

Long Baseline Neutrino Facility (LBNF) Update

Community Informational Meeting

27 July 2022

Outline

- Opening
- Toxicologist Report & Findings
- Dust Mitigation Activities
- Summary
- Questions & Answers

Patrick Weber

Dr. Gary Krieger, MD

Josh Willhite

Patrick Weber

Open Discussion

Toxicologist Report & Findings

Dr. Gary Krieger, MD

Toxicologist Report & Findings

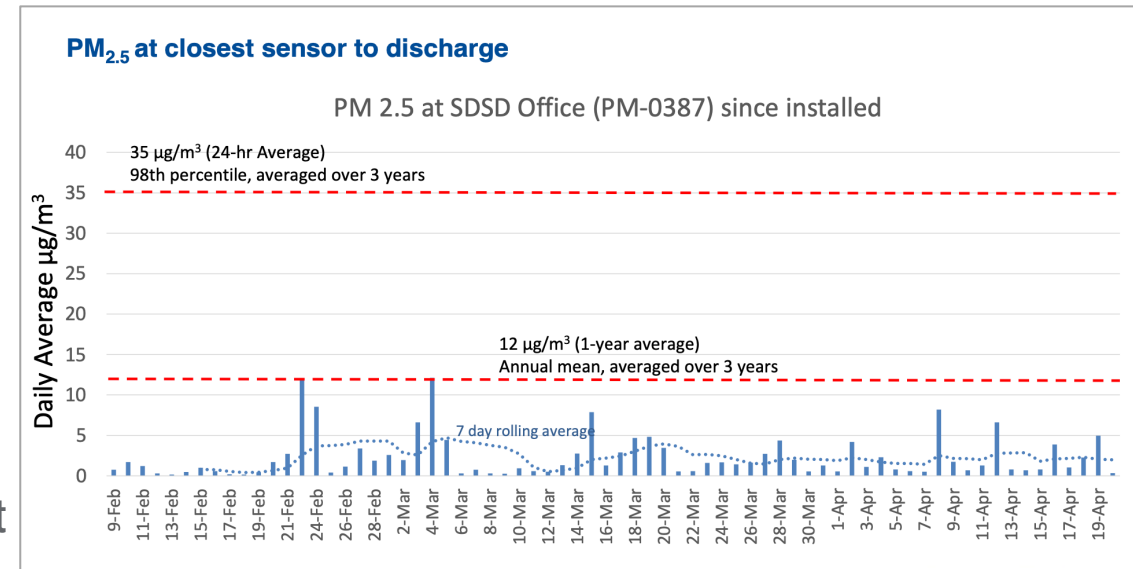
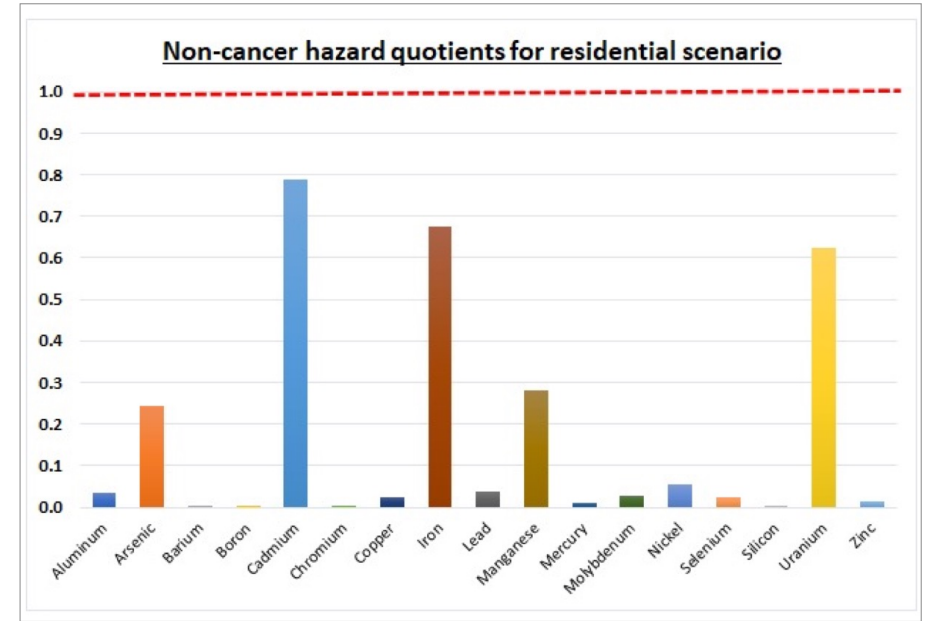
Last meeting (April 20): Had results from the analysis that looked for metals in soil samples

- Findings:
 - LBNF excavation soils passed the screen: Do not present increased risk of cancer or non-cancer health effects to children or adults living on the excavated soil.

