

2. CLIMATE AND METEOROLOGY

2.1 Introduction

The meteorological data-collection program has gathered representative meteorological surface data in accordance with the guidance for Prevention of Significant Deterioration (PSD) air-quality permit requirements. Meteorological surface data were collected at six locations in the mine study area. These stations—Pebble 1, Pebble 3, Pebble 4 (previously Pebble 2), Pebble 5, Pebble 5A, and Pebble 6—are located at sites surrounding the Pebble Deposit (Figure 2-1). Installation of monitoring stations began in October 2004. Meteorological monitoring first began in January 2005 at Pebble 1.

The transportation-corridor study area is climatologically similar to the mine study area. Because of this similarity, no additional baseline meteorological studies were conducted in the transportation-corridor study area.

The scope of work for the meteorological study in the mine study area was to measure and report the following meteorological parameters:

- Wind speed.
- Wind direction.
- Wind direction standard deviation (sigma theta).
- Temperature.
- Precipitation.
- Evaporation.

The specific parameters measured at each monitoring station are summarized in Table 2-1.

2.2 Results and Discussion

The wind direction is bimodal in the vicinity of the Pebble Deposit (Pebble 1, see Figure 2-1), generally from the northwest or from the east-southeast or southeast. The wind direction in the vicinity of Frying Pan Lake (Pebble 4) is influenced by the terrain, with a northerly and north-northeasterly component rather than a northwesterly one. The wind-direction patterns in the mine study area are not consistent with the wind-direction pattern observed at the Iliamna airport. Non-calm wind conditions are typical for the mine study area, with calm conditions observed only 1.89 percent of the time at Pebble 1. The wind can be strong; wind speeds in the mine study area were generally higher than at the Iliamna airport.

The temperature pattern in the mine study area was similar to the pattern at the Iliamna airport, although temperatures in the mine study area were usually lower. Hourly mean temperatures

ranged from a minimum of -35.3 ° C (-31.5°F) on January 2006 at Pebble 1 to a maximum of 24.3°C (75.7°F) recorded both at Pebble 3 in May 2006 and at Pebble 4 in July 2006.

Generally, more precipitation was observed in the mine study area during the months of August, September, and October than during other months. Monitoring station Pebble 4 recorded the highest total monthly precipitation of 310.2 millimeters (12.2 inches) in September 2007. The highest total monthly evaporation recorded was 111.7 millimeters (4.4 inches) in June 2005 at Pebble 1. Variation and missing data in the current precipitation and evaporation record impede data comparisons among and within stations.

The mine study area is in a transitional climatic zone with strong maritime influence. Summer temperatures are moderated by the open waters of Iliamna Lake, the Bering Sea, and Cook Inlet. Winter temperatures are more continental because of the presence of ice on Iliamna Lake and sea ice in Bristol Bay. Winter weather systems typically travel into the region from the Bering Sea to the west, from along the Aleutian Island chain to the southwest, and from the Gulf of Alaska to the south. Depending on the season, weather systems consist of cool to cold air that is saturated with moisture, resulting in frequent clouds, rain, and snow. Less frequent wintertime incursions of frigid, stable arctic air masses bring shorter periods of clear but very cold conditions to the region. In the summer, incursions of very warm air masses from interior Alaska can cause atmospheric instability, which results in the development of cumulus clouds and occasional thunderstorm activity.

TABLE 2-1
Meteorological Parameters Measured at each Monitoring Station

Parameter	STATION						
	Pebble 1	Pebble 2	Pebble 3	Pebble 4	Pebble 5	Pebble 5A	Pebble 6
Wind Speed	X (at 10 m)	X (at 3 m)	X (at 3 m)	X (at 10 m)	X (at 10 m)	X (at 10 m)	X (at 10 m)
Wind Direction	X (at 10 m)	X (at 3 m)	X (at 3 m)	X (at 10 m)	X (at 10 m)	X (at 10 m)	X (at 10 m)
Wind Sigma Theta	X (at 10 m)	X (at 3 m)	X (at 3 m)	X (at 10 m)	X (at 10 m)	X (at 10 m)	X (at 10 m)
2 m Air Temperature	X	X	X	X	X	X	X
10 m Air Temperature	X			X	X	X	X
Solar Radiation ^a	X			X	X		X
Barometric Pressure ^a	X			X	X		X
Relative Humidity ^a	X			X	X		X
Precipitation	X	X	X	X	X		X
Evaporation	X (summer)	X (summer)		X (summer)	X (summer)		X (summer)

Notes:

- a. These parameters are not discussed in the meteorology chapter of the environmental baseline document, but are included in the data reports in the appendices to that chapter.

m = meters above grade.

“X” indicates a monitored parameter.

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Temperature Sensor at 2 Meters above Grade in the Mine Study Area, February 2007



Pebble 4 Meteorological Monitoring Station in the Mine Study Area, July 2006





Precipitation Gauge with Wyoming Wind Screen in the Mine Study Area, September 2007

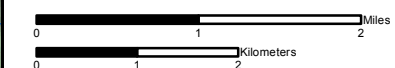
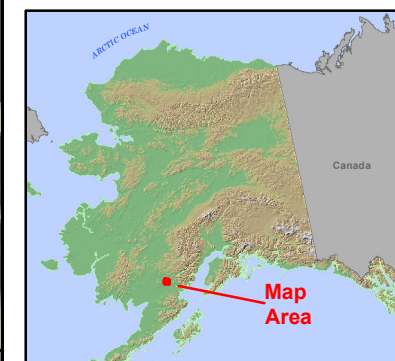


Pebble 6 Meteorological Monitoring Station in the Mine Study Area, September 2007

Figure 2-1
Locations of Meteorological
Monitoring Stations with
Dates of Operation
in the Mine Study Area

Legend

-  Meteorological Stations
-  General Deposit Location



Scale 1:75,000
 Alaska State Plane Zone 5 (units feet)
 1983 North American Datum

