

**NEPA GUIDANCE
FOR
AIR QUALITY ANALYSIS
OF
SKI AREA CONSTRUCTION OR EXPANSION**

US Forest Service
Region 1

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An increase in new ski areas and existing ski area expansion proposals in USFS R1 since 1995 has expanded the need for ski area related NEPA work and associated air quality analysis. This guidance is intended to help personnel select the proper level of air quality disclosure and to prepare adequate air quality "affected environment" and "environmental effects" sections in NEPA documents. This guidance is based on review of six recent ski area EIS's and their associated air quality analysis. It is also based on recent EPA comments regarding ski area air quality analysis.

Frequently, ski area proponents prepare their NEPA documents with a contractor who subcontracts the air quality analysis to an air quality consultant. The Forest Service role then becomes one of selecting the proper level of air quality disclosure, review, and integration of public input. Many of the NEPA contractors and air quality consultants have considerable experience in dealing with air quality issues and can be very useful in selecting the proper level of disclosure.

In general, ski area proposals in USFS R1 can be categorized in three different levels, each of which have an appropriate level of air quality analysis.

1) Small expansions: 0 - 1 chairlifts, less than 500 new parking spaces, less than 50 new base area residences, and only minor expansion of base area facilities.

"Small expansion" air quality NEPA disclosure can generally be handled with a brief description of existing air quality and a qualitative description of environmental effects. If the expansion is located in the proximity of a Prevention of Significant (PSD) Class I area or close to a non-attainment area then the level of disclosure should be increased. (For a definition of PSD, see USFS, 1997)

2) Moderate expansions or small new ski areas: 2 - 4 new chairlifts, 500 - 1000 new parking spaces, 50 - 100 new base area residences, and addition of new base area or on slope facilities and new roads.

"Moderate expansion" air quality NEPA disclosure will require a more detailed description of the affected environment, at least a qualitative description of emissions, and may require emissions modeling to compare relative air quality and Class I visibility impacts between alternatives.

3) Large expansions or moderate/large new ski areas: 5 or more new chairlifts, more than 1000 new parking spaces, more than 100 new base area residences, and significant construction or expansion of base area and/or on-slope facilities and new roads.

"Large expansion" air quality NEPA disclosure will require a thorough description of the existing air quality including baseline meteorology and background air quality monitoring. A quantification of existing, proposed, and cumulative emissions, and screening modeling and/or refined dispersion modeling is recommended to compare air quality impacts against air quality standards or Class I visibility criteria.

Ski area expansions or new ski areas near Class I areas will generally require at least quantifying emissions and screening for visibility impacts analysis (via simple computer models). Proposals near non-attainment areas will generally require some kind of dispersion modeling to predict air quality concentrations since regulatory constraints are more limiting in those areas.

Typically air quality sections in ski area EIS's are organized by NEPA Chapter III (affected environment) and Chapter IV (environmental effects).

Chapter III -- Affected Environment

The affected environment section should include a discussion of federal, state and local air quality regulations, local climate and meteorology, and existing air quality conditions. The air quality regulatory section should summarize the pertinence of the:

- Clean Air Act
- Criteria pollutants and air quality standards (state and national)
- Prevention of Significant Deterioration criteria
- Visibility regulations
- State Implementation Plans (for Montana or Idaho)
- Conformity requirements (if within a non-attainment area)

The conformity requirements (Section 176(c) of the 1990 Clean Air Act amendments), require that all federal agencies conform to state implementation plans. The EPA conformity rules require that agencies not cause or contribute to violations of air quality standards. Currently a discussion on conformity is not required for non-attainment areas.

USFS (1997) and Story (1994) have summaries of the air quality regulations which, with some modification, can be read into ski area NEPA documents.

Proximity of the ski area to Class I areas, non-attainment areas, or significant stationary sources should be disclosed. The climate and meteorology of the proposed ski area should be discussed in order to

explain potential to disperse ski area emissions. This includes elevation gradients and topography, temperature variability, precipitation patterns, local up and down slope wind patterns, existence and persistence of inversions, and general air patterns. Typically ski slopes have good to excellent wind dispersion but valley bottoms, where base area and associated residential development are located, have less ventilation. Some kind of dispersion modeling is usually necessary for large expansions or new developments. Appropriate modeling may require one year of on-site meteorological data or five years of representative off-site data.

Existing ski area emissions can be described qualitatively in Chapter III. These usually include facility emissions (lifts, buildings), snowmobiles, grooming and maintenance machinery, vehicle tailpipe emissions, road dust, and base area residential emissions (primarily fireplaces and wood burning stoves). Emissions are usually greatest during construction when mechanized equipment and pile and broadcast burning are most active. Air quality influences from surrounding sources (municipalities, silvicultural and agricultural burning, other area sources) should be mentioned.

Chapter IV -- Environmental Effects

The purpose of the environmental consequences section is to consider the significance and potential impacts of the proposed ski area emissions relative to Forest Service responsibilities under the Clean Air Act and other mandates. The analysis should consider cumulative effects of other activities on private land, public land, occurring or planned, in the airshed. USFS (1997) contains a detailed description of those responsibilities. The recommended disclosure can be stratified by the general level of ski area development described above.

