REVIEW OF THE COLORADO SMELTER OPERABLE UNIT 2 TOTAL SUSPENDED PARTICULATE AND METALS AIR CONCENTRATION SUMMARY

NOVEMBER 12, 2019

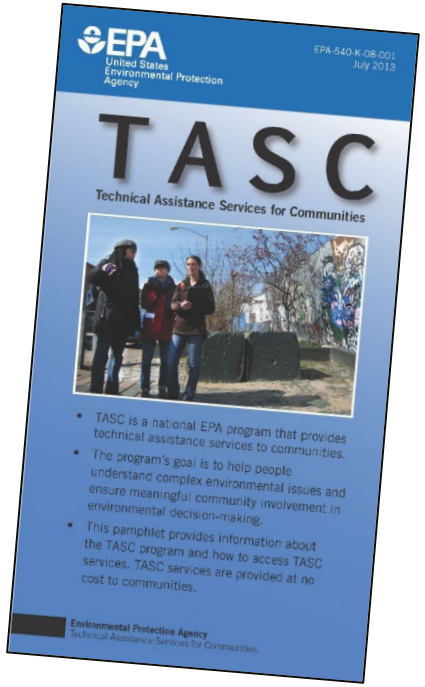
AGENDA

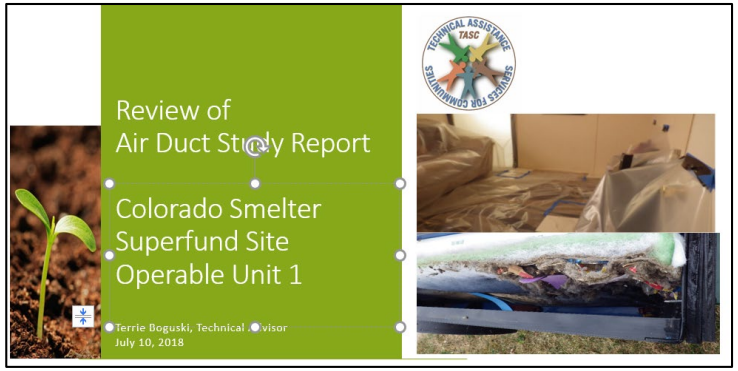
- TASC Program and Overall Results of TASC's Review
- Air Monitoring Basics
- OU2 Site Conditions
- Results and TASC Comments

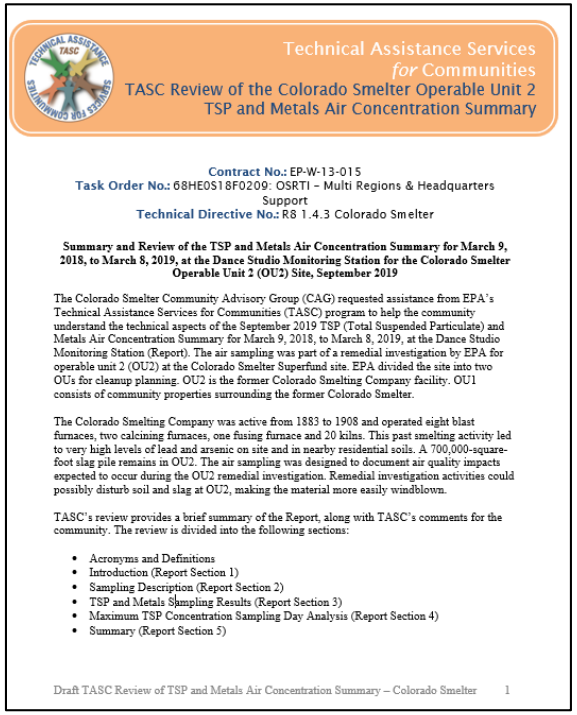
This presentation is funded by the U.S. Environmental Protection Agency's (EPA's) Technical Assistance Services for Communities (TASC) program. Its contents do not necessarily reflect the policies, actions or positions of EPA.

