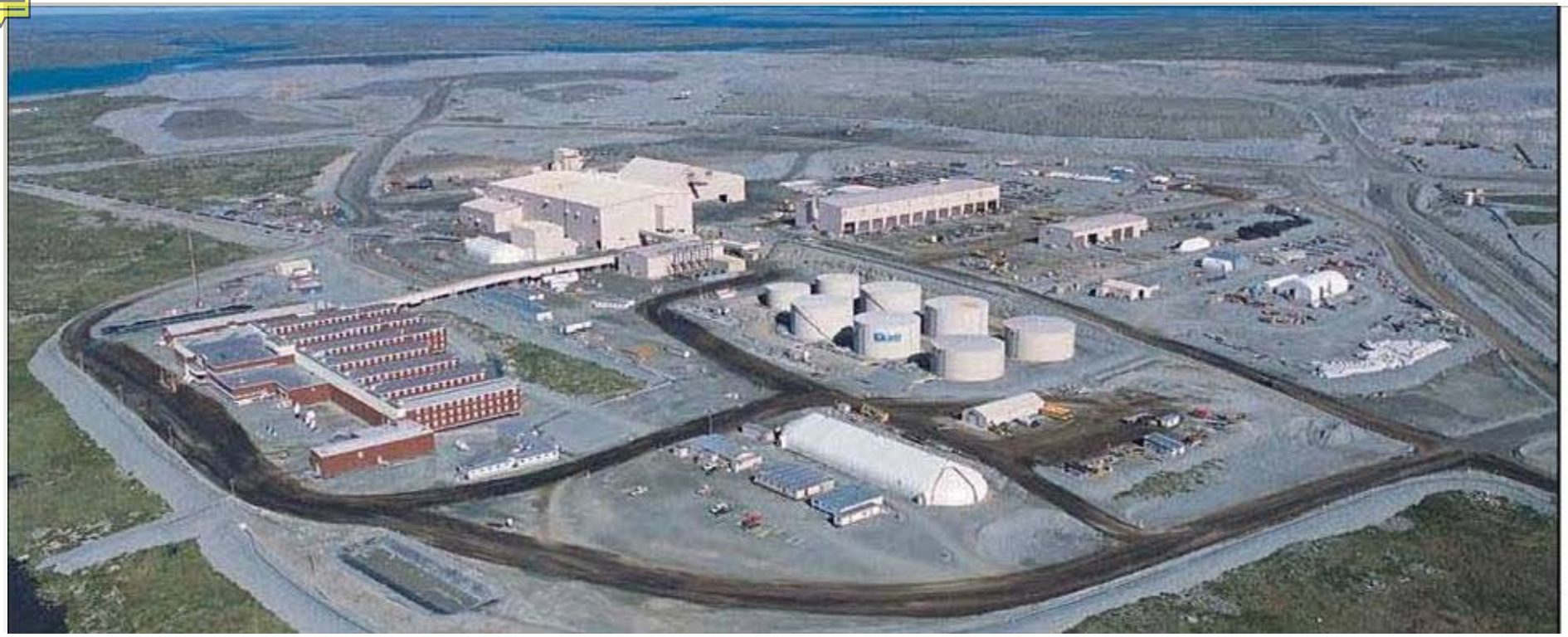

EKATI Air Quality Monitoring Program

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Air Quality Monitoring Program Overview

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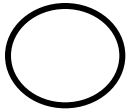
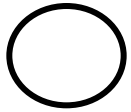
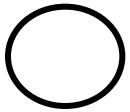
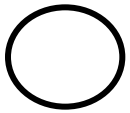
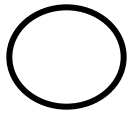
VEC	Effect	Predicted Effect (1995 EIS)	Observed Effect (2006 to 2008)
Air Quality	**Air emissions from process plant operation**		
Air Quality	**Air emissions from diesel power generation**		**Additional analysis required**
Air Quality	**Roads and road traffic create fugitive dust**		

<u>Adaptive Management Actions</u>:

- Programs initiated to reduce air emissions
- EK-35 dust suppression implemented on airstrip

Negligible
Negligible/Minor
Minor
Minor/Moderate
Moderate
Major

Air Quality Monitoring Program Overview

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Program Initiated in 1998 - Six Key Components:

1. Dustfall monitoring (initiated in 2006)
2. High volume air samplers (HiVols or HVAS)
3. Continuous air monitoring (CAMB)
4. Snow core sampling (every three years)
5. Lichen sampling (every three years)
6. Greenhouse Gas Reporting

