Technical Memorandum
Sycamore Tailings and Barrel Waste Alternative
Noise Analysis

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Date: January 15, 2010
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1.0 Introduction

This Technical Memorandum was prepared by Tetra Tech and presents a Noise Analysis for the Sycamore Tailings and Barrel Waste 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 Sycamore Tailings and Barrel Waste Alternative would 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 following provides a comparison between the MPO and the Sycamore Tailings and Barrel Waste Alternative facility layouts:

- The top surface of the Dry Stack Tailings Facility would be about 5,250 feet above mean sea level (amsl) for the MPO, and about 5,050 feet amsl for the Sycamore Tailings and Barrel Waste Alternative. The Dry Stack Tailings Facility for Sycamore Tailings and Barrel Waste Alternative would have a footprint of about 1,170 acres compared to 870 acres under the MPO.

- The top surface of the Waste Rock Storage Area would be about 5,450 feet amsl for the MPO. The Sycamore Tailings and Barrel Waste Alternative would have a Waste Rock Storage Area with a top elevation of 5,700 feet amsl. The footprint of the Waste
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.
Rock Storage Area would be about 1,885 acres under the Sycamore Tailings and Barrel Waste Alternative, compared to 2,000 acres for the MPO.

- The Heap Leach Pad for the MPO would be constructed in two (2) phases. The leach pad for the Sycamore Tailings and Barrel Waste Alternative would be constructed in a single phase and would have a smaller total footprint than under the MPO. Under both the MPO and the Sycamore Tailings and Barrel Waste Alternative, the closed leach pad(s) would eventually be covered with waste rock.

- Under the Sycamore Tailings and Barrel Waste Alternative, the combined footprints of the Waste Rock Storage Area and Dry Stack Tailings Facility (about 3,055 acres) would be somewhat larger than the combined footprints under the MPO (about 2,870 acres). The location and shape of the combined Waste Rock Storage Area and Dry Stack Tailings Facility under the Sycamore Tailings and Barrel Waste Alternative would be quite different from the combined footprint under the MPO. Under the Sycamore Tailings and Barrel Waste Alternative, the Dry Stack Tailings Facility would be located north of the Plant Site and the Waste Rock Storage Area would be located south of the Plant Site, with about 2.3 miles separating the two areas.

- The location and size of the Open Pit would be the same under both the MPO and the Sycamore Tailings and Barrel Waste Alternative.

- Under the Sycamore Tailings and Barrel Waste Alternative, the Plant Site facilities would have a slightly different configuration and footprint than under the MPO.

- The Primary Access Road would be in the same location under both the MPO and the Sycamore Tailings and Barrel Waste Alternative.

The differences between the Sycamore Tailings and Barrel Waste Alternative and the MPO are primarily differences in the location and shape of the Waste Rock Storage Area and the Dry Stack Tailings Facility. Other features of this alternative are similar to those proposed for the MPO. Consequently, most of the noise and vibration impact discussions, and the associated noise contour figures in the April 2009 Noise Study, are applicable to the Sycamore Tailings and Barrel Waste Alternative. Differences in the location and shape of the Waste Rock Storage Area and Dry Stack Tailings Facility would, however, result in changes in the potential locations for equipment operations under the Sycamore Tailings and Barrel Waste Alternative.

The following sections of this Technical Memorandum explain which results of the April 2009 Noise Study are still applicable to the Sycamore Tailings and Barrel Waste Alternative, including which results would change under this alternative.

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 Sycamore Tailings and Barrel Waste 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, differences in the location, maximum height, and shape of the footprints of the Waste Rock Storage Area and the Dry Stack Tailings Facility would produce only minor localized shielding differences for blast noise under the MPO and the Sycamore Tailings and Barrel Waste Alternative. For in-pit blasting in particular, the pit walls would provide much more effective terrain shielding than would Waste Rock Storage Area and Dry Stack Tailing Facility. Blast noise effects at the closest noise-sensitive receptor locations would not be significantly affected by differences in the location, shape, or height of the footprints of the Waste Rock Storage Area and the Dry Stack Tailings Facility under the MPO and the Sycamore Tailings and Barrel Waste Alternative.

Because blasting events would be similar under both the MPO and the Sycamore Tailings and Barrel Waste 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 Sycamore Tailings and Barrel Waste Alternative.

3.0 Construction Noise Impacts

Although the Plant Site would still be in the same general area, under the Sycamore Tailings and Barrel Waste Alternative the Plant Site facilities 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 Sycamore Tailings and Barrel Waste 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 Sycamore Tailings and Barrel Waste 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 State Route 83 (SR 83).