TECHNICAL ASSISTANCE SERVICES FOR COMMUNITIES (TASC)

- One of several EPA-sponsored technical assistance programs
- Independent services provided under contract with Skeo







OVERALL RESULTS OF THE REVIEW

- The air sampling followed EPA's guidelines for sampling particulate matter in air.
- TASC agrees with the report's finding that OU2 likely does not have a significant impact on the surrounding region as a source of windblown site-related contaminants.
- Community members may want to ask for additional information from EPA about EPA's air sampling approach and write-up of the results

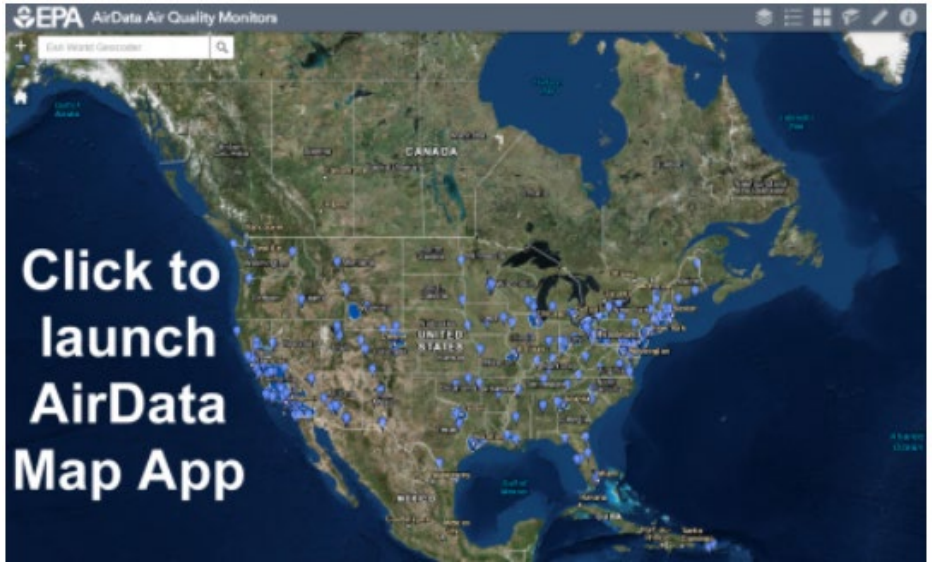
AIR MONITORING BASICS

WHY MONITOR AIR?

- Air quality regulations
- Health concerns
- Potential site-related releases

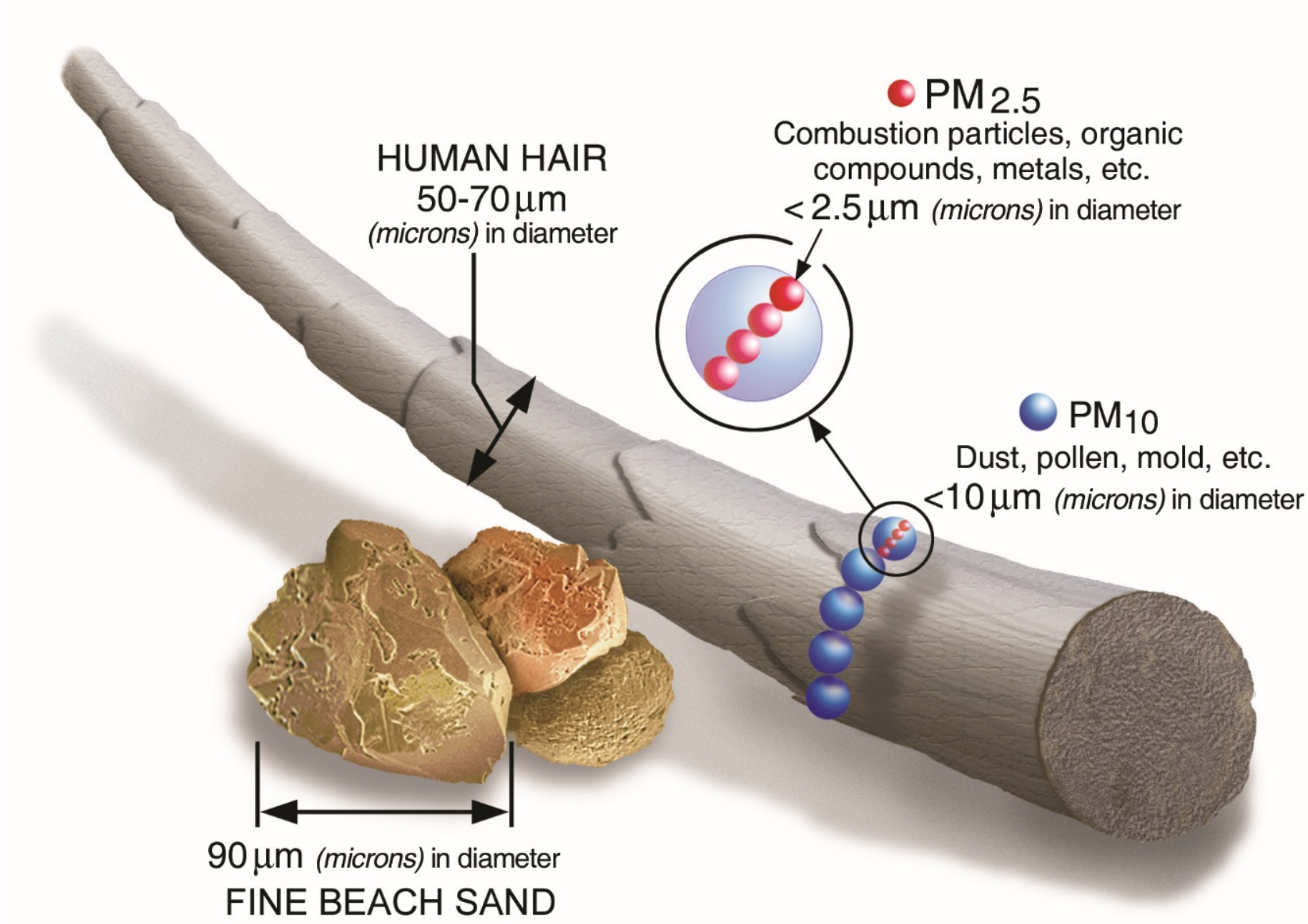
NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)

