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Subject:
Sierrita Odor Evaluation – Milestone Summary

This Milestone Summary represents project milestones ARCADIS has achieved in its ongoing investigation of odor complaints directed at Freeport-McMoRan Sierrita Inc. (Sierrita), primarily by residents of the Ruby Star Airpark, and its evaluation of Sierrita processes and operations as potential sources of odors. This Summary describes the progress made, but not the completion of ARCADIS's work in connection with the odors and potential odor sources. In addition, it represents only the work that ARCADIS has performed and is intended to be read in conjunction with Sierrita's Milestone Summary, which documents the related activities conducted by Sierrita.

January 2015 – Site Visit and PDEQ Meeting

From January 20-22, 2015, ARCADIS team members visited Sierrita for initial meetings with Sierrita Environmental staff, to meet with Ruby Star Airpark residents, and to observe Sierrita process operations.

On the morning of January 20, 2015, a resident of the Ruby Star Airpark reported an odor complaint to Sierrita. ARCADIS staff immediately mobilized to McGee Ranch Road south of the Ruby Star Airpark and noted a mild breeze from the south or southeast carrying a mild odor of petroleum or metallic-type character.

On January 21 and 22, 2015, ARCADIS met with a total of 11 residents of the Ruby Star Airpark who shared their experiences with odors in the area. Four residents said they had never experienced noticeable odors. Another resident smelled odors occasionally, but did not find them offensive or worthy of complaint to the Pima County Department of Environmental Quality (PDEQ). The remaining six residents, who are the primary complainants in the Sierrita and PDEQ records, stated they frequently smelled foul odors that they believe originate from Sierrita. The descriptions of the odors by these residents vary. In general, these residents noted that they usually experienced odors in the early morning hours when wind direction is from the southeast and wind speeds are less than about five miles an hour. Five of these residents stated that the odors are at times offensive and negatively impact their quality of life. One resident said the odors have on occasion caused a physical reaction that includes a burning throat, nose, and mouth, in addition to difficulty breathing.

In between scheduled interviews with Ruby Star Airpark residents on January 21 and 22, 2015, the ARCADIS team walked and drove along McGee Ranch Road evaluating local topographic features, wind patterns, housing and business developments, and searching for unusual odors. ARCADIS team members did not detect any unusual odors during these excursions.

During the January site visit, ARCADIS staff observed process operations at Sierrita, including ore loading and hauling from the pit, ore crushing, conveyor transport of ore, leach stockpiles, overburden stockpiles, flotation processes in the mill building, solvent extraction, thickener tanks, decant ponds, the moly roaster process, and chemical storage facilities.

On January 23, 2015, ARCADIS attended a meeting with Sierrita staff and PDEQ staff to discuss the history of odor complaints in the vicinity of Sierrita and steps for evaluating potential odor sources.

On January 28, 2015, PDEQ provided ARCADIS with PDEQ records of complaints received from residents in the general vicinity of Sierrita.

A review of PDEQ and Sierrita odor complaints has revealed that the majority of complaints were received from locations in Ruby Star Airpark with a few complaints from locations further north and east. The majority of complaints occurred between 7 am and 10 am with light winds from the south or southeast.

March 2015 – Site Visit and Odor Screening Sample Collection

From March 16-19, 2015, ARCADIS team members visited Sierrita to meet with Sierrita Environmental staff, observe Sierrita process operations, and collect screening level odor samples for evaluation by an odor laboratory.

During this visit, ARCADIS observed the tailings impoundment, the electrowinning tankhouse, the mill building, the reagent building, the tailings thickener tanks, solvent extraction, and a stormwater collection pond.

March 18, 2015 Odor Sampling

On March 18, 2015, ARCADIS collected odor samples from the following sources at Sierrita:

- Moly Roaster Stack
- Mill Rougher Flotation – Pack 1, Cell 1
- Copper-Moly Thickener Tank C
- Solvent Extraction Plant 1 E-Stripper Tank
- Decant Liquid
- Xanthate Liquid Mix Tank

ARCADIS collected the air samples from each source into Tedlar® (inert plastic) bags using an evacuation chamber and shipped the samples overnight under chain-of-custody record to St. Croix Sensory, Inc. (St. Croix) in Stillwater, Minnesota, for odor evaluation by an odor panel. As provided to PDEQ on May 15, 2015, that detailed report indicated that the odor panel classified all six air samples as 'unpleasant' on the hedonic tone scale and with odor characteristics of 'chemical' and/or 'offensive'. Odor strengths for the six samples ranged from a low of 580 detection threshold odor units for the Moly Roaster Stack to 3,100 detection threshold odor units for the 10:1 diluted Xanthate mixture (31,000 odor units adjusted dilution value). Please note these are screening level results that represent estimated odor parameters and should not be interpreted as absolute results.

March 19, 2015 Odor Observation

On the morning of March 19, 2015 the ARCADIS team and Sierrita Environmental staff mobilized to the north side of the Sierrita property to inspect a stormwater collection pond designated as the O7 Pond. This pond collects stormwater runoff from the north overburden stockpiles. No odors were detected from the liquid surface of the O7 Pond. Heading south from McGee Ranch road on the dirt road to the O7 Pond, at approximately 11:00 AM and latitude 31°53'17" North, longitude 111°06'05" West, the ARCADIS team and Sierrita Environmental staff noted discernible chemical odors characteristically similar to the general odors of the Sierrita Mill and a brief whiff of xanthate. The odor was not continuous during this time and was not noticeable after about five minutes. When detected, ARCADIS and Sierrita personnel estimated the odor as falling between a one and two on PDEQ's one-through-five odor scale (*i.e.*, between detectable with indistinguishable characteristics and distinguishable and definite, but not necessarily objectionable). At the time and location the odors were detected, winds were from the southeast and, although variable in speed, were estimated to be less than five miles per hour.

Since the March 2015, visit to Sierrita, ARCADIS has compiled and provided to PDEQ the odor results report and developed this Milestone Summary.

Conclusion

As stated above, this Milestone Summary presents a picture of ARCADIS's completed work in the ongoing odor investigation at and around Sierrita. As the investigation continues, Sierrita intends to evaluate its processes internally, as outlined in its own Milestone Summary, utilizing ARCADIS when necessary to determine whether Sierrita may be the source of the alleged odors.