4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

Chapter 4 assesses the potential environmental consequences associated with the Proposed Action consisting of the construction and operation of the proposed HGS and four wind turbines at the Salem site) and secondary action(s) including the construction and operation of power transmission lines, a rail spur, and potable, raw water and wastewater lines. Hereafter, the term "Proposed Action" will include all related secondary actions as they are necessary for the operation of the HGS or to meet the purpose and need of the Proposed Action. Connected Actions are possible projects or activities that may be linked to the Proposed Action or secondary action(s). There are two connected actions associated with the proposed HGS at the Salem site. Both pertain to mining of minerals needed for the operation of the HGS. These connected actions are not considered this EIS.

The main connected action is the surface mining and transport of coal to supply fuel for the generating station. However, environmental impacts associated with the particular mine or mines (Spring Creek and/or Decker, in Montana's Powder River Basin) from which coal would be purchased to fuel the HGS are already addressed in previous EISs (USGS-MDSL, 1977; USGS-MDSL, 1979; MDSL, 1980). These EISs are incorporated by reference into the present EIS.

Another connected action is the mining and transport of limestone from the Graymont Indian Creek Lime Plant and quarry near Townsend. This limestone quarry/plant is an existing facility that has been evaluated with the appropriate level of MEPA analysis and has operating permit #00105 from DEQ.

Potential environmental consequences can be direct or indirect, on-site and/or off-site. Direct impacts are those that are directly caused by the Proposed Action, like an increase in air pollutants emitted. Indirect impacts are those that follow in turn from the primary or direct impact; increased air pollutants, for example, could lead to increased smog, visibility impairment in Class I areas like national parks and wilderness areas, or increased deposition of toxic substances and their uptake by living organisms.

Potential environmental consequences are discussed under each resource topic for three possible alternatives related to the Proposed Action: 1) No Action, in which no HGS would be built at the Salem or alternate (Industrial Park) site; 2) Proposed Action, or the construction and operation of the HGS at the preferred Salem site east of Great Falls; and 3) construction and operation of SME's proposed generating station at the alternate site, which is the Industrial Park location just north of the City of Great Falls. Consequences of mitigations are also discussed.

4.2 METHODOLOGY

MEPA and NEPA both require the disclosure of more than the direct and indirect effects. Rather than include the following three categories with each resource, they are combined at the end of the chapter so the reader can understand the overall effects of these categories of effects.

- Neither NEPA nor MEPA requires an agency to avoid adverse or even significant effects, but they must be disclosed. Typically, agencies attempt to avoid, minimize, reduce, or mitigate adverse affects. "*Unavoidable*" adverse effects are those that would occur regardless of the proposed mitigations or other actions that would eliminate adverse effects.

- The "*relationship between short-term uses and long-term productivity*" varies somewhat according to resource. Short-term uses of a resource could be for a couple of years or the life of the project. Long-term productivity may refer to productivity during the life of the project and beyond for some resources and for others long term would only apply when the project is completed. The key to this section is to look at the trade-offs between short-term uses and long-term productivity with and without the Proposed Action, Agency Alternative, and any mitigations. The gains and losses are described.

- An irreversible or irretrievable commitment of resources would occur when resources were either consumed, committed, or lost as a result of the project. The commitment of a resource would be "***irreversible***" if the project started a "process" (chemical, biological, and/or physical) that could not be stopped. As a result, the resource, or its productivity, and/or its utility would be consumed, committed, or lost forever. Commitment of a resource would be considered "***irretrievable***" when the project would directly eliminate the resource, its productivity, and/or its utility for the life of the project or some period of time, but the resources would recover.

The interdisciplinary study team (see Chapter 7, List of Preparers) followed a structured process to analyze the potential environmental impacts, or effects, resulting from the two alternatives for constructing and operating a coal-fired electricity generating station for SME. This procedure, called the cause-effects-questions process, is described the six steps outlined in the following text box.

Using this process, both direct and indirect effects that could potentially occur as a result of different management scenarios were identified. As mentioned above, direct effects are impacts that would be caused by the alternative(s) at the same time and in the same location as the action. Indirect effects are impacts that would be caused by the alternative(s) that occur later in time or farther removed in distance than the action, or, as described above, by means of a longer chain of cause-and-effect linkages.

Causes-Effects-Questions:
A Structured Analytic Process

Step 1: Identify the specific activities, tasks, and subtasks involved in the Proposed Action(s) and alternative(s) (Table 4-1).

Step 2: For each specific activity, task, and subtask, determine the full range of direct effects that each could have on any environmental resource. For example, removing vegetation could cause soil erosion. See Appendix K for more detail.

Step 3: For each conceivable direct effect, identify which further effects could be caused by the direct effects. For example, soil erosion could cause stream sedimentation, which could kill stream species, which could diminish the food supply for fish, leading to decreased fish populations. This inquiry can identify multi-stepped chains of potential causes-and-effects. See Appendix K for more detail.