Dustfall Monitoring

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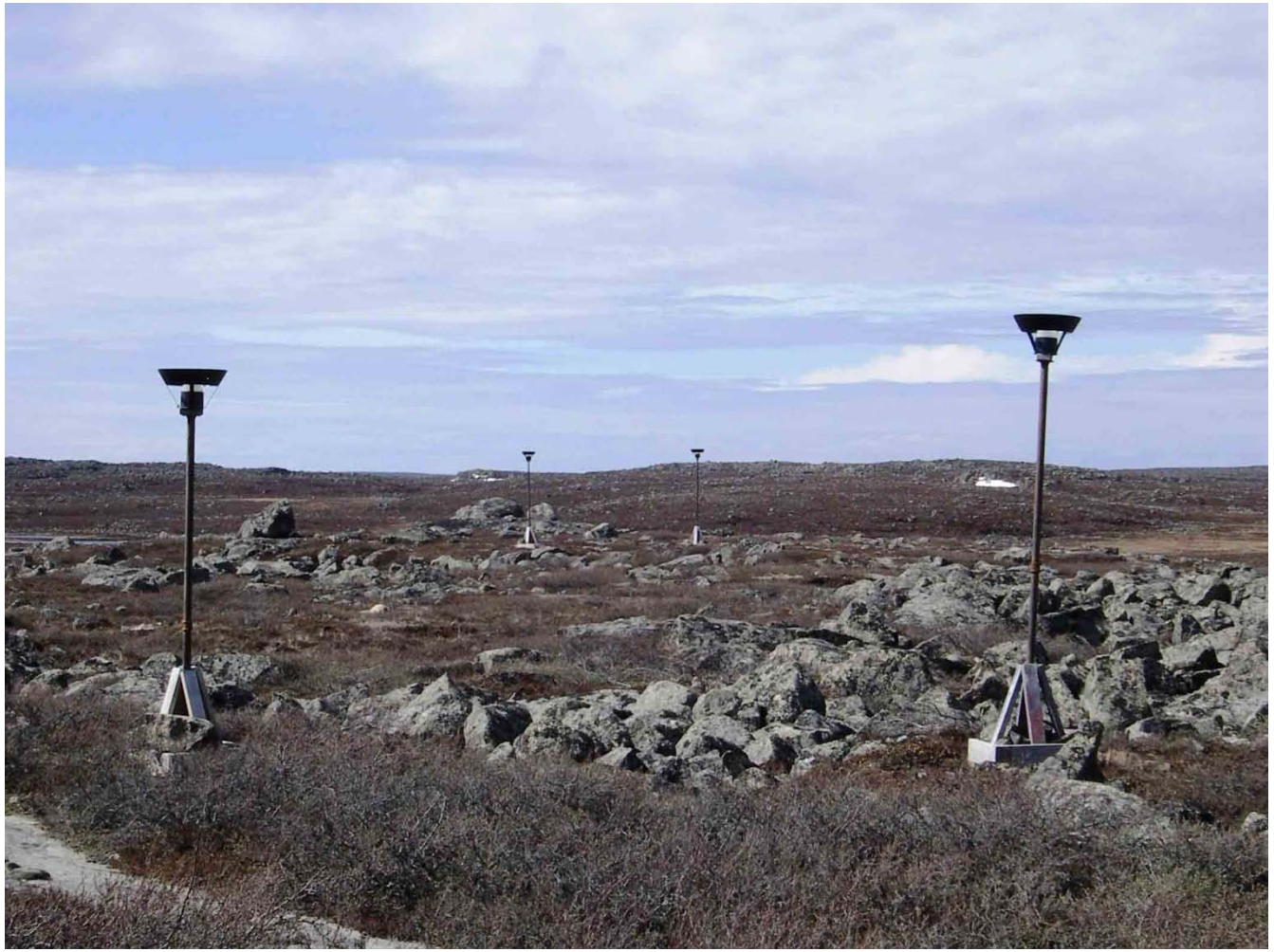
Dustfall Monitoring

- 17 dustfall stations
- Collect dust for 30 days during June, July, and August
- Measure Particulate Matter and Metals
- Two background sites AQ-49 & AQ-54 (coincide with snow and lichen background sites)
- Fox and Misery haul roads – monitoring 30m Upwind, 30, 90, 300 & 1000 m Downwind
- 3 sites located 125, 162 & 280 m from the airstrip
- 2 sites adjacent to the LLCF tailings facility



AQMP Monitoring Sites

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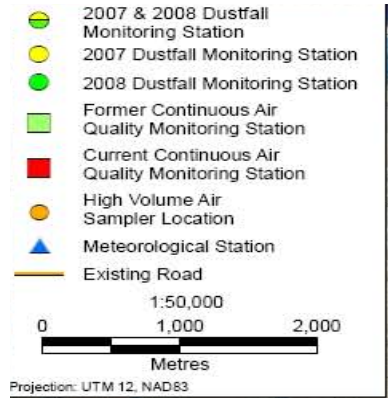