- EPA requires states to monitors for all criteria pollutants
  - Carbon monoxide
  - Lead
  - Nitrogen dioxide
  - Ozone
  - Particulate matter less than 10 microns (millimeters)
  - Particulate matter less than 2.5 microns
  - Sulfur dioxide



https://www.epa.gov/outdoor-air-quality-data/interactive-map-air-quality-monitors

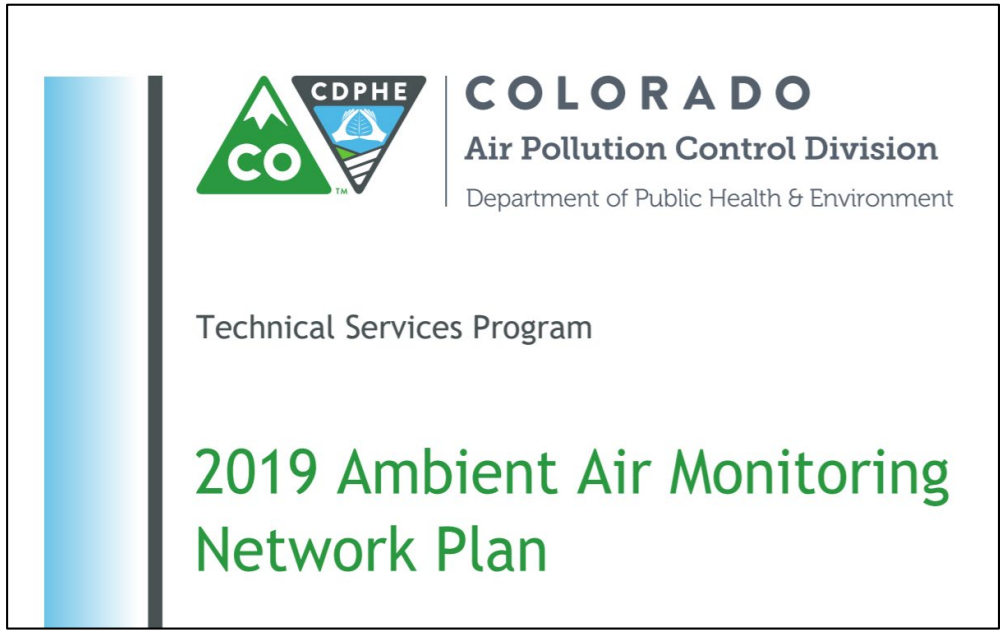
The Clean Air Act requires every state to establish a network of air monitoring stations for criteria pollutants



Source: https://www.epa.gov/pm-pollution/particulate-matter-pm-basics#PM

NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)

