial Backfill Alternative would include a period of about three (3) years during which material would be removed from the Waste Rock Storage Area, transported by truck to the Open Pit, and used for partial backfilling of the pit. Haul trucks would be loaded with material from the Waste Rock Storage Area using heavy equipment such as excavators and wheeled loaders. Other equipment, such as bulldozers and large graders, would also be used to contour the Waste Rock Storage Area surface, to maintain haul roads, and possibly to contour the material used for partial backfill of the Open Pit

It was assumed that waste rock would be removed from the Waste Rock Storage Area, starting along the western side of the area and progressing eastward. A portion of the top surface may also be lowered. The buttress areas on the eastern and southern sides of the Waste Rock Storage Area are anticipated to remain in place and therefore would provide noise shielding for the waste rock removal activities. The loaded haul trucks would likely use the existing haul road system to transport the waste rock material into the Open Pit.

Waste material excavation and haul truck loading would be expected to generate noise levels of about 90 dBA at a distance of 50 feet from the activity. This is about 3 dBA higher than the noise level assumed for modeling operational equipment noise levels at the Waste Rock Storage Area and the Dry Stack Tailings Facility. Even in the absence of any terrain shielding, those noise levels would be reduced to background levels at a distance of about 1.5 miles. The remaining portions of the Waste Rock Storage Area, however, would be expected to provide at least 10 dBA of noise shielding for the closest residential area along Singing Valley Road. Therefore, the shielding provided by the remaining portions of the Waste Rock Storage Area, and the buttress areas on the southern and western sides of the Waste Rock Storage Area, would reduce noise from truck loading activities to background noise levels at a distance of about 0.8 miles. Noise levels at the nearest residences along Singing Valley Road generally would be less than the maximum intermittent equipment noise levels discussed in the April 2009 Noise Study for operational activities at the Waste Rock Storage Area.

Haul truck operations between the Waste Rock Storage Area and the Open Pit would be expected to generate noise levels of about 87 dBA at 50 feet from the truck, and would be reduced to background noise levels at a distance of about 1.5 miles. Haul truck operations would typically be about 2.2 miles from the nearest existing residences, and would not cause any off-site noise impacts. Noise from equipment operations inside the Open Pit would be fully shielded by the pit walls, and would not be audible at off-site locations. Preliminarily, backfilling of the pit would occur below the 3,800 foot elevation. For reference, the anticipated pit bottom is at an elevation of about 3,050 feet, and the eastern pit wall is at an elevation of about 5,050 feet.

7.0 Conclusion

A review of operational and facility changes was performed between the MPO and the Partial Backfill Alternative being considered in the EIS process. Because the facilities, operations, and anticipated traffic patterns are generally the same for both scenarios, the discussions, noise contour figures, and analysis results presented in the April 2009 Noise Study are applicable to the Partial Backfill Alternative. The additional activities associated with partial backfill of the Open Pit would add a relatively minor source of on-site noise during a period of about three (3) years following the end of active mining operations. Noise impacts generated during this period would be comparable to or less than those generated by operational equipment at the Waste Rock Storage Area during the active mining period.

REFERENCES

Tetra Tech (2009) *Supplemental Noise Study, Rosemont Copper Project.* Prepared for Rosemont Copper Company. Report Dated April, 2009

WestLand (2007) *Rosemont Project Mine Plan of Operations.* Prepared for Rosemont Copper Company. Report Dated June, 2007