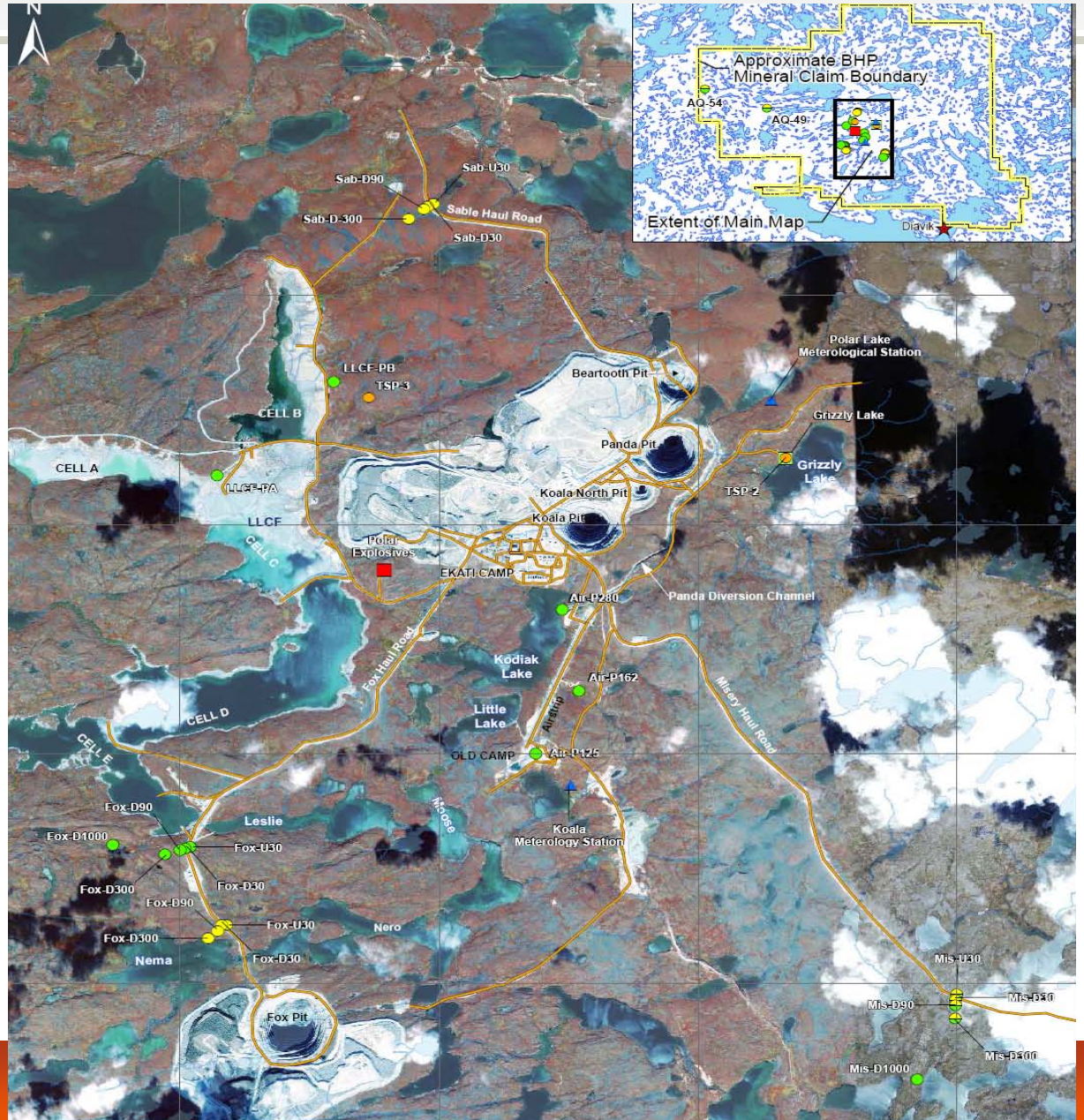

Dustfall Results and Trends

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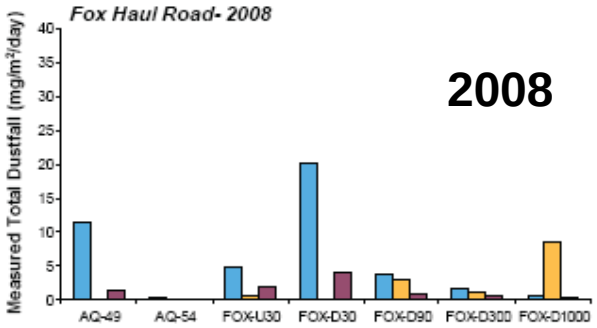
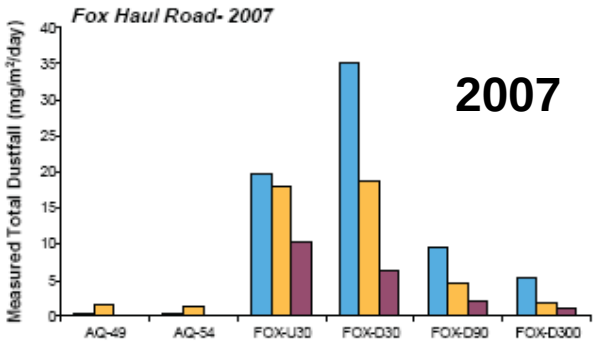
Key Findings

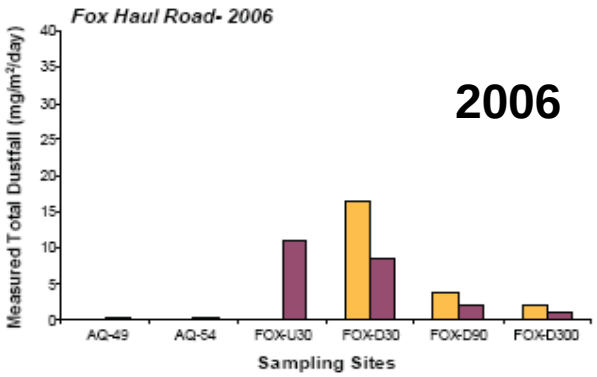
- 2006-2008 results suggest that dust deposition was highest at Fox Haul Road, followed by Misery & Sable Roads
- Dust deposition at Misery was lower in 2008 compared to 2006/07 due to inactivity at the Misery Pit
- A general trend of dust deposition decreasing from the centerline of the haul road was evident.
    - Dust suppression was implemented in the drier months as needed on haul roads using a combination of water and DL-10

Dustfall Monitoring Results and Trends

Fox Haul Road:

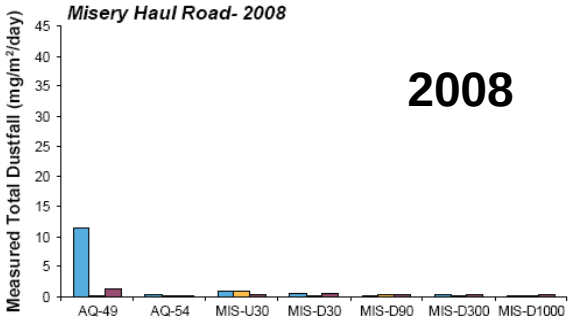


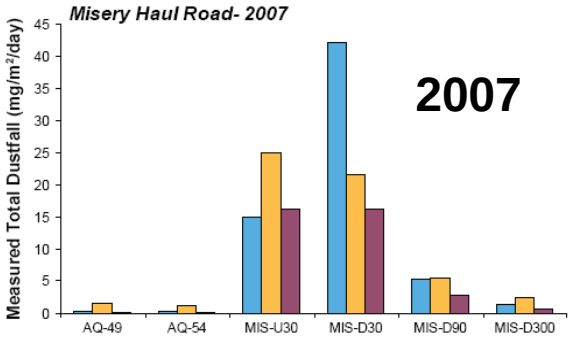


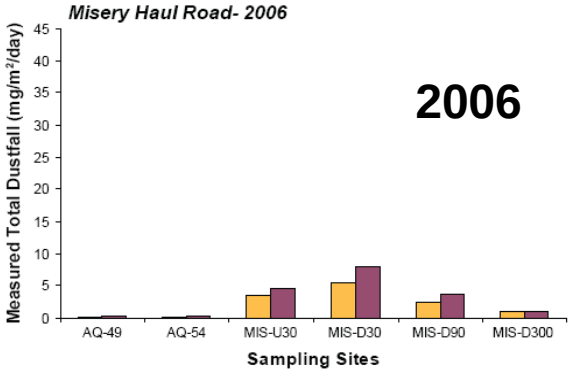


Note: Reference stations AQ-49 and AQ-54 are provided for comparison.

Misery Haul Road:





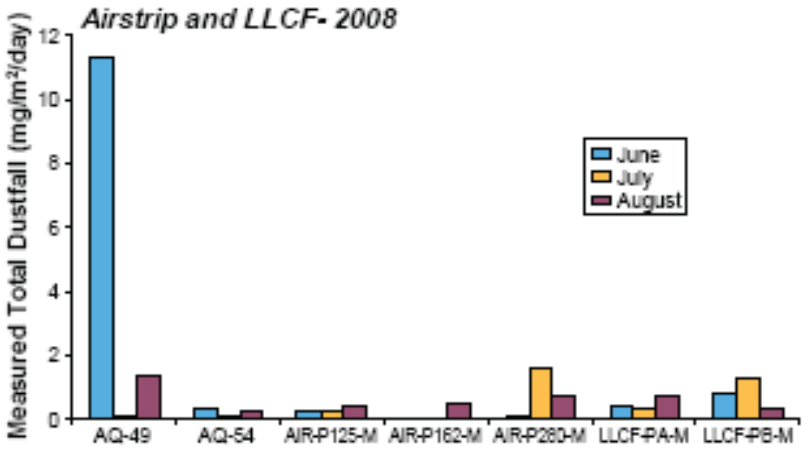


Note: Reference stations AQ-49 and AQ-54 are provided for comparison.

Dustfall Monitoring Results and Trends

Airstrip and LLCF Results:

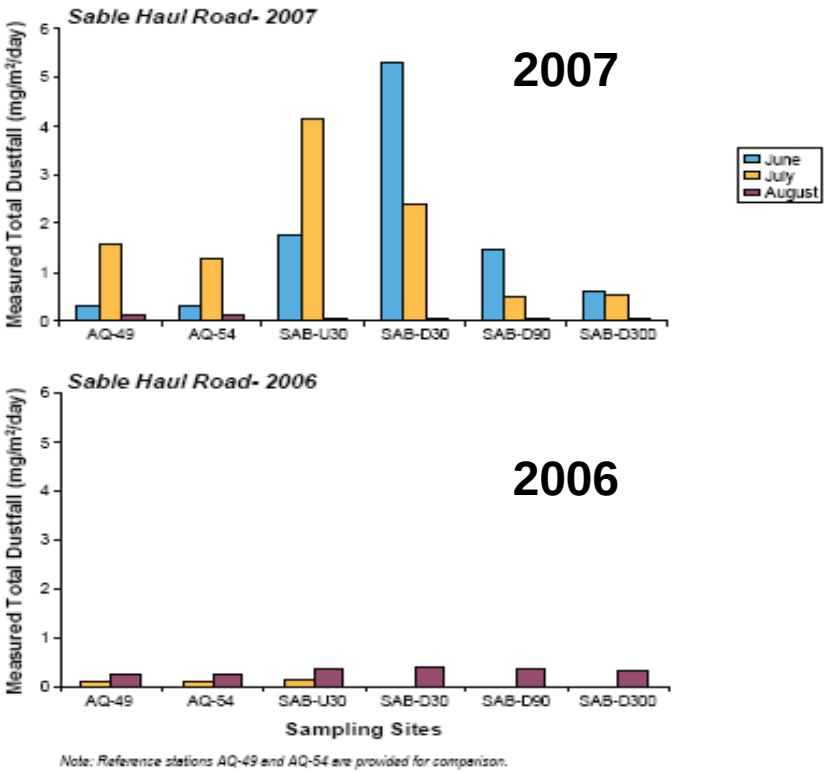
- EK-35 was used for dust suppression on the airstrip during drier months in 2006 and 2008
- Initial results suggest dustfall levels are less than background levels at the airstrip stations sampled.
- Additional years of data collection at the airstrip and LLCF are required to make any general conclusions.



Dustfall Monitoring Results and Trends

Sable Road Results:

- The Sable haul road did not have haul traffic in 2007 nor was dust suppression used on this road in 2007
- Data suggest that at Sable Road in 2007 by 300 m dust levels settled to background levels
- Sable monitoring station was disabled in 2008 due to inactivity



Dustfall Monitoring Future Directions

- Dustfall sample collection methodology is to be reviewed before the 2011 AQMP to address concerns of contamination of samples by helicopter propeller blast or contaminated container lids.

- Dustfall sampling will continue as per the 2006-2008 AQMP

High Volume Air Sampling

High Volume Air Sampling Results

Grizzly Lake – Station TSP-2:

- Average daily TSP concentrations at TSP-2 measured in 2007/08 were less than the Government of NWT TSP daily maximum criteria of 120 µg/m^3.

Cell B – Station TSP-3:

- On two occasions the instantaneous maximum daily concentration at TSP-3 exceeded the NWT daily standard
- However, average daily TSP concentrations at TSP-3 measured in 2007/08 were less than the Government of NWT TSP daily maximum criteria of 120 µg/m^3.

