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TO:	White Pass MDP FEIS Project File
FROM:	Alex White
CC:	SE GROUP Project Files
DATE:	December 2, 2004
RE:	Additional Air Quality and Noise Information

1.0 INTRODUCTION

This memorandum consists of additional information about the air quality and noise level within the White Pass MDP project area including the source of background air pollutants at White Pass, the dBA scale and other factors affecting noise levels, construction site noise levels, and noise levels from snowmaking.

2.0 ADDITIONAL AIR QUALITY INFORMATION

2.1 SOURCE OF BACKGROUND AIR POLLUTANTS

Cars and Buses

Vehicle exhaust is a potential source of pollutants at White Pass. Because of the relatively rural nature of the White Pass Ski Area and the fact that the area is not experiencing existing air quality problems, vehicles are not expected to be a significant source of emissions.

Groomers and Other Maintenance Vehicles

White Pass has two diesel powered machine groomers to help ensure a high quality trail surface, especially during the early and late stages of the season when climate and snow conditions are less than optimal. The snow groomers are minor sources of emissions at White Pass.

Fireplaces and Wood Burning Devices

Air pollution from wood-burning stoves and fireplaces can be an air quality concern, especially during the autumn and winter seasons when air inversions are more likely. The 16 fireplaces in the White Pass Village Condominiums are minor sources of emissions at White Pass because they burn propane gas.

Particulate Matter

Particulate matter consists of fine particles of smoke, dust, pollen or other materials that remain suspended in the atmosphere for a substantial period of time. Particulate matter is measured in three forms: Total Suspended Particulate (TSP) as well as PM10 and PM2.5, both of which are subsets of TSP. PM10 is respirable or fine particulate matter, defined as smaller than 10 micrometers in diameter while PM2.5 is the same material smaller than 2.5 micrometers in diameter.

Visual observations in the White Pass Study Area indicate the largest source of suspended fine particles (PM10/2.5) appears to be re-entrained road dust from automobiles and trucks, particularly from traction sanding of US 12 during the winter months. The traction sand used has a large quantity of fine particles. The equation for calculating road dust emissions is directly dependent on vehicle miles traveled (VMT). Increases or decreases in miles traveled will produce the same percentage of change in emissions (Washington Dept. of Ecology 1997). Additional known minor sources of TSP in the White Pass area are smoke from local condominium fireplaces and occasional wildfires on nearby forestlands, which do not typically occur simultaneously.

Carbon Monoxide

Carbon monoxide (CO) is an air pollutant generally associated with transportation sources. Processes involving incomplete fuel combustion, such as home heating appliances and residential wood burning, also generate CO. Carbon monoxide is a pollutant whose impact is usually localized. The highest ambient CO concentrations often occur near congested roadways, intersections and parking lots during periods of low temperatures, light winds, and stable atmospheric conditions. No increments for carbon monoxide have been established for Class I and Class II Airsheds.

The primary source of CO in the vicinity of White Pass is US 12 traffic and cold start engines. Additional known CO sources at White Pass, are a backup diesel emergency generator that operates about 12 hours annually, 16 fireplaces inside the White Pass condominiums and the cooking facilities at the restaurant and day lodge.

Ozone

Ozone is primarily a product of regional (urban) motor vehicle traffic. It is created during warm sunny weather when photochemical reactions occur that involve hydrocarbons and nitrogen oxides. Unlike carbon monoxide, however, ozone and other reaction products do not reach their peak levels closest to the source of emissions, but rather at downwind locations affected by the urban air plume after the primary pollutants have had time to mix and react under sunlight.

The Washington Department of Ecology (WDOE) currently maintains an ozone monitor at the top of the *Pigtail lift*. Since the White Pass Study Area is not located in proximity to an ozone producing urban area and because of the cool, moist weather in the winter, the NAAQS for ozone is below allowable levels at White Pass. No increments for ozone have been established for Class I and Class II Airsheds.