Step 4: Starting at the beginning of each chain of causes-and-effects, work through a series of questions for each potential effect:

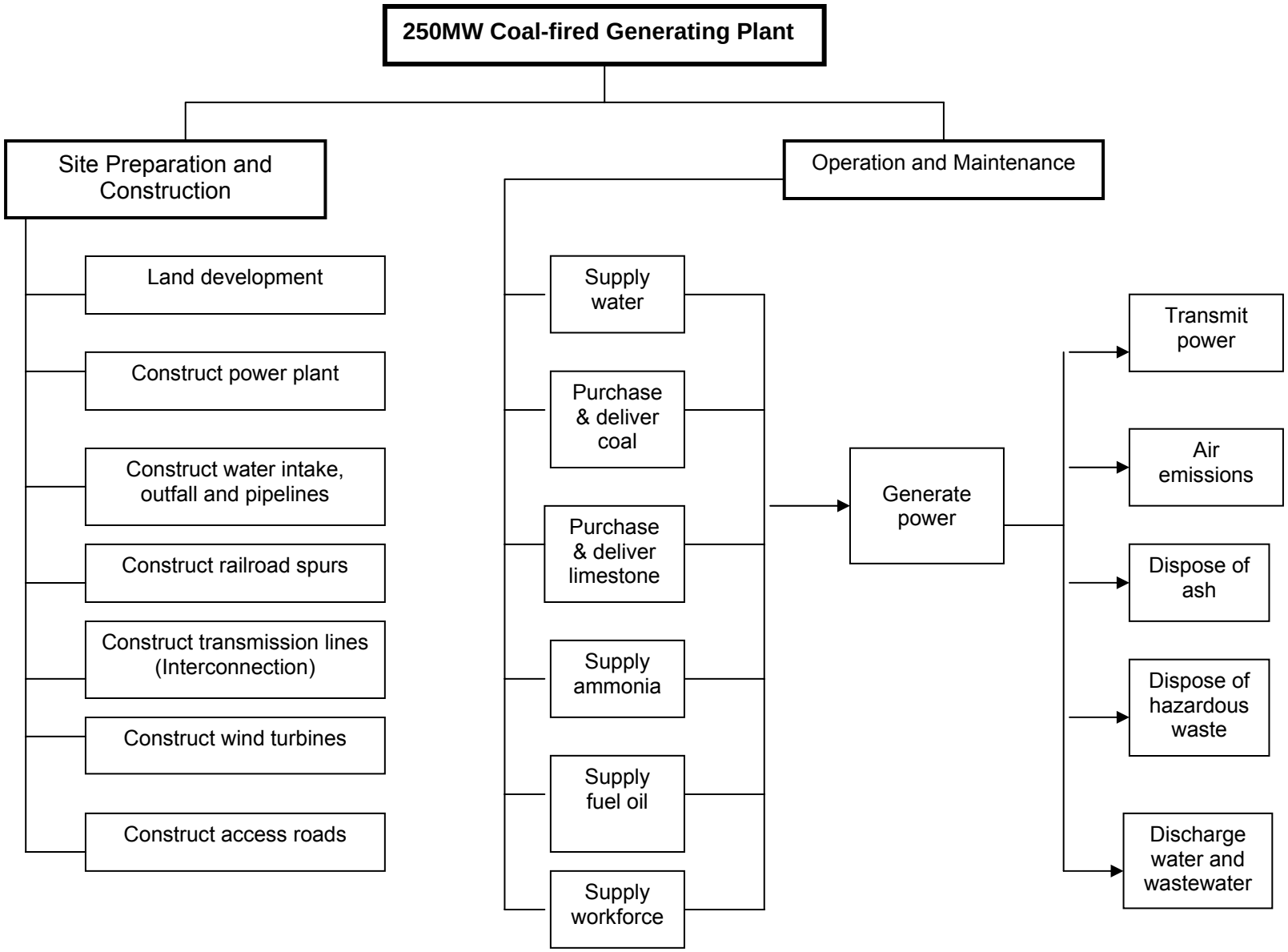
- Would this effect actually occur from this project?
  If not, why not? What would preclude it from happening?
- If the effect cannot be ruled out, characterize which types of data, other information, and analyses are needed to determine the parameters of the effect, including its extent, duration, and intensity. Identify the sources from which the data is to be obtained.

Step 5: Gather the data and conduct the analyses identified by the above steps, utilizing only relevant information.

Step 6: Document the results of this study process.

Figure 4-1 presents the preliminary cause-effects activities and tasks diagram for the proposed SME generating station. Appendix K presents the entire preliminary cause-effects-questions diagram that the study team prepared at the outset of the analysis. This visual aid helped organize the investigation and focus it on relevant issues.

Figure 4-1. Preliminary Cause-Effects Activities and Tasks Diagram for Proposed Southern Montana Electric Generating Station



4.2.1 DEFINITIONS

Discussions of environmental consequences in the following sections will utilize a general vocabulary consisting of the following terms and definitions:

Types of Impact

Beneficial – A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.
Adverse – A change that moves the resource away from a desired condition or detracts from its appearance or condition.
Direct – An effect that is caused by an action and occurs in the same time and place.
Indirect – An effect that is caused by an action but is later in time or farther removed in distance, but is still reasonably foreseeable.

Duration of Impact:

Temporary – Impact would occur during a transition phase only, or in the case of potential future developments, during the site preparation and construction phases only. Once these phases have ended, many resource conditions are likely to return to pre-transition/construction conditions.
Short-term – Impact would extend past the transition, or construction phase for future developments; it could conceivably last 5-10 years, and depending on the resource, could persist for the life of a project.
Long-term – Impact would likely persist for 25-30 years or longer, often beyond the project life, depending on the specific resource and type of project.