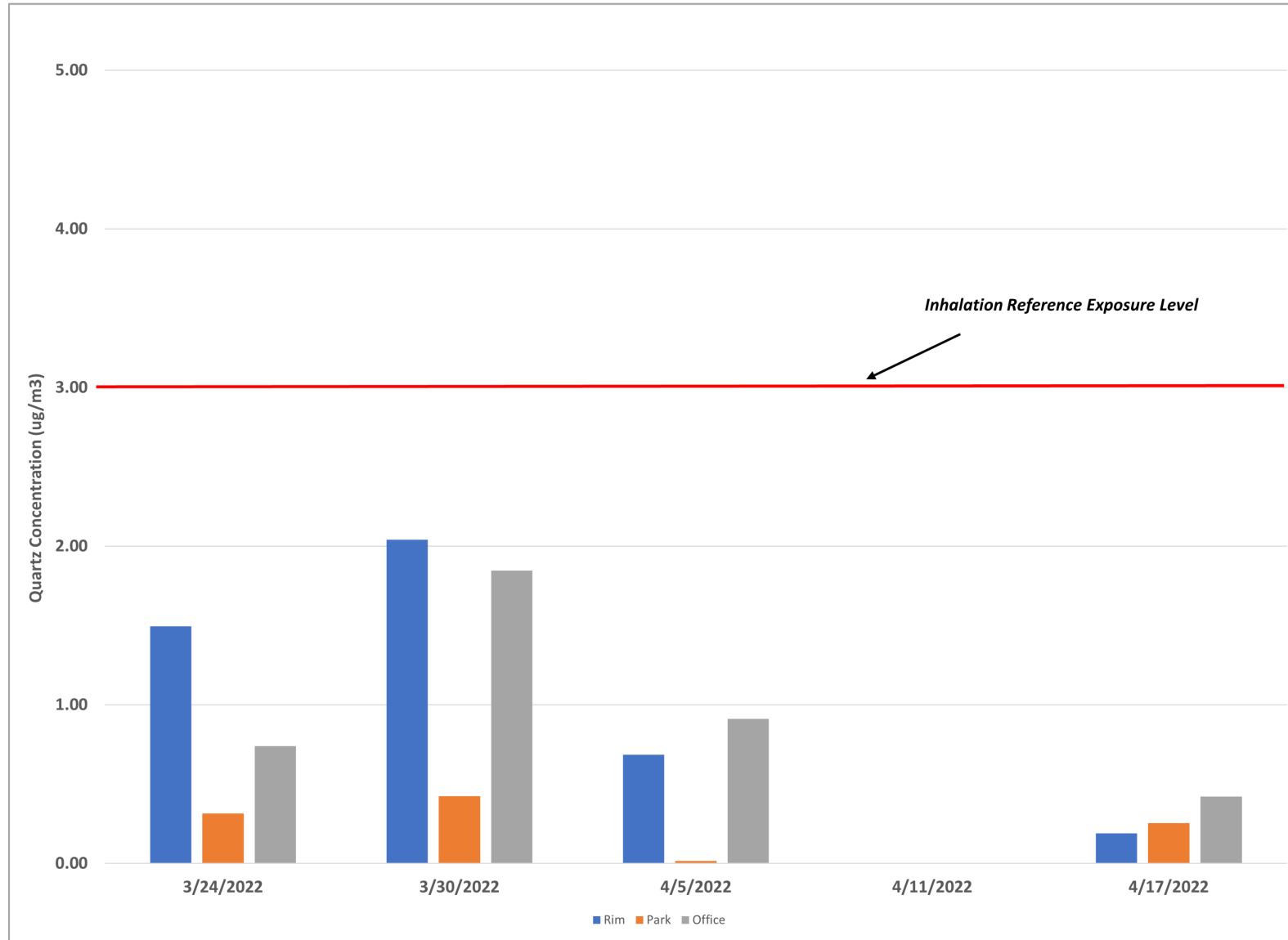
Last meeting: Had data on size of the dust particles:

- Findings:
 - Fine fraction site-related PM <2.5 micrometer is quite low and well below health-based regulations specified in National Ambient Air Quality Standards (NAAQS)
 - If ALL of the measured LBNF fine PM were crystalline silica it would still not pose a significant health hazard as the concentration and exposures are extremely small
- Nevertheless, in an abundance of caution, additional samples were being collected and analyzed

Today: have results on the crystalline silica content of the dust

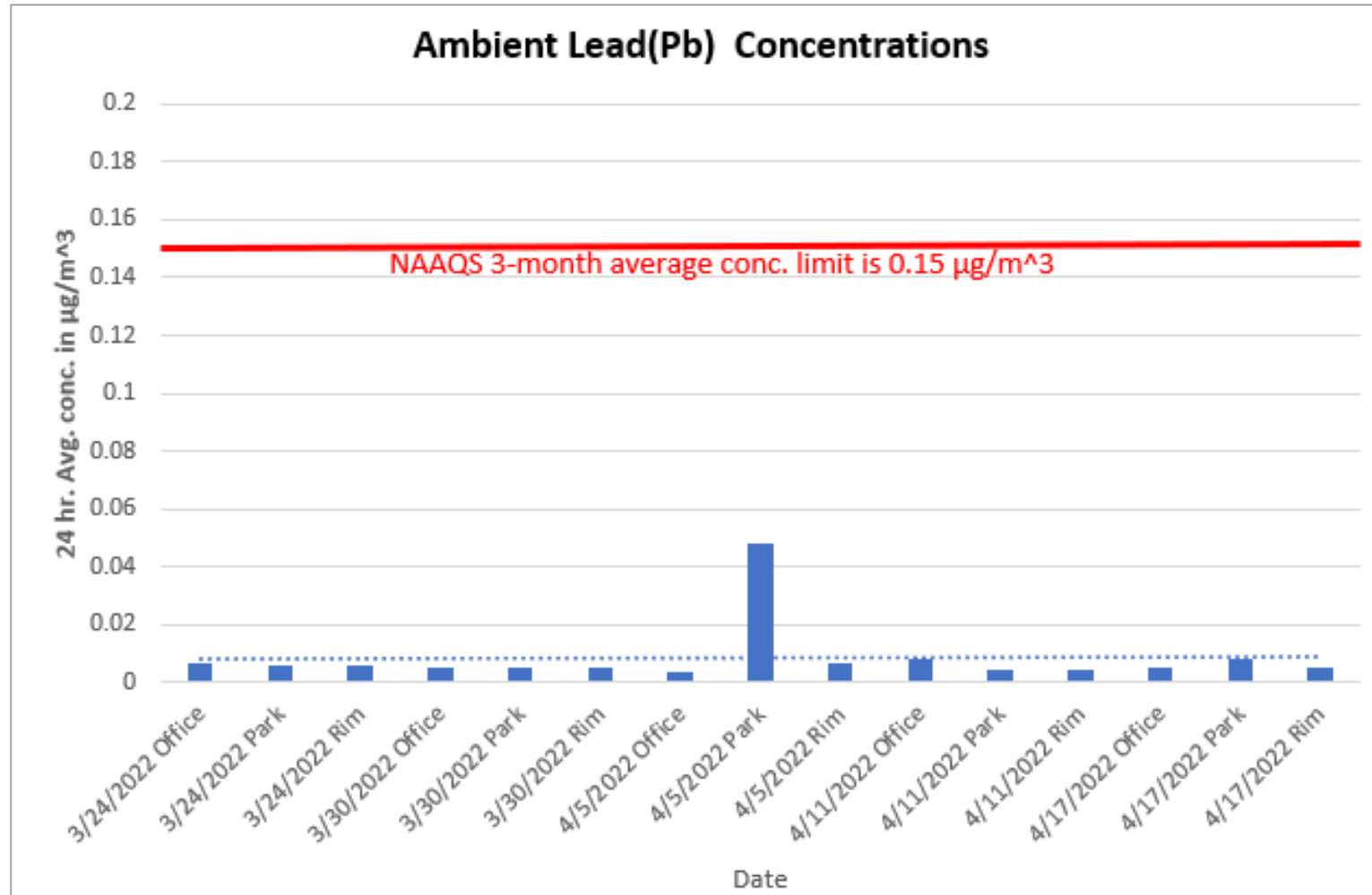


Crystalline silica test results by X-ray diffraction (PM 4.0 particulates)