Sulfur Dioxide

While non-road mobile and on-road mobile sources contribute to sulfur dioxide (Sox), the major contributors in the State of Washington are point sources, mainly the Centralia Power Plant. These sources of sulfur dioxide are mostly products of petroleum and coal combustion. As the mobile sources of sulfur dioxide are very small, sulfur dioxide is not considered a significant pollutant from White Pass anthropogenic activities. There are no monitoring facilities for sulfur dioxide in or near the White Pass Study Area, and there is no data to suggest that the NAAQS for sulfur dioxide is above allowable levels.

Lead

The past major source of lead as an air pollutant was emissions from vehicles using “lead-based” fuels. Stringent air quality regulations have eliminated the use of these fuels in Washington. There are no monitoring facilities for lead in or near the White Pass Study Area and lead is not above air quality standards in urban Yakima County. There is no data to suggest that lead is above the NAAQS of 1.5 µg/m3 per calendar quarter.

Visibility

The clarity of the air, or visibility, is another way to judge air quality. Visibility is affected by natural and human-caused materials in the air, such as fine particles of soot or dust, sulfates and nitrates. These materials alter visibility by changing the way light is transmitted through the atmosphere. Distant objects appear veiled by a haze that reduces both color and brightness. Even the gases that make up the air we breathe can affect visibility by scattering light. In the State of Washington, concerns about visibility range from views in urban areas, to views in parks and wilderness areas, and at scenic vistas.

Visibility is an important air quality value in the western United States, particularly for scenic and recreational areas. The Clean Air Act requires the EPA to promulgate regulations for the prevention of visibility impacts in Class I areas that result from human sources of air pollution. The agency has promulgated regulations that provide guidelines to states for including visibility protection in State Implementation Plans.

In the summer of 2003, the WDOE eliminated their visibility program so they no longer monitor or actively manage visibility in the state, although they do require visibility protection as part of the new source permitting process. The Forest Service, Park Service, and EPA sponsor the network of IMPROVE visibility monitoring sites in Washington State including the one located at the top of one of the lifts at White Pass. Other nearby IMPROVE monitoring sites include locations at Snoqualmie Pass in the Snoqualmie-Mt. Baker National Forest and at the Paradise Visitor Center in Mount Rainier National Park. Major air pollutants detected at the IMPROVE monitoring site receptors include sulfate, organic carbon, nitrates, and dust. The Forest Service has a long-standing philosophy that visibility is a value to be protected 365 days per year, 24 hours per day in the managed Class I areas, including Goat Rocks Wilderness. Currently, no stationary air pollution source or construction activities have been identified in the State of Washington that contribute to air quality/visibility impairments in mandatory Class I areas (Washington Dept. of Ecology 1997).

Monitoring data and published reports single out sulfur emissions as the single most significant source of visibility impairment (WA Dept. of Ecology 1997). As shown in Table 3.8-3, the existing sulfur emissions by uses within the White Pass Ski Area, most all from vehicles, are low (maximum 2.88 pounds per hour) and would not affect visibility in the nearby Class I Airsheds.

The federal strategy for visibility improvement calls for a two-phased effort. Thus far, visibility program efforts have focused on large sources, referred to as Phase I sources, that have obvious negative impacts on visibility. Obvious impacts mean visual plumes extending from a large source to the area of visibility impairment. There are no visual plume/large source areas in the vicinity of White Pass.

Phase II, regional haze, is more complex. While scientific and technical limitations to understanding regional haze have long prevented the EPA from proceeding with the development of a Phase II program to deal with regional haze, these issues have largely been overcome and the EPA is in the process of developing regulations.

3.0 ADDITIONAL NOISE INFORMATION

3.1 THE DBA SCALE AND OTHER FACTORS AFFECTING NOISE LEVELS

The A-weighted decibel (dBA) scale used to describe sound is a logarithmic scale that accounts for the large range of audible sound intensities. The nature of dBA scales is such that individual dBA ratings for different noise sources cannot be added directly to give the sound level for the combined noise source. For example, two noise sources producing equal dBA ratings at a given location will produce a combined noise level 3 dBA greater than either sound alone. When two noise sources differ by 10 dBA, the combined noise level will be 0.4 dBA greater than the louder source alone.