- Colorado has a plan
- Particulate matter 10 (PM10) and PM2.5 are monitored at Fountain School in Pueblo
- PM10 exceeded the 24-Hr maximum standard (155 micrograms per cubic meter (($\mu g\ m^{-3}$)) once in 2018 at Fountain School
  - On April 17 due to a high wind dust event
- PM2.5 did not exceed 24-Hr maximum standard in 2018 at Fountain School
- PM2.5 annual average in 2018 at Fountain School was 6.2 $\mu g\ m^{-3}$
  - EPA's annual average PM2.5 standard is 12 $\mu g\ m^{-3}$



https://www.colorado.gov/airquality/tech_doc_repository.aspx?action=open&file=2019AnnualNetworkPlan.pdf

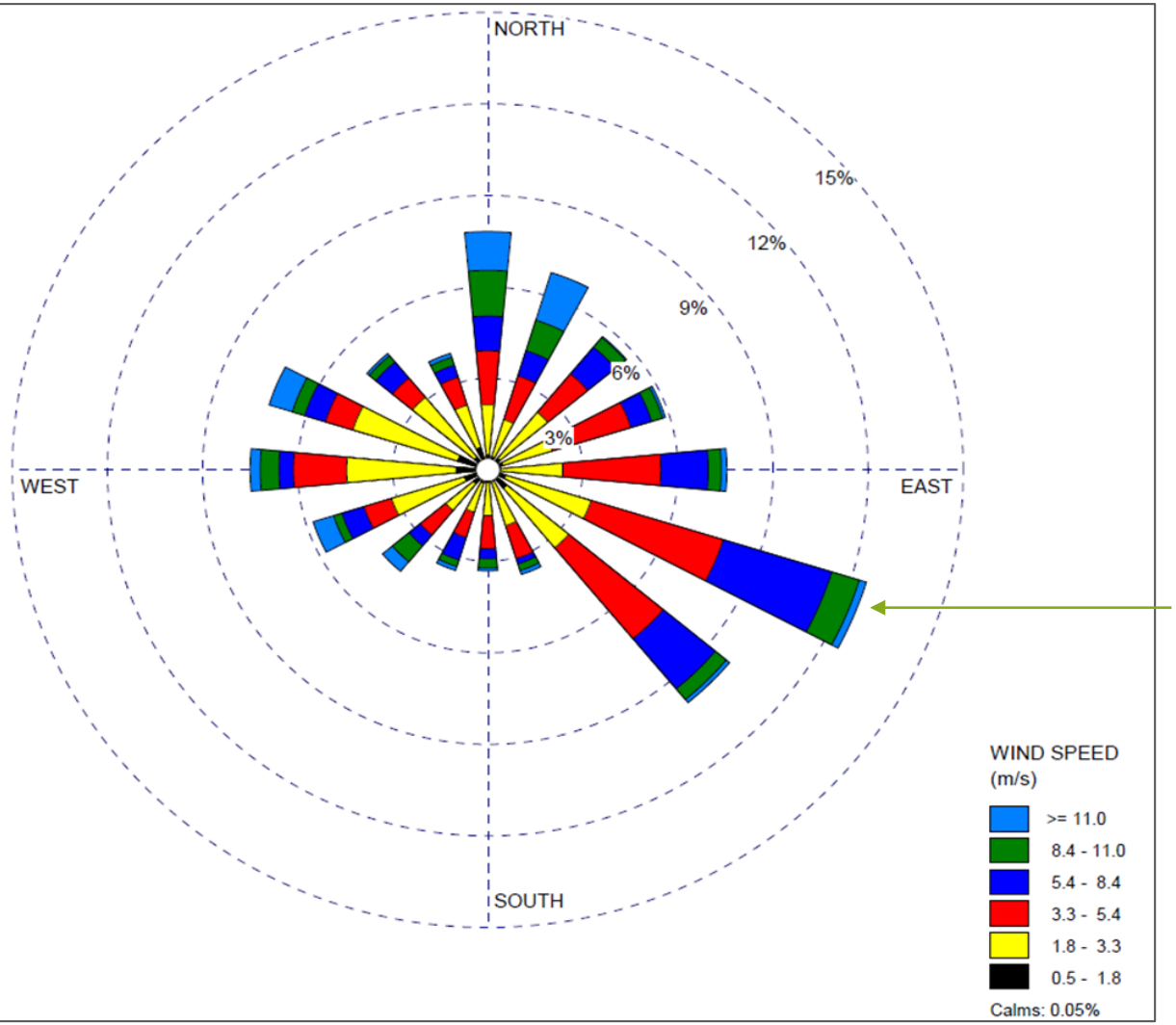
HEALTH CONCERNS

- Long term exposure to high levels of PM 2.5 and PM10
  - Coughing and wheezing, asthma attacks, bronchitis, high blood pressure, heart attack, strokes, premature death
    - Possible Sources - wood-burning stoves, forest fires, diesel engines, non-road vehicles, agricultural burning, wind-blown dust and other natural sources
- Exposure to site-related contaminants – particulate matter comprised of arsenic, lead or other metals
  - Health concerns are specific to each contaminant