Context of Impact:

Localized – Impacts would affect the resource area only on the project site or its immediate surroundings, and would not extend into the region.
Regional – Impacts would affect the resource area on a regional level, extending well past the immediate project site.
Worldwide – Impacts would affect the resource on a global level, extending well past the immediate project site and regional area.

Intensity of Impact:

Negligible – The impact is at the lowest levels of detection – barely measurable and with no perceptible consequences.
Minor – Change in a resource occurs, but no substantial resource impact results.
Moderate – Noticeable change in a resource occurs, but the integrity of the resource remains intact.
Major – Substantial impact to or change in a resource area that is easily defined, noticeable, and calculable but may not be measurable, or exceeds a trigger level.
Significant – The impact to or change in a resource is well defined, highly noticeable, measurable, and meets one or more of the significance criteria described in MEPA or NEPA summarized below, and/or violates an applicable state, federal or local statute or regulation.

4.2.2 EIS SIGNIFICANCE CRITERIA

The Highwood Coal-Fired Power Plant could have a wide variety of impacts on different components of the environment. The importance, or "significance," of each of these diverse impacts depends on several factors. For example, if a state or federal law clearly would be violated by any aspect of the Proposed Action, then that obviously would be a significant impact. Other factors affecting significance are matters of professional judgment, such as the importance of losing some wildlife habitat. The Council on Environmental Quality (CEQ) regulations implementing NEPA and DEQ's MEPA regulations provide a list of factors to be considered in determining impact significance. This EIS is based on an assessment method that combines these multiple factors into an overall assessment of significance. The following major factors influence the significance of most types of impacts:

- Magnitude of the impact (how much);
- Duration or frequency of the impact (how long or how often);
- Extent of the impact (how far);
- Likelihood of the impact occurring (probability).

Several levels were identified for each of these factors, as shown below.

Magnitude:
- major
- moderate
- minor

Duration:
- long term
- medium term (intermittent)
- short term

Frequency:
- often
- intermittent
- seldom

Extent:
- large
- medium (localized)
- small (limited)

Likelihood:
- probable
- possible
- unlikely (improbable)

Combinations of these factors would constitute various overall ratings of significance, as shown in Table 4-1. Given this general structure, specific definitions of these levels for each resource or impact topic were developed for this EIS.

Other factors affecting significance of impacts need to be taken into account during the impact analysis process. CEQ and MEPA regulations both contain the following similar requirements:

- The uniqueness and fragility of the resources or values; CEQ specifically defines different types of geologic features;
- The importance of the resource or value to the state and society, or conversely the degree to which impacts are likely to be highly controversial;
- The degree to which a precedence for future actions with significant impacts would be set as a result of the impact of the Proposed Action; and
- The potential for conflicts with local, state, or federal laws, requirements or plans.

CEQ regulations also include three additional factors that need to be considered:

- The degree to which the proposed action affects public health and safety;
- The degree to which the proposed action may adversely affect or cause the loss of significant scientific, cultural, or historic resources including sites on or eligible for the National Register of Historic Places; and
- The degree to which the proposed action may adversely affect endangered or threatened species or its habitat.

MEPA has one unique additional factor:

- The potential growth-inducing or growth-inhibiting aspects of the impact.

A Proposed Action also may generate impacts that are beneficial with regard to a given topic or resource area, in which case these impacts will be identified as "beneficial." By the same token, in some instances, impacts hypothetically may be neither beneficial nor adverse, or be negligibly beneficial or adverse, in which case they will be identified as such.

Table 4-1. Criteria for Rating Impacts

Levels of Impact				Impact Rating
Magnitude	**Duration**	**Extent**	**Likelihood**	
Major	Any Level	Large or Medium	Probable	**Significant**
Major	Long Term	Large or Medium	Possible	
Major	Medium-term, inter-mittent, or short-term	Any Level	Probable	
Major	Medium-term, inter-mittent, or short-term	Any Level	Possible	**Potentially Significant or Non-Significant**
Moderate	Any Level	Large or Medium	Probable	
Major	Any Level	Small	Probable	
Major	Long-term	Small	Possible	
Moderate	Any Level	Large	Possible	
Moderate	Any Level	Medium or Small	Possible	
Moderate	Any Level	Small	Probable	
Major	Any Level	Large	Unlikely	
Major	Long-term	Medium or Small	Unlikely	
Minor	Any Level	Large	Probable	
Minor	Long-term	Medium or Small	Probable	
Major	Medium-term, inter-mittent, or short-term	Medium or Small	Unlikely	
Minor	Medium-term, intermittent	Medium	Probable	**Non-Significant**
Minor	Any Level	Large	Possible	
Minor	Long-term	Medium or Small	Possible	
Moderate or Minor	Any Level	Any Level	Unlikely	
Minor	Short-term	Medium	Probable	
Minor	Medium-term, inter-mittent, or short-term	Small	Probable	
Minor	Medium-term, inter-mittent, or short-term	Medium or Small	Possible	

4.3 SOILS, TOPOGRAPHY, AND GEOLOGY

4.3.1 NO ACTION ALTERNATIVE

The No Action Alternative would not have any impacts on the topography or the geology of the Salem or Industrial sites. There would be no change to contours or elevations of the land.

