

Freeport-McMoRan Sierrita Inc.  
6200 W. Duval Mine Rd.  
PO Box 527  
Green Valley, Arizona 85622-0527

September 30, 2013

**Via Email: [Air.Permits@pima.gov](mailto:Air.Permits@pima.gov) and**  
**Certified Mail: 7011 1150 0000 0283 8621**  
**Return Receipt Requested**

Ms. Elizabeth Quinley  
Pima County Department of Environmental Quality  
33 N Stone Ave, Suite 730  
Tucson, Arizona 85701

**Re: Notice of Violation; # PC 1307-099; Permit # 6067**

Dear Ms. Quinley:

Freeport-McMoRan Sierrita Inc. (Sierrita) is in receipt of the above referenced Notice of Violation (NOV), dated August 27, 2013, and received on August 30, 2013. The Pima County Department of Environmental Quality (PDEQ) requests that Sierrita submit documentation that includes planned dust control measures for the tailings impoundment, including any changes in operation and monitoring, to prevent future violations of the type alleged here. As PDEQ knows, Sierrita operates a comprehensive Dust Control Management Plan. This plan has developed over our long history of operation and, we believe, has been quite successful in controlling dust emissions from the Sierrita facility, including the tailings impoundment. Given the construction of the impoundment, the environmental conditions, and the size of the tailings impoundment, Sierrita believes that its actions leading up to and including July 27, 2013 were commensurate with the tailings impoundment surface area susceptible to windblown dust. Nevertheless, Sierrita, and the Freeport-McMoRan Corporate office, are always examining ways to control windblown dust. This letter specifically examines the events of July 26 and 27, 2013 and Sierrita's actions leading up to the dust event. We have also outlined several actions we have been exploring to assist in dust control at the Sierrita facility.

**Alleged Violation:**

**Permit Condition, Attachment "B", Section II.E**

1. The Permittee shall not cause, suffer, allow or permit diffusion of visible emissions, including fugitive dust, beyond the property boundary line within which the emissions become airborne. Sources may be required to cease temporarily the activity or operation which is causing or contributing to the emissions until reasonably necessary and feasible precautions are taken.
2. Condition II.E.1 shall not apply when wind speeds exceed twenty-five (25) miles per hour (using the Beaufort Scale of Wind-Speed Equivalents, or as

recorded by the National Weather Service). This exception does not apply if control measures have not been taken or were no commensurate with the size or scope of the emission source.

3. Condition II.E.1 shall not apply to the generation of airborne particulate matter from undisturbed land.

#### **PCC 17.16.050**

- D. No person shall cause, suffer, allow or permit diffusion of visible emissions, including fugitive dust, beyond the property boundary line within which the emissions become airborne, without taking reasonably necessary and feasible precautions to control generation of airborne particulate matter. Sources may be required to cease temporarily the activity or operation which is causing or contributing to the emissions until reasonably necessary and feasible precautions are taken.
  1. Sources required to obtain an air quality permit under ARS § 49-426, § 49-480 or Rule 17.12.470 may request to have the actions constituting reasonably necessary and feasible precautions approved and included as permit conditions. Compliance with such permit conditions shall be considered compliance with this subsection.
  2. This subsection shall not apply when wind speeds exceed twenty-five (25) miles per hour (using the Beaufort Scale of Wind-Speed Equivalents, or as recorded by the National Weather Service). This exception does not apply if control measures have not been taken or were no commensurate with the size or scope of the emission source.
  3. This subsection shall not apply to the generation of airborne particulate matter from undisturbed land.

#### **Findings:**

**Freeport-McMoRan Sierrita Inc. allowed diffusion of visible tailings dust generated from the tailings impoundment beyond the eastern property boundary on July 27, 2013, without taking control measures commensurate with the tailings impoundment surface area susceptible to windblown dust.**

#### **Discussion of the Event and On-Going Control Measures:**

On July 26<sup>th</sup>, a monsoon storm moved into the area, bringing high winds and significant isolated rainfall to the northern half of the tailings impoundment. During the storm, the wind gusts measured up to 37 mph, and a total of 0.9 inches of rain fell on the northern half of the impoundment. On July 27, 2013, a second monsoon storm moved into the area bringing high winds. These winds averaged approximately 20 miles per hour, with gusts up to 29 mph. The average wind speed on these dates were measured at a 10-meter meteorological station located on the northwest corner of the tailings impoundment that records winds speeds at an elevation reflective of winds impacting the surface of the impoundment. This monitoring site is owned and operated by Sierrita, and the monitoring program for this tower is conducted in accordance with EPA Meteorological Monitoring Guidance for Regulatory modeling Applications (EPA-454/R-99-005). The rainfall was measured using a manual rain gauge located at the tailings impoundment

maintenance shop approximately 0.67 miles N of the 10-meter meteorological station, at the northern edge of the tailings impoundment.