  - Lead - high levels may cause anemia, weakness, kidney and brain damage, damage to a developing child's nervous system
  - Arsenic – high levels may cause cancer in the skin, lungs, bladder and kidney

PUEBLO MEMORIAL AIRPORT WIND ROSE FOR THREE-MONTH PERIOD

This wind rose depicts winds for a 3-month period from March to May 2018.

- Wind blew from each direction at least part of the time.
- Even though the prevailing winds were from the east-southeast and southeast, this only accounts for about 23% of the time.
- Wind blew from the direction of OU2 or portions of OU2 towards the sampler about 25% of the time.



Prevailing wind from E/SE

OU2 SITE CONDITIONS

Legend

- OU2
- Slag Pile

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USGS, AeroGRID, IGN and the GIS User Community.

N

0 500 1,000 2,000 Feet

Colorado Smelter

Slag Pile Investigation

DRAFT

Social Path

Approximate Areas of Slag Piles
(Area represented in Square Feet)

Colorado Smelter Site Boundary

Date: August 15, 2016

Map Projection: UTM Zone 13 N, NAD 83 Meters
Data Sources:
Social Path - U.S. EPA Region 8 (2016);
Slag Piles - U.S. EPA Region 8 (2016);
Site Boundary - U.S. EPA Region 8 (2016).