- Data collected by samplers put into the Manuel Brothers Park and other public spaces
- General community exposure is 3 $\mu\text{g}/\text{m}^3$ of crystalline silica without any appreciable health risk
- The project's analyzed concentrations are below the health protection risk-based level
- Community health risk is de minimus
- On 4/11/2022, results were below detection limit

Ambient Lead Concentration Data



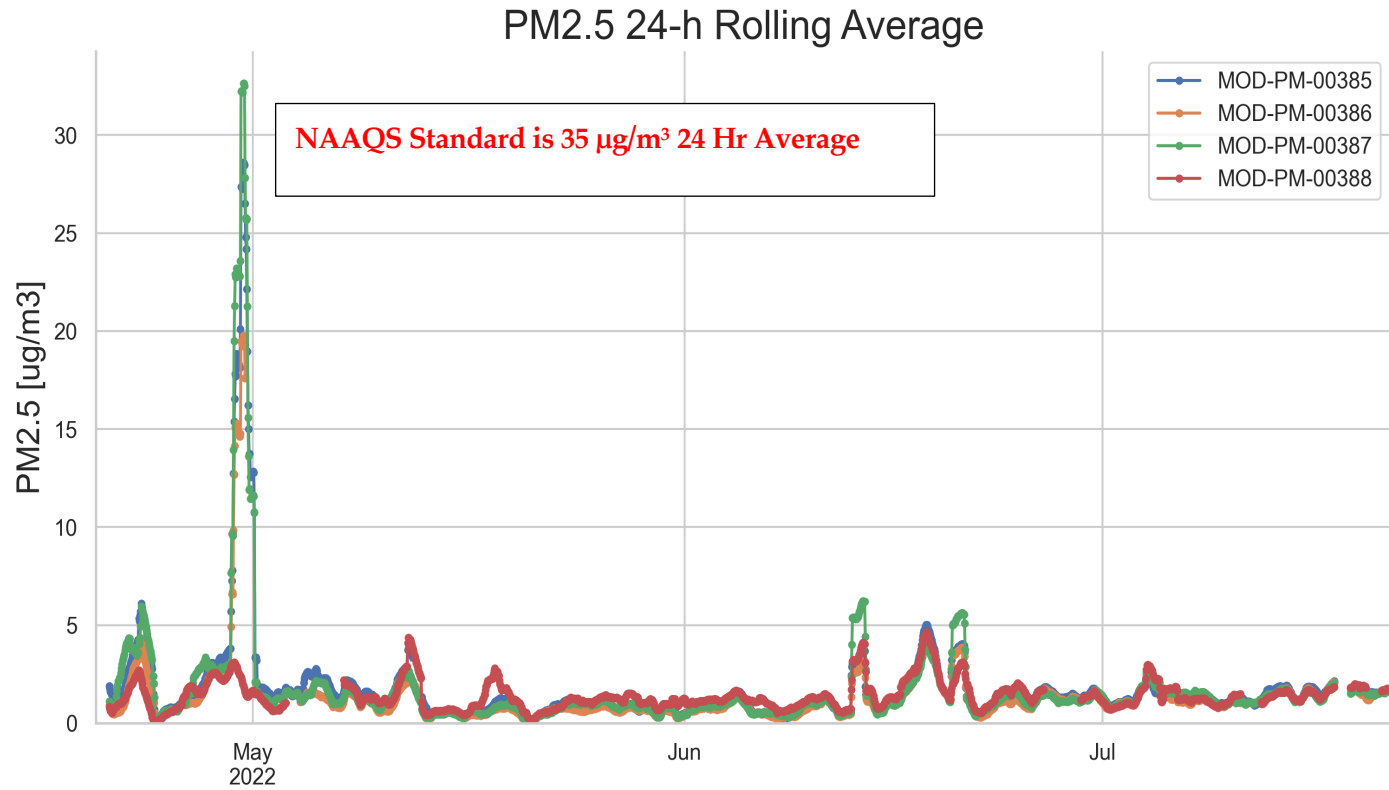
- Sampling performed per EPA’s 6-day sampling protocol on the dates of 3/24, 3/30, 4/5, 4/11 and 4/17/2022
- Lead is the only metal that has a NAAQS limit
- Other metals tested (i.e. Iron, Arsenic and Cadmium)
- Winter storm on 4/5/2022 with potential for wind blown fugitives
- **No rock discharge on 4/5/2022**
- Highest Arsenic concentration: $0.012 \mu\text{g}/\text{m}^3$ also on 4/5/2022