The heavy rainfall experienced on July 26 provided more than sufficient water coverage and dust suppression on the surrounding area, and as a result, a subsequent inspection or use of additional dust suppressants was not warranted. While it is generally accepted that heavy rain can compromise the crust of the impoundment surface, immediate response and follow-up inspection provide no added benefit to Sierrita's dust control practices. Based on our experience, when the soil is saturated and the surface is wet, an inspection would not identify any damage or conditions requiring immediate action. Rain events of the nature seen on July 26<sup>th</sup> are expected to provide sufficient moisture to last throughout the evening and into the following day.

Furthermore, the short time frame between the rain event on July 26<sup>th</sup> and the high winds seen on July 27<sup>th</sup> left insufficient time for an adequate assessment of the condition of the tailings surface to be conducted, and control measures to be undertaken.

#### Construction Activities:

While some construction on the impoundment is a normal part of operations, every five years Sierrita undertakes a "pipe lift." During a pipe lift, the entire elevation of the pipeline on half of the impoundment is raised approximately 40 feet to begin construction of a new level. Pipe lift construction can last approximately 6-10 months and necessitates larger areas of the impoundment to be under construction at any one given time. As this construction only occurs once every 5 years, Sierrita takes additional precautions to prevent dust from these areas, including:

- Additional application of magnesium chloride ( $MgCl_2$ ) dust suppressant to areas under construction.
- Assigning water trucks to construction areas to ensure sufficient water availability.
- All new roads constructed at the tailings impoundment are compacted to stabilize the road surface and reduce dust production. During the construction phase  $MgCl_2$  is applied to the uncapped roadway. At the completion of the pipe lift these roadways are capped with native soil and treated with magnesium chloride.
- Additional personnel are brought in to assist with construction activities, freeing more personnel up for dust control activities.

#### Application of Magnesium Chloride:

Preceding the event, three separate  $MgCl_2$  deposition campaigns were undertaken in April, May and June to prepare for the summer monsoon. Each of these campaigns deposited  $MgCl_2$  across the entire north dam. These applications each put a significant layer of  $MgCl_2$  in place as a precautionary measure. The layered  $MgCl_2$  technique allows for longer lasting applications on the surface, allowing for dust control throughout the summer monsoon season. While rain events will rinse some of the material off, the layered application leaves additional material behind.

<i>Month (2013)</i>	<i>MgCl<sub>2</sub> applied (gallons)</i>
<b>April</b>	69,300
<b>May</b>	46,200
<b>June</b>	67,100
<b>July</b>	63,000
<b>August</b>	142,100
<b>September</b>	68,600

Table 1: MgCl<sub>2</sub> applied to Impoundment by month

The application of MgCl<sub>2</sub> for dust control is highly dependent upon conditions. For maximum effect, MgCl<sub>2</sub> must be applied on a dry surface. Application of MgCl<sub>2</sub> to a wet surface can result in dispersion of the MgCl<sub>2</sub>, resulting in ineffective control. For this reason, Sierrita makes every attempt to apply MgCl<sub>2</sub> to dry surfaces to ensure effective dust prevention. As a result, MgCl<sub>2</sub> was not applied on either July 26 or 27, 2013. Following the event on July 27, 2013, Sierrita applied MgCl<sub>2</sub> to the entire surface of the northern half of the impoundment, totaling 108,500 gallons, in a campaign that lasted 10 days. Due to additional rainfall events occurring during this timeframe, Sierrita has applied two additional layers of MgCl<sub>2</sub>; totaling 165,200 gallons, to the entire surface of the northern half of the impoundment.