AQMP Monitoring Sites

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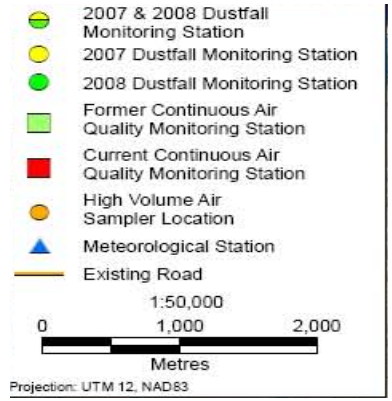

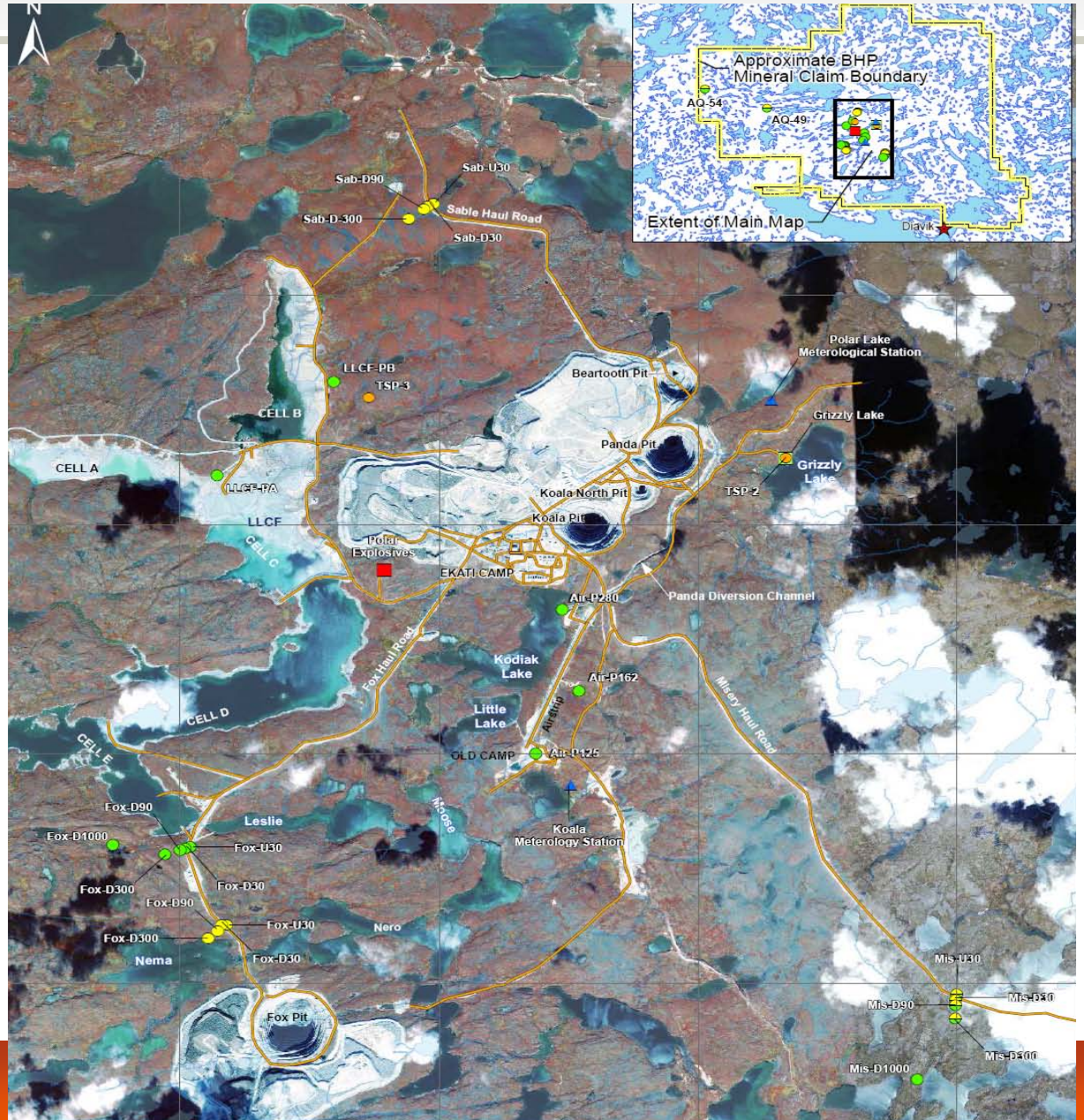

High Volume Air Sampling Future Directions

- BHPB is attempting Winter Sampling for 2010-2011
- Change in sample preparation methodology has increased quality of results (reduction of negative weights on sample filters).
- Investigating alternative technologies to replace the HiVols for Suspended Particulate measurements.

Continuous Air Monitoring (CAMB)

Continuous Air Monitoring (CAMB)

1 hour, and 24 hour averages for all continuous air monitoring parameters in 2008 were reported as primarily below the federal and territorial air quality objectives with minor exceptions for NO2.