Dust Mitigation Activities

Josh Willhite

PM_{2.5} Quant Air Quality Monitoring

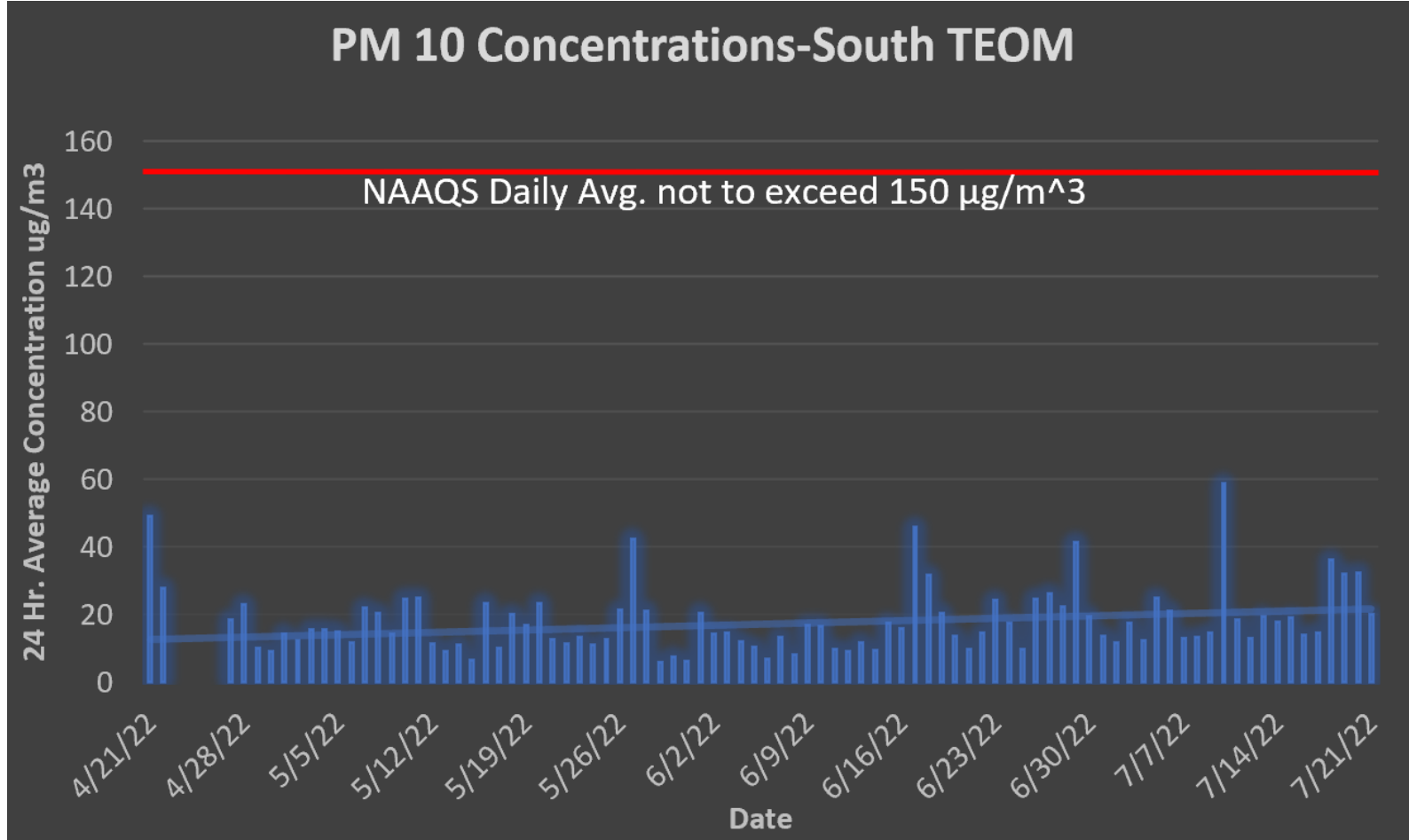
Current PM 2.5 Monitor Locations



- Peak at end of April corresponds with dense fog, which the instrument cannot distinguish from dust.
- Lower concentration data at that time is from Spearfish location.