Additionally, application of MgCl<sub>2</sub> results in damage to the surface due to the use of equipment. As a result, it is not Sierrita's normal practice to operate equipment on the surface during high wind events. While mobilization of equipment for the application of MgCl<sub>2</sub> on the surface is relatively quick depending on location, (1-2 hours), adequate application of material over a large area can take several days, depending on the size of the area in question. As mentioned above, the response to the north dam required 10 days to complete sufficiently.

#### Impoundment Size/Inspections:

The Tailings Impoundment covers approximately 3600 acres, with a perimeter road which measures approximately 8 miles. Due to the size of the impoundment, it is impossible to inspect the entire surface on a daily basis. The perimeter road is located anywhere from 8 to 40 feet below the active surface. Consequently, this road does not provide a vantage point to conduct a visual inspection of the surface. Furthermore, it is impractical to drive a vehicle along the upper bench because the "bleeders" (i.e., 6 inch diameter pipes) used to deposit material on the impoundment surface extend across this topmost berm.

To adequately inspect the surface of the impoundment, an operator must walk on the surface to evaluate the conditions. When the area to be inspected is dry, an operator will walk towards the interior of the impoundment as far as safe practices allow in order to evaluate the surface condition. In the event that areas cannot be safely accessed, an operator may use binoculars to observe surface conditions. Areas to be inspected are determined based on the deposition plan, areas of construction, and results of past inspections.

Inspections of surface conditions are typically performed in the morning, at approximately 9:00 AM, to allow sufficient time for areas of concern to be identified and addressed immediately. These areas can then be added to the plan for further control measures to be taken as needed. Due to the large surface area of the impoundment, an

inspection performed on July 27<sup>th</sup>, may not have identified the damaged area. Additionally, due to past experience, the area in question received sufficient rainfall on July 26<sup>th</sup> to maintain a wet surface through the morning of July 27<sup>th</sup>. As a result, any inspection of the area would have shown a wet surface requiring no additional action to be taken.

#### Reasonable Precautions

As required by Attachment B, Section XIX.B.3.b.ii of the air quality permit, Sierrita maintains a Tailings Dam Dust Control Management Plan. The Dust Control Plan for the tailings impoundment has been developed and improved significantly over time, incorporating new and modified best practices to control dust.

In its daily operation, Sierrita employs several methods to manage dust from the tailings impoundment. For example, Attachment B, Section XIX.B.1.b(viii) & (ix) of the permit requires Sierrita to employ at least one of the “reasonable precautions” listed in that section to prevent excessive amounts of particulate matter from becoming airborne. Sierrita employs these reasonable precautions on an ongoing basis to control dust emissions from the tailings impoundment, in anticipation of high wind events, and in response to wind events. Specifically, the following reasonable precautions are employed by Sierrita on an ongoing basis:

- The wet dam construction method is used to control the surface of the impoundment, maintaining the majority of the impoundment surface wet or encrusted, while the remaining area is under construction.
- All new roads constructed at the tailings impoundment are compacted to stabilize the road surface and reduce dust production. These roadways are capped with native soil and treated with MgCl<sub>2</sub> dust suppressant.
- Heavily traveled perimeter roads are treated with MgCl<sub>2</sub> semi-annually and with additional applications as deemed necessary.
- A polymer-based dust suppressant is applied to the active berms of the tailings impoundment. This colorized material acts as a protective layer on the vulnerable side slopes and allows for easy visual observation of areas that need more attention or reapplication.
- Vehicle access is controlled and restricted through the use of fencing and gates.
- Vehicle speed is limited to 25 miles per hour at the tailings facilities and perimeter roads.
- Small wind breaks along the outer berm of the impoundment are designed to control slurry distribution to each area within the dam. This allows for more even distribution of material and wetting of the surface.
- Six-inch bleeders located at 80 foot intervals along the outer berm distribute tailing slurry to the surface of the dam at the rate of approximately 26,000 gpm. These bleeders are adjusted as needed and as practicable to wet areas of the tailing impoundment surface requiring additional control.
- Five water trucks, equipped with fire nozzles for wetting the slope, top and inside of perimeter berms are used to distribute water or a magnesium chloride dust suppressant as needed. Water is deposited as needed, averaging 30,000 – 100,000 gallons per day at the time of the year the opacity event occurred. During the monsoon season, the amount of water applied varies significantly,

depending on surface conditions. Following rainfall events, the amount of water applied to the impoundment will decrease accordingly.