There would be no significant adverse impacts on soils from the No Action Alternative, although negligible to minor, long-term adverse impacts would continue from existing land use practices. Even on lands with very little slope, long-term background rates of erosion would continue, particularly on cultivated areas, due to the exposure of soils to wind and water from grazing, tilling, disking, plowing, and movement of farm machinery. This erosion is exacerbated by the high clay content of the soils in the area. Overall, in this area, as throughout most of the High Plains area and the nation as a whole, soil loss rates exceed soil formation rates. In Montana, average erosion rates on crop and pastureland are estimated to be 5.5 tons of soil per acre (12.3 metric tons per hectare) per year (USDA, 2000). Soil formation rates are estimated to be only 10–25% of these erosion rates, leading to a net loss of topsoil over the long term.

Insofar as SME would need to purchase power from existing sources of wholesale supply to meet energy supply needs in the service area, SME would be contributing indirectly to ongoing soil resource impacts, and possibly impacts to geology and topography, at different generating stations in the region or at potentially new generating stations located outside of the region.

4.3.2 PROPOSED ACTION – HGS AT THE SALEM SITE

4.3.2.1 Construction

Under the Proposed Action, construction activities on the HGS are anticipated to occur for two years and seven months. Two months or more are anticipated to be spent on site grading and site preparation activities. The total area of disturbance for these activities would include the total footprint of the power plant, approximately 545 acres (221 ha), and additional roadway, rail spur, and utility corridor zones. Installation of the proposed wind turbines and related facilities such as access roads and electrical and transmission cables would require several months.

All coal storage and processing facilities would be located within the 545-acre footprint of the power plant. Additionally, this area would include several storm water detention ponds and a waste monofill (Figure 4-2). The monofill would be constructed within the confines of the railroad loop for the disposal of ash and water treatment system byproducts. The monofill area within the rail loop would be laid out in a rectangular grid consisting of approximately 100 acres (40 ha). The monofill would be constructed as twelve cells in a 3 by 4 grid. Each cell would be an excavated pit approximately 36 feet (11 m) deep. Once filled and covered, the monofill grid would have a height of roughly 22 feet (7 m) above grade. Excavated material would be predominantly fine-grained, high content inorganic clay soils with high plasticity and low permeability, which would be used to construct a clay liner and perimeter containment berms with the balance stockpiled for use as final cover.