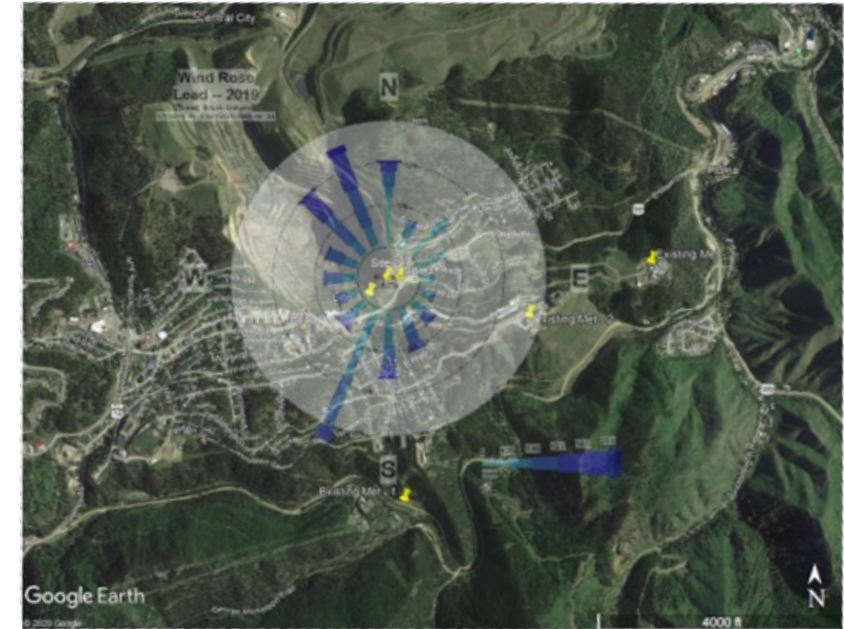
- PM 2.5 monitor positioned adjacent to the South PM 10 monitor
- South PM 10 monitor location since June 28th
- Side by side data comparing PM 2.5 and PM10 (Criteria Air Pollutants)

PM10 Concentrations-South TEOM



- 4/23/2022-4/26/2022 had no readings as the PM10 inlet was plugged by snow. Wind gust recorded at 75.6mph on 4/23.

Wind Rose



- South PM 10 monitor located to measure dust blowing into the most likely direction based on annual wind patterns
- Enhanced dust controls have led to lower PM10 concentrations year over year

Material in Open Cut

- The darker areas of the stockpile are treated with tackifier (EG2600) and water to keep the dust from being emitted from the Open Cut (See Bench Nos. 1, 2, 3, 4 and 5).
- The stockpile areas that are lighter gray will be treated with capping agent (DustBind Plus) below Bench No. 5



Drone Application on 6/22/2022

- Material Capping of downslope benches
 - Drone application of NALCO DustBind Plus (non-hazardous).
 - Subcontractor sprayed DustBind Plus at 20% concentration from 6/22/2022-6/24/2022.
 - “Cap” the pile
 - The project will continue to evaluate effectiveness through PM10 monitoring and visual opacity.
- We also continue supplemental water suppression.
- We will continue to clean Manuel Brothers Park as needed.



Dust Mitigation Activities Going Forward

No.	Engineering Control Name	Purpose	Date
1.	Agricultural Helicopter	A helicopter flies over the Open Cut and releases capping agent in a controlled manner on the untreated stockpile.	August 2022 Exact date to be announced on social media
2.	Remote Control Agricultural Land Rover	A remote-control battery-operated piece of equipment which descends into the Open Cut on a winch and applies a capping agent on the untreated stockpile.	Late August 2022
3.	Optimizing water sprinkler/cannons	Apply water where possible using sprinklers and water cannons.	Ongoing

Helicopter Application



Helicopter Flight Path



Public Safety Precautions:

- Traffic will be cleared on Highway 85 using flaggers during helicopter crossing in accordance with SDDOT standards (<5 minute closure durations)
- Flaggers will have constant radio communication with the helicopter pilot.
- Homestake Trail to be closed and monitored in crossing zone.
- Total flight time approximately 4-5 hours

Helicopter - FAQ

No.	Question	Answer
1.	Where will the helicopter flight operations stage from for landing/fueling?	Pending final arrangements, flight operations will stage from the Black Hills Regional Airport (Spearfish, SD) including all fueling and aircraft maintenance.
2.	Where and how will the capping agent be mixed and loaded for spraying operations?	A staging area will be located on SDSTA property, and the Subcontractor will prepare the mixture in 5,000 gallon "dip tanks." The helicopter will make an aerial approach, fill a specialized 700-gallon bucket on the end of a line, and proceed to the Open Cut for dispersal area.
3.	How will the mixed capping agent be applied to the stockpile?	The specialized bucket includes a pilot-controlled valve that will be used to make a controlled release of the capping agent onto the pre-determined locations on the stockpile. The release can be metered to provide the optimum flow rate to control the coverage.

