

## APPENDIX D-4

### CLIMATOLOGY

#### Introduction

Climatological data is based on information collected by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration weather station located at Kaycee, Wyoming. Kaycee is located approximately 12 miles southeast of the amendment area.

#### Local and Regional Setting

The amendment area is located at the foot of the eastern slope of the Big Horn Mountains, 75 miles north-northwest of Casper and 60 miles south of Sheridan, Wyoming. Immediately west of the amendment area the lands rises nearly 4,000 feet to the top of the Big Horn Mountains. The Big Horn Mountains are oriented north-south in this area, with the highest point, Cloud Peak, approximately 35 miles north of the amendment area. The Black Hills lie about 150 miles to the northeast. The amendment area lies near the North Fork of the Powder River.

Precipitation in the area is generally the result of frontal and up slope activity during the winter and of thermal activity during the summer. Kaycee is in the latitudes of the prevailing westerly winds. The Big Horn Mountains form an effective barrier to moisture that comes in from the west coast. Kaycee is subject to cold air outbreaks from Canada, as there are no mountain ranges to the north to halt the passage of this cold air southward. However, most of the cold air masses do not stay for more than one to three days, as the prevailing westerly winds and general downslope of the land to the east tend to force the cold air out of the area. Westerly winds moving downslope, with the accompanied warming of the air by compression, greatly modify Kaycee's wintertime

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temperatures. Kaycee's climate is classified as semiarid.

#### Temperature

Temperatures show a wide range between summer and winter and between daily maximum and minimums. This is predominantly due to the high elevation above sea level, the dry air which permits rapid incoming and outgoing radiation, and the passage of both warm and cold air masses. Cold air outbreaks from Canada are not generally of very long duration as their path is normally southeasterly, then easterly in these latitudes, leaving Kaycee in the western edge of the cold air masses for a limited time. Kaycee is however subject to abrupt and sometimes large temperature changes. Extreme temperatures have ranged from a low of -51 °F on February 12, 1905 to a high of 99 °F in July 1999.

Because of the cold air outbreaks from Canada, and rapid night time cooling, late spring and early fall freezes are common. This results in an average growing season of 106 days.

#### Precipitation

The least precipitation generally falls in December, January, and February increasing rapidly to the peak rainfall amount in the last half of May and the first half of June. Precipitation mounts then drops off dramatically from the last half of June to a low in August, increasing again to a secondary peak in September. Precipitation amounts then decrease due to the wintertime minimum. Average annual precipitation for the area is 11.5 inches. Normally, about 4.1 inches of the annual precipitation falls between the 32 °F freeze-free dates.

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#### Storms

Severe storms in the area include thunderstorms, tornadoes, hail, local floods, blizzards, windstorms, and drought. Thunderstorms, which may produce hail and local flooding, occur approximately 30 to 35 times per year between late April and September. These storms may produce one-day precipitation events greater than 0.5 inches and/or winds in excess of 50 miles per hour. The occurrence of tornadoes in the area is extremely rare. Blizzard conditions exist when snow storms are accompanied by low temperatures and sustained winds greater than 30 miles per hour, reducing visibility and causing extensive drifting of snow. Hourly winds are estimated to average about 10 miles per hour during the spring to 7 miles per hour during the late summer. Daytime winds are generally stronger than night time winds. Occasionally winds can reach speeds of 75 miles per hour during strong storms.

#### Air Quality

Proposed mining activities within the amendment area will not cause a significant impact upon air quality due to the relatively small scale of the mining operations. According to WDEQ-AQD personnel, air quality permits are not generally required for bentonite mining operations.