AQMP Monitoring Sites

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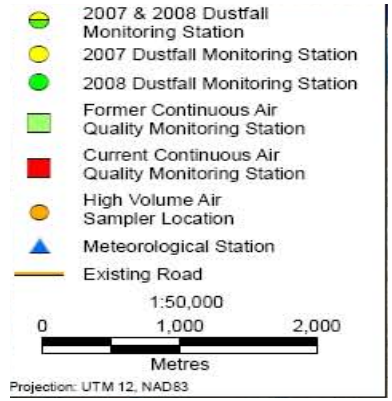

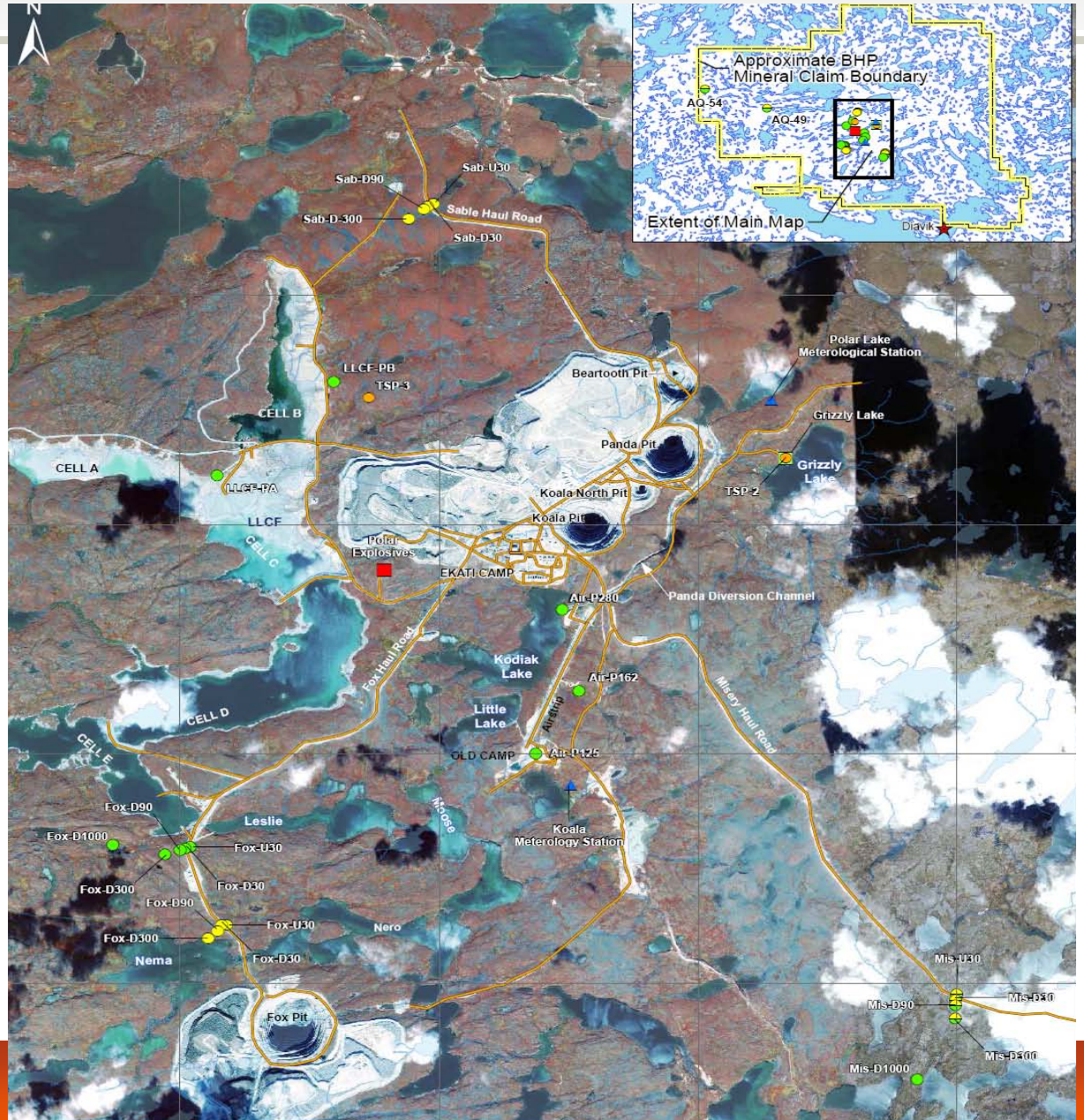

CAMB Future Directions

- BHPB is in the process of renewing the CAMB maintenance contract.
- Investigating technologies for real time monitoring of CAMB data, and daily review by air quality consultant.
- Looking into integrating weather monitoring station with the CAMB

Snow Core and Lichen Sampling

Snow and Lichen Sampling

Flavocetraria cucullata

- 37 lichen sites, 33 snow sites
- Sampling done every 3 years
- Results:
  - Dust dispersal from EKATI predominately confined to the immediate area of mining operations and roads
  - Areas that have been impacted are confined to a small area to the south and west of the mine site