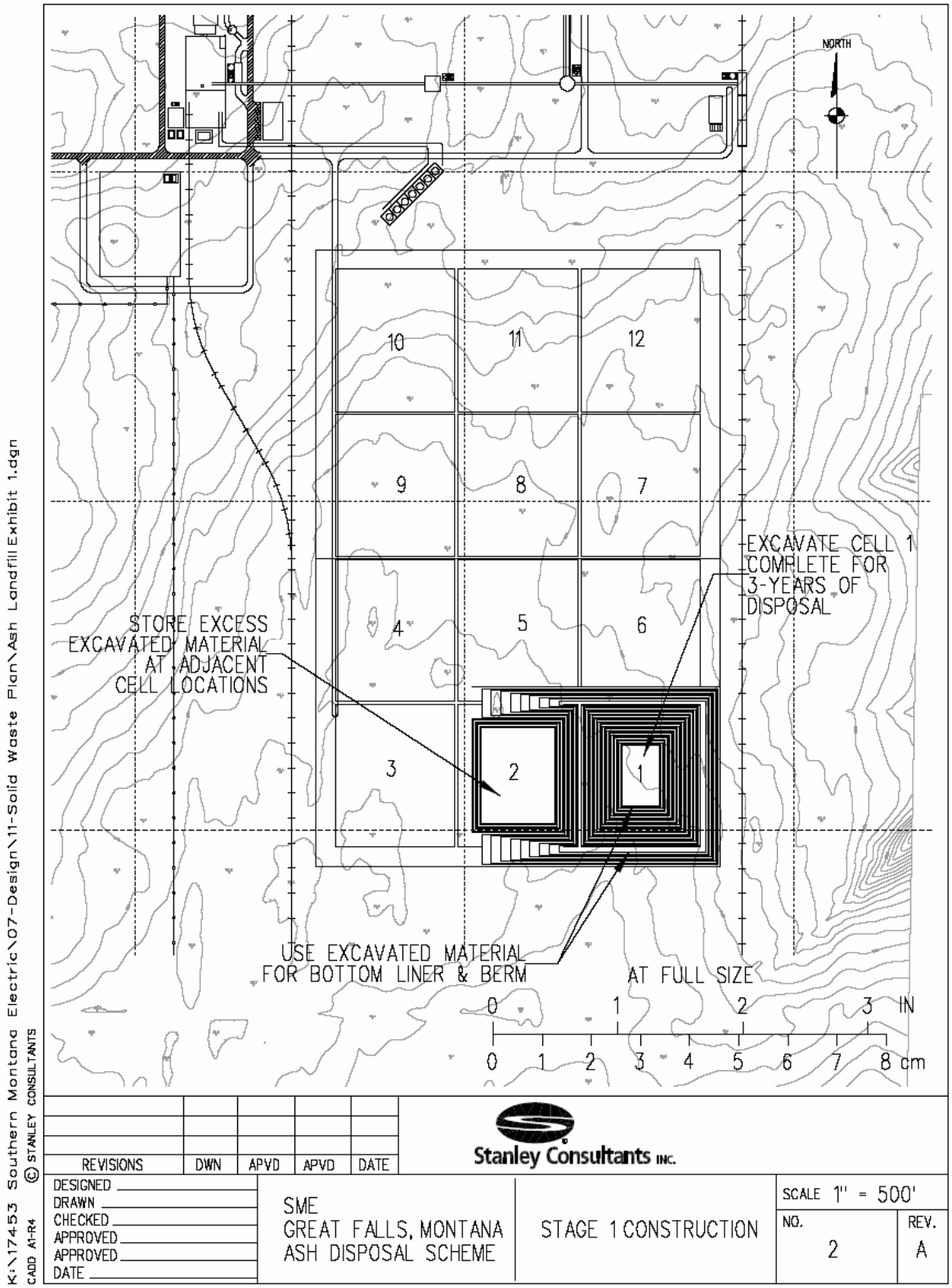


Figure 4-2. Construction Schematic of Ash Waste Monofill

Each cell of the monofill would be designed as a self-contained unit. During initial construction, only one cell (with the associated containment berms) would be constructed. Every three years, a new disposal cell would be constructed, and the excavation materials from this construction would be used as the cover material and topsoil to close the filled cell. The Pendroy Clay soils found onsite are characterized by very slow water transmission rates and infiltration rates. This material would be recompacted at optimum moisture content to create an engineered clay liner for the cell. As each cell is filled, a final cover would be placed on the cell. The final cover is designed to retain the precipitation that falls on the final cover and maximize evaporation and transpiration by the plants grown on the cover. The cap would be constructed with a gravel layer immediately on top of the ash to serve as a capillary break. The gravel would be covered with 48 inches of native on-site materials that would function as subsoil. The capillary break prevents the subsoil from losing water into the waste. Six inches of topsoil would be applied and planted with suitable vegetation to minimize erosion and transpire the moisture retained in the cap. This type of cap, know as an evapotranspiration (ET) cap, is in common use at Class II landfills and other waste repositories in Montana. It is easier to construct and maintain than a compacted clay cap and mimics the natural soil conditions while preventing infiltration. The seeded areas would be maintained along with the balance of the site landscaping for the life of the plant.

With the exception of retention ponds and the monofill site, all areas within the footprint of the site would be contoured to an even grade according to design specifications, and the net balance between soil cut and fill is anticipated to be even (Walters, 2006). If, at any point, soil is stockpiled on site, the stockpile would be stabilized and/or covered, utilizing best management practices.

For access to the construction site, the existing aggregate roadways currently leading to the site would be maintained. At the end of the construction period, these existing roadways would be regraded and covered with additional aggregate. A 1,800-ft. (545 m) long paved access road into the site would be constructed and maintained from the existing Cascade County road, Salem Road.

Additionally, 6,600 feet (2,012 m) of paved internal roadways would be constructed to facilitate both the construction and operations phases of the plant. These on-site, paved roads would be aggregate-based during construction and would be paved upon completion of heavy construction. Internal road construction would take six months.

A 6.3-mile (10.1-km) railroad spur would be installed at the Salem site in order to transport and supply coal to the HGS. The spur would extend south from the plant and tie into existing main line track that is located three miles (five kilometers) south of the city of Great Falls. Although the railroad spur would not cross any waterways, it would cross agricultural lands and Montana State Highway SR 228, Highwood Road, which would require a raised highway (SME, 2005e). When railroad track is laid down, it would permanently remove or cover up arable soils on the agricultural lands to be crossed.

Additionally, two short segments of electrical transmission line would be constructed; the first line segment, approximately 4.1 miles (6.6 m) long, would extend from the plant site to a new

switchyard site proposed for a location south and west of the Salem site; the second line segment, approximately 9.21 miles (14.82 km) in length, would extend south and west from the plant site, crossing the Missouri River north and east of Cochrane Dam. Both line segments would be constructed in new rights-of-way typically extending 50 feet (15 m) either side of centerline. All poles and structures associated with the transmission lines would be directly embedded utilizing native or engineered soils, in the event that additional soil is needed as backfill.

Construction of the raw water supply system would include a collector well which would use a passive intake screen installed on the end of a lateral pipe that extends into the Morony Reservoir. A reinforced, below-grade, concrete caisson (vertical cylinder used as a sump) would be constructed near the river and would serve as the intake's "wet well." A fully enclosed pump house would be located on the top of the caisson with a finish floor elevation at approximately grade.

Installation of the four wind turbine generators (WTGs) would involve temporary disturbance of soils from various activities. Excavation and grading would be required at each WTG location for foundation placement, as well as a temporary crane pad for tower erection. The total area of site disturbance for each tower is estimated at approximately 1.1 acres (0.4 ha), or 4.4 acres (1.6 ha) total. A portion of the excavated native soil materials would be used to establish natural drainage away from the turbine tower foundation. Additional soils disturbance would occur for installation of high voltage underground cable (collection system), communications cable and the electrical grounding system between the HGS Switchyard and WTG locations. A total of approximately 3,300 feet (1,000 m) of excavated trench, typically three feet wide by four feet deep (0.9 m by 1.2 m) would be required.

