Atmospheric Deposition Pail Monitoring System (ADP)

9 July 2013
Introduction / History

- Snow sampling
  - Started in 2007
  - Limited to winter months
  - Limited to when and where snow is present

- Atmospheric Depositional Pail (ADP)
  - Started in 2011
  - Not limited to winter months
  - Discrete sampling period
Data

- ADP Data
- Meteorological Data
- Tailings Placement Data
ADP Data

- Sampling started in January 2011
- 5 sampling sites
- Frequency of collection has been weekly and biweekly
- Samples are filtered then analyzed for Total Lead and Total Zinc
ADP Locations
ADP Northeast Sample Site
Meteorological Data

- 10 meter tower located to the southwest of tails
- Parameters monitored
  - Wind Speed
  - Wind Direction
  - Air Temperature
  - Barometric Pressure
  - Relative Humidity
  - Precipitation
- Measurements are totaled/averaged on an hourly basis
Meteorological Station Location
Predominant wind direction

0.0 - 4.0 mph
4.0 - 7.4 mph
7.4 - 12 mph
Tailings Placement Data

- Surface operations maintains a record of the amount of tails placed and also which cells they were placed in.
Visual Analysis of Data Collected

- Data was combined into graphs over the length of the sample period.
  - These graphs were visually analyzed for patterns that may lead to dusting events.
  - These initial analyses were conducted ‘blind’.
- When patterns were identified they were compared to loading monitored during the same time frame.
  - Loading was typical higher during these periods.
Visual Analysis of Data Collected
ADP Loading Results
NORTHEAST
Average lead and zinc daily load

µg/m²/day

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000 11,000 12,000

EAST

Average lead and zinc daily load

μg/m²/day

Average lead and zinc daily load

µg/m²/day
SOUTHWEST
Average lead and zinc daily load

µg/m²/day

WEST

Average lead and zinc daily load

μg/m²/day

## Yearly Data Analysis

### Period 1
- **Winter**
  - 01/09/2011 through 04/03/2011
  - **140 days** 38.4% 95% of deposition

### Period 2
- **Spring, Summer, Fall**
  - 04/03/2011 through 11/14/2011
  - **225 days** 61.6%

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<td>West</td>
<td>169,704 µg/m²/year</td>
<td>36,196 µg/m²/year</td>
<td>172,879 µg/m²/year</td>
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<tr>
<td>Southwest</td>
<td>72,118 µg/m²/year</td>
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### Period 1
- **Winter**
  - 01/09/2012 through 02/06/2012
  - **117 days** 32.6% 87% of deposition

### Period 2
- **Spring, Summer, Fall**
  - 02/06/2012 through 10/15/2012
  - **242 days** 67.4%

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Analysis of graphs / data

- Wind direction is primarily from the north / northeast during these months.
- Ambient temperature drop below freezing more frequently in 2011 compared to 2012.
Strategies for dust abatement

- **Physical**
  - Snow fence and concrete blocks
  - Snow removal limited to only active areas
  - Interim slopes ‘armored’ with rock
  - Outer finished slopes hydro-seeded where appropriate

- **Topography / texture**

- **Chemical**
  - Surface engineering is currently investigating the application of a polymer to the tailings surface

- **Operational**
  - Difficult
17 January 2012
2B Meteorological Conditions from 2012-01-16 to 2012-01-23
Moving Forward

- Continue to use the ADP system to monitor fugitive dust at tails.
- Increase the temporal resolution by using real time electronic nephelometry (data logging).
- Incorporate long term regional forecasts into the operations of the tailings facility (NPDO).