People generally perceive a 10 dBA increase in a noise source as a doubling of loudness. For example, a 70 dBA sound level will be perceived by an average person as twice as loud as a 60 dBA sound. People generally cannot detect differences of 1 to 2 dBA between noise sources; however, under ideal listening conditions, sound level differences of 2 or 3 dBA can be detected by some people. A 5 dBA sound level change would probably be perceived by most people under normal listening conditions.

When distance is the only factor considered, sound levels from isolated point sources of noise typically decrease by about 6 dBA for every doubling of distance from the noise source. When the noise source is continuous (e.g., vehicle traffic on a highway), sound levels decrease by about 3 dBA for every doubling of distance.

Sound levels at different distances can also be affected by factors other than the distance from the noise source. Topographic features and structural barriers that absorb, reflect, or scatter sound waves can increase or decrease noise levels. Atmospheric conditions (wind speed and direction, humidity levels, and temperatures) can also affect the degree to which sound is attenuated over distance.

For a given noise source, factors affecting the noise impact at a receiver include the distance from the noise source, the frequency of the sound, the absorbency of the intervening terrain, the presence or absence of obstructions, and the duration of the noise event. The degree of impact also depends on who is listening, existing sound levels, and when the noise event takes place. Typical sound levels of familiar noise sources and activities are shown in Table 1.

Table 1:
Weighted Sound Levels and Human Response

Sound Source	dBA[a]	Response Criteria
Carrier deck jet operation	140	Limit amplified speech
Limit of amplified speech	130	Painfully loud
Jet takeoff (200 feet)	120	Threshold of feeling and pain
Auto horn (3 feet)		
Riveting machine	110	
Jet takeoff (2,000 feet)		
Shout (0.5 foot)	100	Very annoying
New York subway station		
Heavy truck (50 feet)	90	Hearing damage (8-hour exposure)
Pneumatic drill (50 feet)		
Passenger train (100 feet)	80	Annoying
Helicopter (in-flight, 500 feet)		
Freight train (50 feet)		
Freeway traffic (50 feet)	70	Intrusive
Air conditioning unit (20 feet)	60	
Light auto traffic (50 feet)		
Normal speech (15 feet)	50	Quiet
Bedroom		
Library		
Soft whisper (15 feet)	30	Very quiet
Broadcasting studio	20	
	10	Just audible
	0	Threshold of hearing

[a] Typical A-weighted sound levels taken with a sound-level meter and expressed as A-weighted decibels (dBA) on the scale. The A scale approximates the frequency response of the human ear.
Source: CEQ, 1970

3.2 CONSTRUCTION SITE NOISE LEVELS

Construction equipment operation can vary from intermittent to fairly continuous, with multiple pieces of equipment operating concurrently. Assuming that a truck (90 dBA), a scraper-grader (87 dBA), a moveable crane (82 dBA), a tractor (85 dBA), and two saws (78 dBA) are operating in the same area, peak construction-period noise would generally be about 93 dBA at 50 feet from the construction site (EPA 1971).

To calculate the noise level at a given distance from a noise source, the noise levels are mathematically calculated using the Inverse Square Law of Noise Propagation. Briefly, this formulation states that noise decreases by approximately 6 dBA with every doubling of the distance from the source. Table 2 summarizes predicted construction noise levels at various distances from the construction site, conservatively assuming no atmospheric absorption or attenuation by trees (in column two) and accounting for attenuation of coniferous trees (in column three). Foliage and ground cover are assumed to provide attenuation of up to 14 dBA according to a study by the USFS (Harrison 1980). Daytime summer background noise levels in coniferous forest are typically 35-45 dBA (Harrison 1980).

Table 2:
Construction Noise Levels
Near a Typical Construction Site

Distance from Construction Site (ft)	Line-of-sight Noise Level (dBA)	Noise Level with Tree Attenuation (dBA)
50	93	93
100	87	75
200	81	69
400	75	61
800	69	55
1,600	63	49
3,200	57	43
6,400	51	37

3.3 NOISE LEVELS FROM SNOWMAKING

Ambient noise levels produced by one snowmaking gun are estimated at approximately 65 dBA at 150 feet. Currently, White Pass has a total of one gun. Noise produced by a snow gun nozzle is fairly directional, with the net impact on the surrounding area varying widely, depending upon wind velocity and direction, terrain, and the dampening effect of snow cover and vegetation.