AQMP Snow and Lichen Sites

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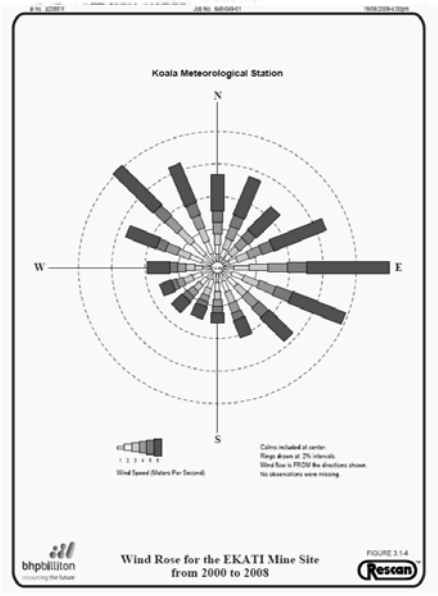
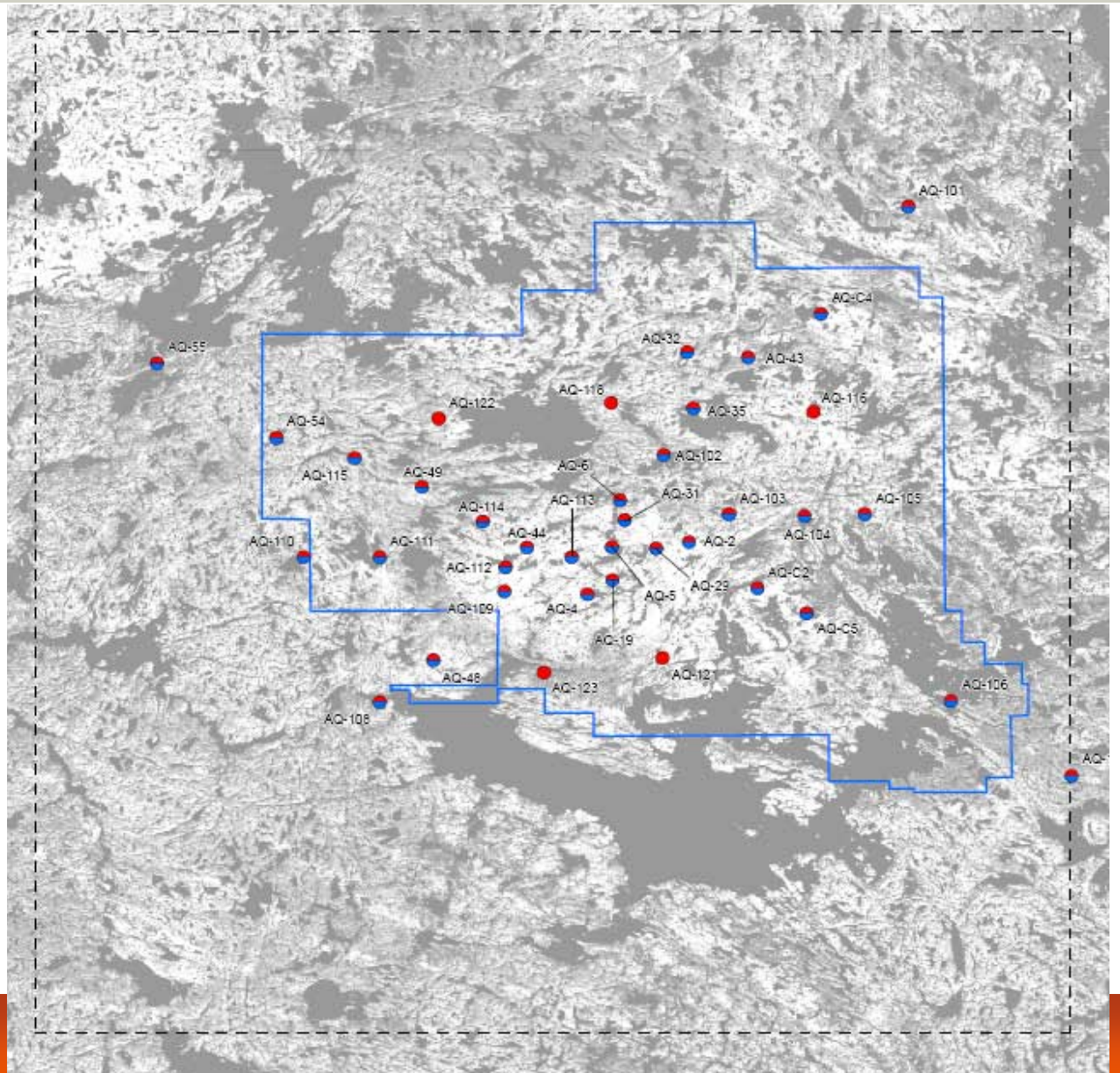
2008 Snow & Lichen Sampling Location
2008 Lichen Sampling Location
Model Boundary
Approximate Claim Boundary
1:450,000
0 10 20
Kilometres





Snow and Lichen Sampling Results and Trends

- Similar to the results presented in the 2005 AQMP, spatial analysis of snow chemistry data suggests that winter loading of TSS and a number of metals (e.g) likely associated with fugitive dust and fine particulates are elevated in a zone directly surrounding the mine footprint and concentrations decline rapidly with distance from mining activity. Variables associated with gaseous emissions, (NO3, NH3, SO4) do not show strong trends with distance from mining activity.
- Most elemental concentrations, even for impacted areas near the EKATI mine site, are below established background concentrations observed at the CAPMoN station Snare rapids and locations reported in the literature. The exceptions are for the sampling locations directly near mining activity, and even those concentrations are below those associated with industrial development.

Snow and Lichen Sampling Results and Trends

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- Elemental concentrations in the two indicator lichens collected in the study area indicate that the influence of dust from the mine is confined to a relatively small area around the mine site. From this study it was also evident that volatile elements are dispersed further from the source than non-volatile elements. Concentrations of elements in lichens collected in 2008 were generally less than in 2005.
- In contrast most of the non-volatile metals and crustal elements, which tend to decline with distance from the mine site have more generalized distribution. Most of the sources of S and N in the lichen tissue are from depositional materials that can re-volatilize and accumulate in the Arctic from long range transport. Concentrations of S and N in lichen tissue reflect both local sources but also arctic haze and subsequent bioaccumulation.

Snow and Lichen Sampling Future Directions

- Snow core sampling methodology is being reviewed.
- Snow core and lichen sampling will continue as per the 2006-2008 AQMP

Greenhouse Gas Reporting

Summary of EKATI Annual Fuel Consumption and GHG Emissions 2006-2008

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- EKATI average annual emissions (2006-08) represent 0.03% of the total CO_2 emissions in Canada estimated at 721 million tonnes in 2006
- The 2008 calculated CO_2 equivalency was lower that what was calculated for EKATI in 2006 and 2007
- Annual Summary of Fuel Consumption and Greenhouse Gas Emissions, 2006 to 2008 :

Year	Total fuel[1] (L)	CO_2	CH_4	N_2O	Total GHG Emissions (tCO_2e)
2006	67,686,230	184,954	225	8,334	193,513
2007	69,383,431	189,599	230	8,544	198,373
2008	67,692,770	186,408	170	1,722	188,300

1: Total fuel is comprised of diesel, jet-A1 and waste oil.