Ongoing operation and maintenance at WTGs would require construction of approximately 2200 lineal feet of access roads. Road construction impacts would be reasonably small considering the relatively minor change in elevation between WTG locations, the HGS plant site and existing county road. Access road construction would be limited to placement of pit run and final road base gradation materials to establish a 25-foot (8-m) wide drivable surface with elevations of 12 inches or more above natural grade, or as otherwise required to interface with an improved primary plant access road. Culverts to re-establish natural drainage would be utilized where required; in addition, riprap and flow diversion devices would be specified as required for erosion protection. Top soils removed at the start of construction would be spread adjacent to completed roadways and disturbed areas would be reseeded with natural vegetation. Impacts to topography and geology from erecting the WTGs would be negligible; impacts to soils would be negligible to minor, localized, and temporary to short-term.

Construction equipment to be used during the various facets of site development for both the power plant and WTGs would include bulldozers, backhoes, earth scrapers, motor graders, heavy haul trucks, large tractors, concrete trucks, asphalt pavers, concrete pavers, rollers, and compactors.

As with almost any construction project involving the use of heavy equipment, there is some risk of an accidental fuel or chemical spill, and the potential contamination of soils. Fuel products

(petroleum, oils, lubricant) would be needed to operate and fuel excavation equipment. To reduce the potential for soil contamination, fuels would be stored and maintained in a designated equipment staging area. Oils and lubricants are usually stored in metal storage cabinets appropriately labeled, often inside a garage or maintenance shed. A person(s) designated as being responsible for equipment fueling would closely monitor the fueling operation, and an emergency spill kit containing absorption pads, absorbent material, a shovel or rake, and other cleanup items, would readily be available on site in the event of an accidental spill. Following these precautions, the potential for an accidental chemical or fuel spill to occur and result in adverse impacts on soils would be negligible.

Construction equipment also has the potential to compact soil, reducing the porosity and conductivity of the soil. Such compaction is likely to slightly increase the amount of surface runoff in the immediate area. The underlying soil in the area of the site, Pendroy Clay, is already characterized by high runoff potential and relatively high soil erosion potential. Stabilization of the soils would be vital to prevent sediment runoff impacts to off-site water sources, possibly degrading water quality.

Siltation, or sedimentation, is a leading cause of stream and river impairment in Montana and the U.S., as it can cause disturbances in aquatic ecosystems. The National Pollutant Discharge Elimination System (NPDES) under the Clean Water Act prohibits the discharge of any pollutant, including sediments, to waters of the United States. The discharge of storm water runoff from construction sites is regulated under the NPDES program. Typically, sediment erosion rates from construction sites are 10 to 20 times greater than those from agricultural lands, and 1,000 to 2,000 times greater than those of forest lands (DEQ, 2003). Construction activities disturbing five acres or more of land are regulated by Phase I of the NPDES program. In Montana, DEQ is authorized to administer the NPDES Program through the Montana Pollutant Discharge Elimination System (MPDES) Program.

DEQ's Water Protection Bureau/Storm Water Program has issues general MPDES permits for construction sites, the chief requirement of which is the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP). SWPPPs contain measures to reduce soil erosion and prevent pollution from petroleum, oil, and lubricants (POLs) and other chemicals or hazardous/toxic materials at construction sites. Specifically, SWPPP plans assess the characteristics of the site such as nearby surface waters, topography, and storm water runoff patterns; identify potential sources of pollutants such as sediment from disturbed areas, and stored wastes or fuels; and identify Best Management Practices (BMPs) which would be used to minimize or eliminate the potential for these pollutants to reach surface waters through storm water runoff.

BMPs at construction activity sites typically consist of various erosion and sediment control measures. At the Salem site, silt fences, straw bales, and other temporary measures would be placed in ditches and along portions of the site perimeter to control erosion during construction activities. At each outfall location, temporary sediment basins would be constructed and maintained until site vegetation is firmly established. These temporary sediment basins would be constructed before mass grading begins, so that they are in place and working for the entire construction period. Regular inspections of the erosion and sediment control measures would be

performed after major storm or snowmelt events by qualified personnel, and as required in the MPDES General Permit.

In addition to preventing sediments from entering water bodies, erosion control methods would be in place to control the fugitive dust produced during construction activities. Dust control would be obtained through the use of water wagons on exposed earth or as required, the application of dust palliative on gravel surfaces. No human disturbances are anticipated, due to the lack of potential receptors in the immediate vicinity of the Salem site.

All disturbed areas (excluding those required for plant operations) would be stabilized and revegetated following completion of construction activities. Soils are likely to have been compacted during construction and would need to be ripped to reduce compaction prior to soil replacement. In addition, fertilizer and mulch may be needed to facilitate plant establishment. Proper seed selection would result in grasses with deep root systems and denser foliage, which would increase local retention times and reduce site outflows.

The construction activities would involve the conversion of existing agricultural lands into impervious areas. Increased urbanization and loss of pervious soils may result in increased surface runoff, perhaps contributing incrementally to localized drainage issues.