1) Small expansions:

If the level of emissions are not expected to result in substantial or observable air pollution concentrations that conclusion can be stated but will need to be justified. Air quality impacts may be minor for small expansions, particularly in areas of robust wind dispersion. The disclosure should describe the existing and increased emissions which would occur and discuss cumulative effects. Sources of emissions may be construction equipment, vehicle tailpipe emissions, road dust, exposed soil on ski runs, buildings, outdoor grills, pile or broadcast burns, and residences. A rationale as to why the emissions would comply with ambient air quality standards should be stated. There must be sufficient disclosure to show that a thorough examination has been completed and disclosed.

2) Moderate expansions or small new ski areas:

Increasing the size of a ski area and its facilities generally increases emissions. A comprehensive emission inventory should be developed. The inventory can use methods outlined in CHM2Hill (1995) to estimate emissions from construction equipment, vehicles, fireplaces, wood stoves, and road dust. Cumulative effects of existing or foreseeable emissions should be included. CHM2Hill (1995) uses EPA AP-42 default emission factors and other guidance to estimate emissions. Background particulate levels of 5-10 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) can usually be assumed unless local air quality data indicate greater or lesser concentrations. Higher concentrations most frequently occur in valley locations where emission sources are frequently concentrated and wind dispersion is reduced. Valley

locations also have the greatest potential for inversions. This particulate is the size range 10 microns in diameter or less (PM-10).¹ If pile or broadcast burns are proposed, the analysis should use established smoke emission estimation techniques or models. Acheson (1993) provides USFS R1 direction for prescribed burns. CHM2Hill (1998) provides additional guidance on smoke emission and dispersion models appropriate for a project. Additionally, any fall or winter burning will have to adhere to the requirements of the Montana / North Idaho State Airshed Groups.

Wind dispersion information from Chapter III can be used to evaluate the potential of point source emissions relative to ambient air quality standards. Conservative screening models such as the SCREEN2 model (EPA, 1992) and/or the visibility screening model VISCREEN (EPA, 1992) should be used to evaluate compliance with ambient air quality standards and visibility criteria. If the screening models predict exceedances of a standard or criteria, more refined dispersion modeling is needed. This modeling will likely need to be performed by a consultant or other experienced modeler.

3) Large ski area expansions or moderate/large new ski areas:

Larger ski areas can substantially impact air quality, particularly if base area parking facilities or residential development occurs in mountain valleys with limited wind dispersion. A comprehensive listing of existing and potential emissions should be disclosed including existing and potentially cumulative emissions from foreseeable expansion or additional base area development or other activities on private or public lands, occurring or planned in the foreseeable future. Large expansions can greatly increase vehicle tailpipe emissions between the ski area and adjacent towns. Dispersion modeling using local meteorological information (usually at least one year of on-site data) should be used to compare concentrations of particulates, and possibly carbon monoxide and nitrogen oxides, to ambient air quality standards. If an adjacent Class I area may be impacted, an analysis of concentrations relative to the Class I criteria is appropriate even though the proposed ski area or its expansion is unlikely to be considered a Prevention of Significant Deterioration pollution source. Applicable dispersion models include WYNDValley 3, ISC3ST, COMPLEX 1, or other EPA approved models (CHM2Hill, 1995; EPA, 1996). The model selection and adequacy of local meteorological data should be confirmed with Montana DEQ or Idaho DEQ prior to modeling.

If the air quality modeling indicates the proposed ski area emissions would result in violations of ambient air quality standards, exceed Prevention of Significant Deterioration criteria, or substantially add to concentrations in non-attainment areas, mitigation measures are required. Mitigation measures sufficient to eliminate the exceedances must be committed to in the NEPA document and Record of Decision before Montana DEQ, Idaho DEQ, or the EPA can concur with implementation of the project.

Contact Mark Story, Gallatin NF or Ann Acheson, Regional Office, for more specific guidance or examples of recent USFS ski area NEPA document air quality sections.

Literature Cited

¹ Although EPA has promulgated standards for smaller particulate matter (PM-2.5), it will be a few years before it can be implemented by the State air regulatory agencies. We will work with the States as they develop their Implementation Schedule. PM-10 is still a standard and we will continue to analyze the effects of our actions against that standard.

Acheson, A, 1993. Describing Air Resource Impacts from Prescribed Burning Activities in NEPA Documents. USFS R1, Missoula. Mt.

CH2MHill, 1995. A Desk Reference for NEPA Air Quality Analysis. USFS R6, Portland, Or.

CH2MHill, 1998. An Introduction to Smoke Emissions and Dispersion Modeling. Portland, Or.

Environmental Protection Agency, 1992. SCREEN2 Model Users's Guide (EPA-450/4-92-006) and Workbook for Plume Visual Screening Analysis (EPA-454/R-92-023). Research Triangle Park, NC.

Story, M. 1994. Air Quality Guidance for Oil and Gas Leasing, USFS Region 1. Missoula, Mt.

USFS, 1997. Air Resource Management. USFS Region 1. Missoula, Mt.