Summary of EKATI Annual Fuel GHG Emissions

- EKATI Greenhouse Gas Emissions are approximately 188,000 tCO2e/year (5000 tonnes less than 2006)
- EKATI average annual emissions represent 0.03% of the total CO_2 emissions in Canada estimated at 721 million tonnes
- Consumption of fuel at EKATI continues to show a decreasing trend due to the implementation of the following reduction programs:
  - Energy Smart Program – initiated 2002
  - The No Idle Campaign (including the onsite shuttle service) – initiated 2008
  - Ongoing shift from the use surface mobile equipment to the development of underground operations
  - Heat recovery project to use waste heat from generators to heat the underground mine operations.
  - Ongoing program burning waste oil to heat air for underground workings

CALPUFF Model

2006 CALPUFF Modeling – Predictions

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The CALPUFF model predicted:

- CALPUFF model predicted negligible long-term effects on ambient air quality in areas at or beyond the boundaries of the claim block
- Deposition of TSP resulting from mine fugitive dust emissions would be indistinguishable from background rates at a distance of 14 to 20 km from active mining areas
- Dustfall monitoring results should show that fugitive dust levels are elevated immediately adjacent to the road, but fall off quickly and should return to background levels by 1 km from the source.

2006 CALPUFF Modeling – Predictions

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The CALPUFF model predicted:

- Ambient concentrations of SO2 and NO2 were predicted to be well below applicable standards outside the EKATI claim block
- The modeled sulphate deposition contributions from EKATI and Diavik are of the same magnitude as background levels beyond 3-5 km from active mining areas.

2008 AQMP Findings vs 2006 CALPUFF Predictions

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- The CALPUFF air dispersion model results compared favourably with observed field data (i.e snow core chemistry, HVAS, lichen and dustfall)

- The modeled sulphate deposition contributions from EKATI, Misery, and Diavik are of the same magnitude as background levels beyond 3-5 km from the active mining areas. However the 2008 snow core chemistry and lichen data did not show a trend of decreasing sulphate deposition with distance from the active mining areas. This result indicates that sulphate deposition is likely less than the model predictions, and is dominated by background deposition.


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AQMP Summary

- Wind Rose

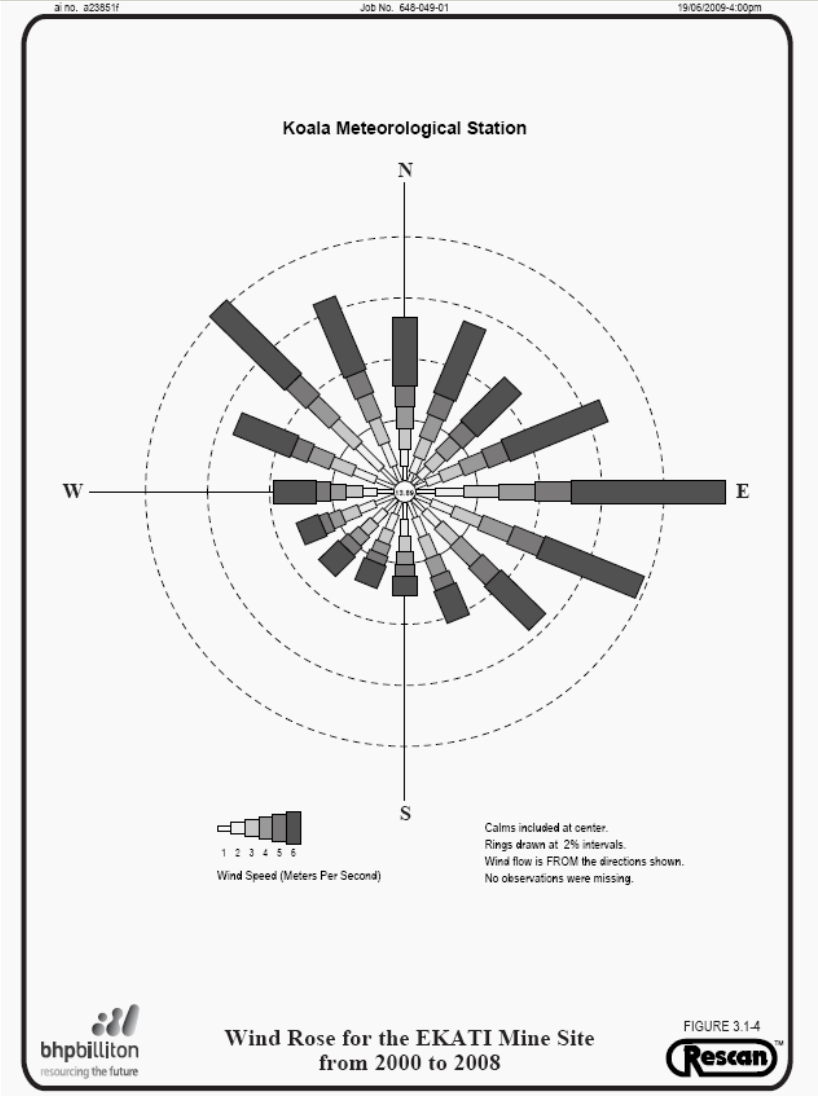

Figure 28. West of Exeter Lake at approximately 29 km from EKATI mine, taken at 11 AM, August 10th, 2008 (i.e. the photograph was taken two hours later, on the same day as Figure 18: the comparison shows haze caused by forest fire in northern Alberta).