4.3.2.2 Operation

With the minor exception of the open monofill cell used in the disposal of ash, site soils would be stabilized once the proposed power plant is operational. Dust abatement would continue to occur on an as-needed basis on gravel surfaces.

The operation of the proposed power plant could hypothetically result in localized contaminant loading into the soil due to percolation of precipitation through coal stockpiles or leachate from the ash infiltrating into the soil from the monofill cells. The water would run off these piles or through the ash waste and could flush heavy metals such as arsenic and lead, which are inherently present in coal in trace amounts, into nearby soils where they could be adsorbed as the water slowly infiltrates down through the soil column. However, given the great depth to groundwater and the impermeability and thickness of clayey soils on site, the potential for extensive contamination problems is regarded as very low.

To further minimize any soil contamination, runoff within the power plant would be carefully managed. The ash monofill would be lined with compacted clay and groundwater in the vicinity of the monofill cells would be monitored. If contamination of soils is detected, SME would be required to follow the steps outlined in the site's Spill Prevention Control and Countermeasures Plan (SPCCP), or equivalent contingency and emergency plan, and the DEQ-approved solid waste management plan.

4.3.3 ALTERNATIVE SITE – INDUSTRIAL PARK SITE

4.3.3.1 Construction

Construction activities at the alternative site would be very similar to those described for the Proposed Action, the Salem site, except that they would not include the wind turbines. Construction timing would be anticipated to be the same, though the total area of disturbance would be only about half that of the Salem site. At the Industrial Site, the total area of disturbance for construction activities would include the total footprint of the power plant, which is several hundred square feet less than at the Salem site, and additional roadway, rail spur, and utility (pipeline and transmission line) corridor zones.

An ash disposal monofill would not be constructed at the site due to space constraints. For access to the construction site, SME and its contractors would maintain existing aggregate roadways to be used for construction access across the Industrial Park. They would regrade and place additional aggregate on these existing roadways at the end of the construction period. SME and its contractors would also construct and maintain all paved internal roadways to facilitate plant construction and operations. These on-site, paved roads would be aggregate-based during construction and would be paved upon completion of heavy construction.

Additionally, five miles (eight kilometers) of new track and railroad bed would be needed, slightly less than the distance for the Salem site. The rail spur would start north of the Missouri River and travel west to the plant site. A 17-mile (27-km) long pipeline, compared to less than two miles (3 km) for the Salem site, would be required to transport make-up water from an intake structure upstream of the Morony Dam (though a closer location would be sought).

Construction equipment to be used during the various facets of site development would be the same as in the Proposed Action, and would include bulldozers, backhoes, earth scrapers, motor graders, heavy haul trucks, large tractors, concrete trucks, asphalt pavers, concrete pavers, rollers, and compactors. Impacts from the use of these types of equipment are described under the Salem site section.

A storm water MPDES permit for construction sites would be required for the Industrial Park site. BMPs employed at this site would be expected to mirror those described for the Salem site. The construction activities would involve the conversion of existing agricultural lands into impervious areas. Increased urbanization and loss of pervious soils might result in increased surface runoff, perhaps contributing incrementally to localized drainage and flooding issues.

4.3.3.2 Operation

Site soils would be stabilized once the proposed power plant is operational at the Industrial Park site. Dust abatement would continue to occur on an as-needed basis on gravel surfaces.

As discussed under the Salem site, the operation of the potential power plant may result in contaminant loading into the soil due to percolation of precipitation through coal stockpiles. Any runoff within the power plant would be carefully regulated and managed. If contamination

of soils is detected, SME would be required to follow the steps outlined in the site's SPCCP, or equivalent contingency and emergency plan, and the DEQ-approved solid waste management plan.

Since the on-site ash monofill would not be constructed at the Industrial Park site, an alternative disposal location for the ash would have to be found. Either an off-site landfill of the same size as the Salem site would have to be licensed, constructed and operated, or the ash would have to be placed in another existing licensed solid waste management facility. The same volume of ash, 228 tpd, would have to be managed. Disposal at a new landfill would possibly require more road construction than at the Salem site, but the total amount of disturbance would not be known until the site was actually selected. The road construction standards might change because the haul to the new landfill would have to be done in smaller, road-worthy trucks. The use of an existing landfill would prematurely fill the landfill and would require that the solid waste facility be replaced earlier than it otherwise would be without the additional material from the power plant. Road-worthy trucks might also be needed to haul ashes to an existing facility.

4.3.4 CONCLUSION

The No Action Alternative would not have any impacts on the topography or the geology of the Salem or Industrial sites. There would be no change to contours or elevations of the land. There would be no significant adverse impacts on soils from the No Action Alternative, although negligible to minor, long-term, possibly adverse impacts would continue from existing agricultural land use practices. Insofar as SME would need to purchase power from other generation sources of wholesale supply to meet energy its supply needs, it would be contributing indirectly to ongoing soil resource impacts, and possibly impacts to geology and topography, at different generating stations in the region or at potentially new generating stations located outside of the region.