Helicopter - FAQ

No.	Question	Answer
4.	How is it determined where the capping agent will be applied on the stockpile?	A mapping drone was used to create a 3-D model of the stockpile which is now approximately 170,000 sf. The pilot's flight plan will be based on the map which he will use to guide and track the dispersal areas along with ground observers.
5.	How long will it take to complete the spraying of the stockpile?	Spraying operations are likely to take 4-5 hours depending on weather conditions.
6.	Is the DustBind product (capping agent) harmful to humans and /or animals?	<ul style="list-style-type: none">• The dust-binding material, called Dustbind Plus, is commonly used in industry. It poses no health, environmental or physical hazards. It poses no threat to aquatic organisms. The Safety Data Sheet classifies the NALCO DustBind Plus as "Not a hazardous substance or mixture."• The NALCO DustBind Plus product was chosen after careful consideration from all stakeholders. The project worked closely with SDSTA to select this product based on effluent-based water quality standards.• The Dust Bind decomposes to carbon oxides thus sugars and poses no threat to the environment or humans.

Helicopter - FAQ

No.	Question	Answer
7.	During the spraying operation as the helicopter goes to and from the Open Cut, will the mixed capping agent drop onto public spaces, houses, general public?	The flight path will be established to avoid any overflight of third-party properties. The Subcontractor will coordinate the appropriate traffic control measures with the City of Lead and the State for US-85 overflight.
8.	Is there a chance of overspray into the park, adjacent properties or vehicles? And if so, can the product cause damage? What is the recommended cleaning procedure?	Flight operations will be timed and executed during favorable wind conditions (preferably 15 mph or less but up to 30 mph and from the South/Southwest). With this constraint and the use of a 150' long line, the point of dispersal is well below the Open Cut edge. Additionally, the flight plan will include a stand-off distance of 225' radius at all times which will further control the chance of overspray reaching pedestrians or vehicles. The capping agent can be cleaned-up with plain water before it dries.
9.	Will there be overspray of the DustBind capping agent into the park?	See previous answer. Upon completion of spraying operations, the Subcontractor will ensure the park is clean for public use.

Helicopter - FAQ

No.	Question	Answer
10.	Who will control access into the public areas during spraying operations?	<p>The Subcontractor developed an approved work plan/flight plan in advance of spraying operations which will define certain stand-off distances and restricted areas. It is anticipated this will include parts of the park and skating rink.</p> <p>The Subcontractor will work with the City of Lead in advance of the spraying operations and establish control areas. The Subcontractor will control the pedestrian access into the park and the City of Lead will control access on the streets, if required.</p>
11.	Who will be contacted for an Emergency Response?	<p>A. City of Lead Police and Fire Department</p> <p>B. The Subcontractor retains the services of an emergency response firm which would be activated in the event of a significant issue including an uncontrolled landing.</p>

Helicopter - FAQ

No.	Question	Answer
12.	At the point of dispersal, how close to the ground is the bucket? If this is minimized, does it help control overspray and drift?	Approximately 100', however this will be adjusted by the pilot to adjust for wind, weather and coverage conditions during the operation.
13.	How long will the capping agent be effective?	The capping agent degrades over time but should provide protection for several months. Future applications may be required by helicopter, drone or rover, pending evaluation of the results. Future rock discharge periods, sequence and long-term weather patterns will also assist in the mitigation of dust.
14.	What safety precautions and preparatory plans are in place to manage and control work?	Prior to flight operations, an approved work plan will be developed by the Subcontractors, and they will manage all the flight planning and FAA required documentation as well as the DOE approved flight request. In addition, a flight safety meeting will be held with all the involved parties before flight operations commence in the field.

Summary

- The dust is not a health hazard. However, we recognize it is a concern for the community and we will continue our efforts to minimize it.
- Multiple dust mitigation activities are in the process of execution.
- The controls that have been implemented this year have helped to substantially reduced the effects on the Manuel Brothers Park and surrounding areas.
- We will continue to monitor and clean as needed.