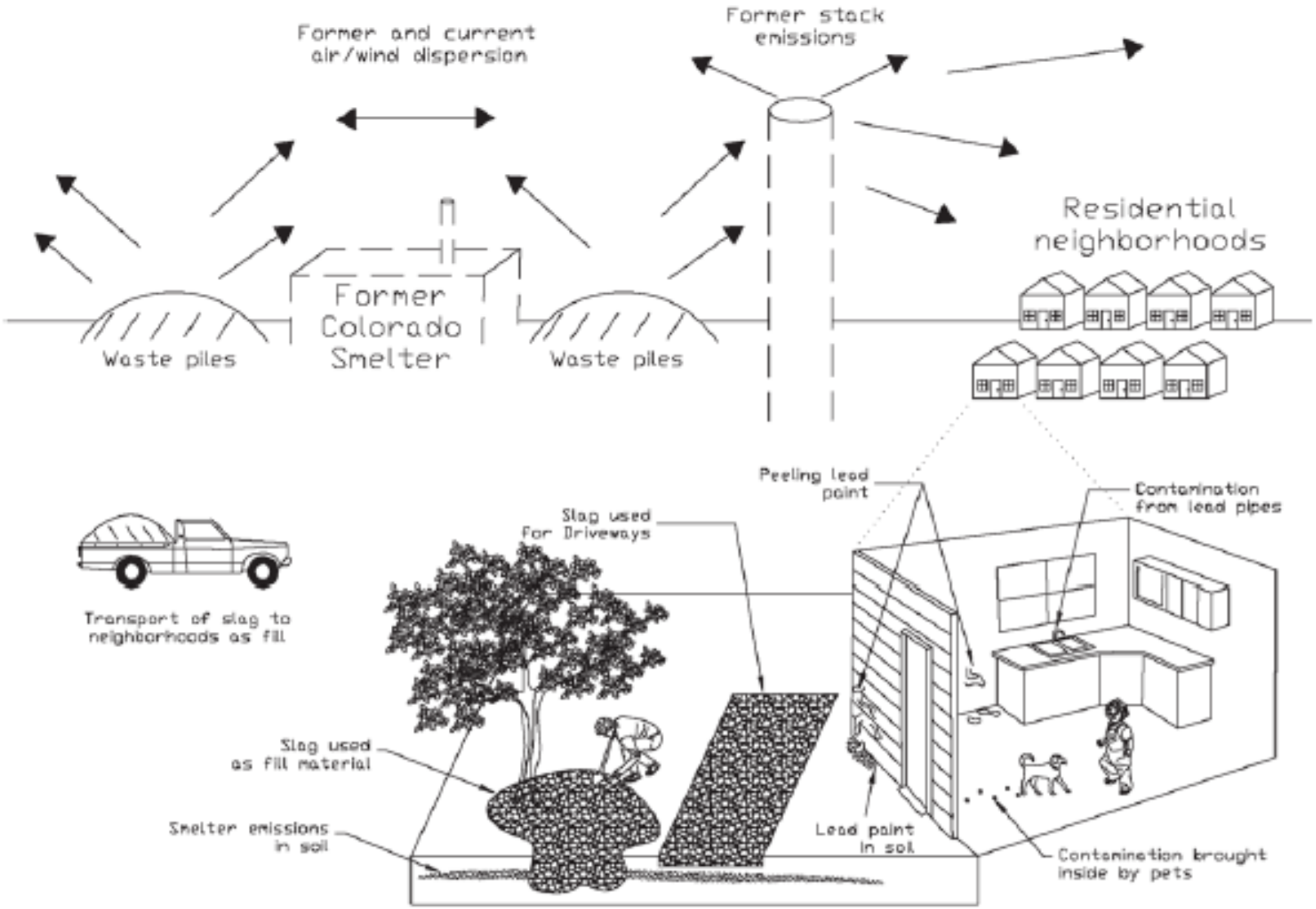
0 100 200 Feet

0 30 60 Meters

EPA REGION 8

Jeannie's Academy of Dance Monitoring Station

Figure 3: Conceptual Site Model Operable Unit 1, Pacific Western Technologies, June 2017



A PILE OF OU2 SLAG

SLAG IN OU2 COVERED BY VEGETATION

BUILDINGS THAT ARE THOUGHT TO BE ON TOP OF OU2 SLAG

THE MATERIAL IN THE BACKGROUND IS NOT WITHIN THE BOUNDARIES OF OU2

HEALTH CONCERNS

- Are site-related contaminants being emitted to air in concentrations that cause a potential public health concern?
  - Residential air Regional Screening Levels (RSLs)
    - Risk-based concentrations
    - Not necessarily cleanup standards
    - Exceedance may indicate need for additional evaluation
  - Health-based risk assessment
    - Potential exposure to site-related airborne contaminants is considered in EPA's risk assessment process
    - Risk assessment results are used to make remedial decisions at Superfund sites

Metal	RSL ($\mu g\ m^{-3}$)
Aluminum	0.52
Arsenic	0.00065
Beryllium	0.0012
Cadmium	0.001
Cobalt	0.00031
Lead	0.15
Manganese	0.0052
Nickel	0.0094
Vanadium	0.01

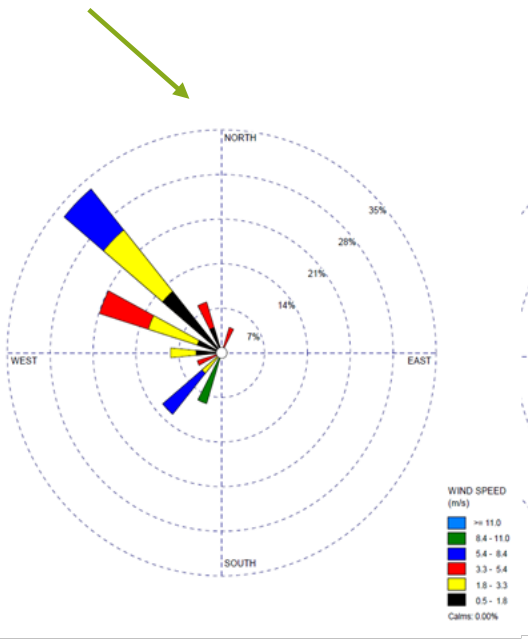
$\mu g\ m^{-3}$ = micrograms per cubic meter of air