As indicated in Section 1.0, the combined footprints of the Waste Rock Storage Area and Dry Stack Tailings Facility under the Sycamore Tailings and Barrel Waste Alternative (about 3,055 acres) would be somewhat larger than the combined footprints under the MPO (about 2,870 acres). In contrast to the MPO, the Dry Stack Tailings Facility and the Waste Rock Storage Area would be separated from each other under the Sycamore Tailings and Barrel Waste Alternative. Maximum elevations for the Dry Stack Tailings Facility would be lower under this alternative than under the MPO, and maximum elevations for the Waste Rock Storage Area would be
higher than under the MPO. The most important differences between the MPO and the Sycamore Tailings and Barrel Waste Alternative are the locations and shapes of the Waste Rock Storage Area and Dry Stack Tailings footprints.

Figure 1 presents the operational equipment noise contours for the Sycamore Tailings and Barrel Waste Alternative. Actual noise generation by equipment working on the Waste Rock Storage Area and the Dry Stack Tailings Facility would be the same as for the MPO, but potential equipment locations would be different due to differences in facility locations and footprint shapes.

Haul trucks and other equipment working at the southeast corner of the Waste Rock Storage Area would be in a location about 400 feet closer to homes along Singing Valley Road than would be the case under the MPO. Compared to the MPO, maximum noise levels from intermittent equipment operations at the Waste Rock Storage Area under the Sycamore Tailings and Barrel Waste Alternative would increase by about 1 dBA (from 39 dBA to 40 dBA) at the nearest residence along Singing Valley Road. Most people cannot distinguish a change in the noise level that is less than about 1.5 to 2 dBA. In addition, as noted in the April 2009 Noise Study, existing minimum noise levels in the Project area are estimated to be about 30 to 40 dBA, and average noise levels were generally 37 to 45 dBA.

Because intermittent equipment operation noise levels would be comparable to existing background noise levels, the change in the footprint of the Waste Rock Storage Area for the Sycamore Tailings and Barrel Waste Alternative would not result in a significant noise impact at the nearest noise-sensitive locations. Equipment working at the northern end of the Dry Stack Tailings Facility would be closer to homes located northeast of the Project site along SR 83 than would be the case under the MPO, but would be shielded from those residences by the ridgeline along the eastern side of the Facility. The maximum elevation of the Dry Stack Tailings Area would be about 150 feet below the lowest point of the ridgeline.

Figure 1 shows noise contours for equipment operating at the north end of the Dry Stack Tailings Facility in the absence of any terrain shielding effects. Terrain shielding would be expected to reduce off-site noise levels by at least 10 dBA. Even without consideration of terrain shielding effects, noise levels from such equipment operations at the Dry Stack Tailings Facility would remain below background noise levels at the closest residences northeast of the Project along SR 83. The Sycamore Tailings and Barrel Waste Alternative would have a conveyor and stacker system from the Plant Site area to the south end of the Dry Stack Tailings Facility. Noise levels from such equipment are typically about 60 dBA at a distance of 50 feet, much lower than the noise levels generated by haul trucks, graders, loaders, and other heavy equipment, and also much lower than operational noise levels from the Plant Site area. Noise levels from the conveyor system would be reduced to less than 40 dBA at a distance of about 940 feet, and would be below minimum background noise levels at distances beyond 2,000 feet. Because the conveyor system would have minimal noise impacts, Figure 1 does not include noise contours for the conveyor system.
5.0 Traffic Noise Impacts

The Sycamore Tailings and Barrel Waste Alternative would not alter the basic employment level or operating material requirements for the Project as described in the MPO. Consequently, the MPO and the Sycamore Tailings and Barrel Waste Alternative would be expected to have the same traffic generation. In addition, this alternative would not alter the routing of the proposed Primary Access Road. Consequently, the MPO and the Sycamore Tailings and Barrel Waste 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 Conclusion

A review of operational and facility changes was performed between the MPO and the Sycamore Tailings and Barrel Waste Alternative being considered in the EIS process. Because the facilities, operations, and anticipated traffic patterns are generally the same for both scenarios, most of the discussions, noise contour figures, and analysis results presented in the April 2009 Noise Study are applicable to the Sycamore Tailings and Barrel Waste Alternative. Revised noise contours (Figure 1) have been prepared to illustrate maximum equipment operation noise conditions under the Sycamore Tailings and Barrel Waste Alternative. Compared to the MPO, maximum equipment operation noise levels under the Sycamore Tailings and Barrel Waste Alternative would increase by about 1 dBA at the closest noise sensitive receptor location. Intermittent equipment operation noise levels under this alternative would be comparable to existing background noise levels, and would not cause significant noise impacts at the nearest noise-sensitive receptors.
REFERENCES


Traffic noise contours are 24-hour Ldn noise levels for Year 20 traffic conditions.