- During construction activities, water trucks are assigned to construction areas to ensure water is available as needed.
- Five low ground pressure snow-utility vehicles (“All-tracks”) are used to apply magnesium chloride dust suppressant to the surface of the tailings impoundment. This material is deposited as needed, usually 2-3 times per month, 3,000-5,000 gallons per application. This hygroscopic dust suppressant binds to the tailings surface while pulling moisture out of the air creating a hardened exterior cover. This wetting agent is also applied to areas before and after construction activities.
- Six  $MgCl_2$  storage “bladders” are staged in strategic locations around the impoundment. This increases the storage capacity for  $MgCl_2$  as well as reduces lag time between application and re-filling of All-tracks.

These measures in combination have been proven over time to provide a reasonable control of dust emissions from the Sierrita facility and tailings impoundment.

#### **Proposed Additional Control Measures:**

As part of Sierrita’s ongoing commitment to continuous improvement and dust control at the tailings impoundment, we are constantly investigating new options or alternative means to improve dust control. Several improvement opportunities have been identified, and will be investigated to determine the best course of action to improve dust control on the impoundment.

#### **Surface Inspections:**

Sierrita’s Tailings Dam Dust Control Management Plan indicates that inspections will be conducted “frequently” to observe the dam surface characteristics and weather conditions. The inspection assists in the identification of fatigue on the surface crusts and areas on the surface of the impoundment which are susceptible to high wind events. The results of these inspections are used to determine the need for additional dust control measures. The existing inspection process and form are designed to accomplish this goal. Opportunities exist, and are being pursued, for improvement of the inspection process, including:

- Revision of the surface inspection process to improve tracking of the areas inspected, and areas identified for re-inspection.
- Creation of a separate system to document follow up and corrective actions taken as a result of the conditions identified during the inspection.
- Include a requirement that a supervisor review and sign the form.
- Create a Standard Operating Procedure (SOP) for completing inspections.
- Re-train operators in the procedures for completion of these inspections.

Due to the differences in surface conditions seen during pipe lift and berm construction activities, the existing form will be also evaluated to determine if separate inspection criteria is necessary. A second form, to be used only for areas under construction may be implemented if the criteria are deemed significantly different.

The review of the inspection form is currently underway. Implementation of changes will be accomplished and submitted with a revision of the Tailings Dam Dust Control Management Plan at a later date.

Manpower:

Currently the tailings impoundment operations crew number approximately twenty personnel. This main crew operates on a "day shift" schedule which runs Monday through Friday from 6:30 am through 3:00pm. They are trained to perform a number of daily tasks, including dust control activities, regular operation of the tailings impoundment, and construction activities. A smaller crew and supervisor may operate on Saturdays to complete additional tasks, and perform dust control activities as necessary. Mill operations personnel, known as "shifters" operate at the tailings impoundment on a 24/7 rotating schedule, with two shifters working at all times. The shifters operate the tailings pumping station and tailings pipeline, and are trained on water trucks to assist in dust control activities as needed.

The manpower situation at the impoundment is currently being reviewed to identify changes that can be made to improve weekend coverage.

Technology/Systems:

Sierrita is also exploring options for improving technologies used for dust control, as well as tracking and predicting potential areas of concern on the impoundment. Additionally, Sierrita is currently in the process of identifying and testing new dust suppressant products for use on the surface of the tailings impoundment. Due to the construction standards for tailings impoundments, surface application of dust suppressants must be carefully investigated, reviewed and tested prior to implementation. If a suitable material is identified during the review, test plots will be established and monitored for effectiveness. Any new practices that arise out of this investigation will be incorporated into the Tailings Dam Dust Control Management Plan.

\* \* \*

As demonstrated above, Sierrita has an aggressive plan in place for dust control, and was implementing that plan during the alleged opacity event. Furthermore, Sierrita is committed to continuous improvement of dust control measures in order to prevent excess opacity from our operations. Sierrita believes that the foregoing information addresses the concerns raised in the NOV.

Please contact me at 520.393.2603 if additional information is necessary.

Sincerely,



Kali Hoyack  
Environmental Engineer II

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Certification of Truth, Accuracy and Completeness

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete.

John Broderick, Vice President and General Manager



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(signature)

(date)