POTENTIAL SITE-RELATED RELEASES

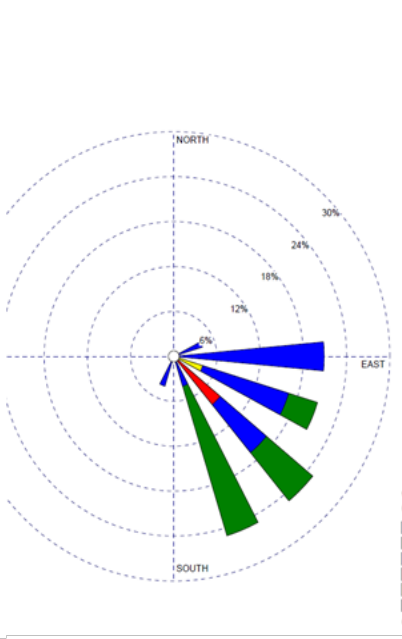
- Are unacceptable concentrations of contaminants leaving the site?
- Is work at the site causing unacceptable contaminant releases to air?
- Monitoring for site-related airborne contaminants can help answer these questions
- Key aspects of air monitoring
  - Generally downwind of site or a specific work area
  - Sometimes at a site or work zone boundary
  - Includes monitoring wind direction, speed, temperature, humidity
  - A wind rose depicts wind direction and speed for a specified time period

RESULTS AND TASC COMMENTS

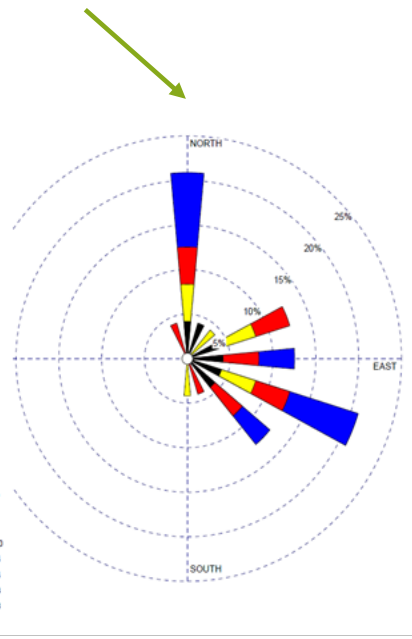
EVRAZ WIND ROSES FOR 24-HOUR TIME PERIODS



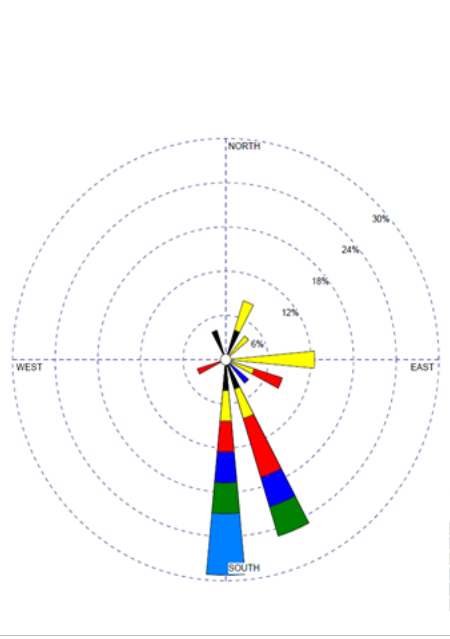
March 15



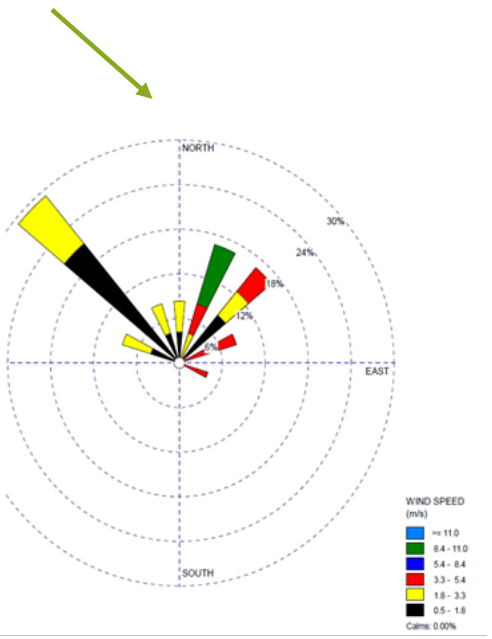
April 20



June 7



June 13



October 5

RESULTS HIGHLIGHTS

- EPA collected 59 24-hour air samples from air sampler on Dance Studio roof
- Tested for total suspended particulates (TSP) and 22 metals

Legend

- OU2
- Slag Pile

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USGS, AeroGRID, IGN and the GIS User Community.

N

0 500 1,000 2,000 Feet

RESULTS HIGHLIGHTS (CONTINUED)

- Arsenic was never detected
  - Laboratory detection limit was above the residential air Regional Screening Level (RSL)
- Lead was not detected above its residential air RSL
- Manganese average quarterly concentrations were 15 to 27 times higher than its residential air RSL, possibly related to EVRAZ Steel Mill
- Wind speeds were higher than normal for the 5 days with highest TSP concentrations
- Report concludes that the relatively low TSP and metal concentrations indicate that remedial investigation is NOT largely impacting air in the surrounding region

AVERAGE RESULTS COMPARED TO RESIDENTIAL AIR REGIONAL SCREENING LEVELS (RSL)

Metal	Q1 (µg m^{-3})	Q2 (µg m^{-3})	Q3 (µg m^{-3})	Q4 (µg m^{-3})	RSL (µg m^{-3})	Avg Qs/RSL
Aluminum	0.652	0.756	0.515	0.494	0.52	1.2
Arsenic *	<0.000996	<0.000726	<DL	<DL	0.00065	
Beryllium	0.0000578	0.0000593	0.0000428	0.0000405	0.0012	0.0
Cadmium	0.000399	0.000331	0.000323	0.000222	0.001	0.3
Cobalt	0.000626	0.000628	0.000427	0.000364	0.00031	1.6
Lead	0.0127	0.0116	0.00868	0.00771	0.15	0.1
Manganese	0.142	0.122	0.0809	0.0834	0.0052	20.6
Nickel	0.00277	0.00379	0.00215	0.00211	0.0094	0.3
Vanadium	0.0028	0.00312	0.0019	0.00212	0.01	0.2
* Laboratory detection limits for arsenic were above its RSL						
DL= laboratory detection limit						

MAXIMUM RESULTS COMPARED TO RESIDENTIAL AIR REGIONAL SCREENING LEVELS (RSL)

Metal	Q1 (µg m^{-3})	Q2 (µg m^{-3})	Q3 (µg m^{-3})	Q4 (µg m^{-3})	RSL	Avg Qs/RSL
Aluminum	1.77	2.27	0.515	0.494	0.52	2.4
Arsenic *	<0.000726	<0.00100	<DL	<DL	0.00065	
Beryllium	0.000102	0.000116	0.0000428	0.0000405	0.0012	0.1
Cadmium	0.00114	0.00124	0.000323	0.000222	0.001	0.7
Cobalt	0.00157	0.00144	0.000427	0.000364	0.00031	3.1
Lead	0.0462	0.029	0.00868	0.00771	0.15	0.2
Manganese	0.449	0.469	0.0809	0.0834	0.0052	52.0
Nickel	0.00946	0.019	0.00215	0.00211	0.0094	0.9
Vanadium	0.00815	0.0101	0.0019	0.00212	0.01	0.6
* Laboratory detection limits for arsenic were above its RSL						
DL= laboratory detection limit						

TASC REVIEW

- The air sampling followed EPA's guidelines for sampling particulate matter in air.
- TASC agrees with the report's finding that OU2 likely does not have a significant impact on the surrounding region as a source of windblown site-related contaminants.
- Community members may want to ask for additional information from EPA
  - On which of the 59 sampling dates was the wind blowing from the direction of OU2 towards the air sampler?
  - Is more evaluation of air quality planned because some results were above air Regional Screening Levels (RSLs)?

IS THE DANCE STUDIO A GOOD LOCATION?

PROS

- Location likely to be worst-case dust scenario
  - Prevailing winds
  - Location of temporary stockpile
  - Higher levels of lead and arsenic soils southeast of the former smelter
- Metals data available for this location
- Rooftop location is above street-level dust from traffic
- Rooftop location provides safety from tampering or theft

CONS

- Only one monitoring location
- May detect emissions from other sources
  - For example, EVRAZ Steel Mill, OU1 excavations, highway, other industry
- Rooftop location may not capture same contaminant levels as in breathing zone

Treat Suomi

Senior Associate

tsuomi@skeo.com

719-256-4674