The construction of a power plant and related facilities at the Salem and Industrial Park sites would involve extensive site grading and excavation activities that would disturb a considerable amount of soil and alter the topographic contours of the respective sites. Because the sites are relatively flat, the impacts associated with topography are considered negligible. Impacts to soil resources from construction activities at the Salem site would be slightly larger than those at Industrial Park site, due to the ash disposal monofill construction at the Salem site. At the Salem site, soil resource impacts from construction activities would have a moderate magnitude, medium-term duration, medium extent, and probable likelihood. The soil resource impacts from construction at the Industrial Park site would be of minor magnitude, medium-term duration, and medium extent, and have a probable likelihood of occurring. The overall rating for impacts on soil from the construction phase of the power plant would be adverse and non-significant for both the sites.

Due to the operation of the waste monofill for the duration of the plant's life, operation-related impacts on soil resources for the Salem site would be of minor magnitude, long-term duration, and small extent, and have a probable likelihood of occurring. Soil that is stockpiled while a monofill cell is being filled would have to be stabilized and monitored on a consistent basis. The

impacts of plant operation on soil at the Salem site would be adverse, and while impacts would most likely be non-significant there is potential for them to become significant.

Operation-related impacts on soil resources for the Industrial Park site would be of minor magnitude, short-term duration, and small extent, and have a possible likelihood of occurring. Soils are anticipated to be completely stabilized upon commencement of plant operations, and the only outstanding impacts to soil remain the permanent increase in impermeable surface area and the risk associated with soil contamination from site runoff or leachate. The impacts of plant operation on soil at the Industrial Park site would be adverse and non-significant. Nevertheless, since the amount of ash waste would not change, an alternative disposal site would have to be located. Impacts to soils at a new location are unknown and site-dependent.

4.3.5 MITIGATION MEASURES

The compliance with the terms and conditions of the MPDES permit and the extensive use of best management practices (BMPs) during all construction activities would minimize the loss of soil due to erosion. Additionally, the regulation of all runoff within the power plant grounds, groundwater quality monitoring in the vicinity of the monofill cells, and adherence to a site-specific SPCCP, equivalent contingency and emergency plan, or DEQ-approved solid waste management plan would reduce the risk of a major adverse impact on soil resources to below the level of significance.

Oils, lubricants, and other chemicals would be stored inside a garage or maintenance shed within metal storage cabinets appropriately labeled. A person(s) designated as being responsible for equipment fueling would closely monitor the fueling operation, and an emergency spill kit containing absorption pads, absorbent material, a shovel or rake, and other cleanup items, would readily be available on site in the event of an accidental spill.

To minimize erosion and stabilize soils, all areas disturbed during construction would be stabilized, graded, and revegetated with appropriate grasses and forbs (using seeds) as soon as possible afterwards. Compacted soils may require ripping to mitigate the effects of compaction and allow roots to properly penetrate, develop, and obtain oxygen, moisture and nutrients; in addition, mulching and/or fertilizer may be needed to encourage initial plant growth.

4.4 WATER RESOURCES

4.4.1 NO ACTION ALTERNATIVE

The No Action Alternative would not significantly, adversely affect water resources at or near the Salem site or the Industrial Park. However, negligible to minor, long-term adverse impacts would continue from existing land uses.

Runoff from the agricultural lands on the sites can carry sediments, and possibly nutrients and other pollutants, to surface waters where they can potentially degrade water quality.

Sedimentation is a leading cause of stream and river impairment in Montana and the U.S, and it can cause disturbances in aquatic ecosystems such as the degradation of fish spawning grounds, the potential reduction of recreational activities, increased cost of domestic water purification and decreased life span of dams and levies. Continuing agricultural practices such as grazing, plowing, disking, harvesting, fertilizing, and using pesticides (e.g. herbicides, fungicides, insecticides) on the Salem or Industrial Park sites would contribute incrementally (albeit to a minute extent) to this distant, regional water quality problem.

Insofar as SME would need to meet its energy supply needs by purchasing power from generation sources located elsewhere, SME could potentially be contributing indirectly to ongoing water resource impacts at different generating stations in the region or at potentially new generating stations located outside of the region.

4.4.2 PROPOSED ACTION – HGS AT THE SALEM SITE

4.4.2.1 Construction

Under the Proposed Action, construction activities would last approximately two years and seven months. The maximum area of disturbance for these activities would include the total footprint of the power plant, approximately 545 acres (221 ha) (though not all of this would be disturbed), a water intake structure and associated pipelines, and additional roadway, rail spur, transmission lines, and utility corridor zones. Installation of the proposed wind turbines and related facilities such as access roads and electrical and transmission cables would require several months.

General construction impacts associated with the upland sites (the plant footprint and transportation corridors) could indirectly affect water resources by increased storm water runoff from the sites carrying sediment and contamination loads into surface water, and by contamination from construction equipment and activities infiltrating area soils and percolating down into the groundwater. Direct impacts to water resources from construction activities include the construction of the water intake structure in the Morony Reservoir, the installation of a transmission line and pipeline within the watershed of the Missouri River, and excavation and soil disturbance from installing four proposed wind turbines on site.

Under existing conditions, the main footprint of the Salem site drains to 13 distinct outfall locations, located in two different watersheds. Drainage areas vary in size from seven to 207 acres (3-84 ha). Along the western boundary of the site, storm flows are routed through in-place culverts under Salem Road. To the north and east, flows are to local coulees.

Under the Proposed Action, the Salem site would remain gravity drained. Disturbed areas (excluding those required for plant operations) would be revegetated. Proper seed selection would result in grasses with deep root systems and denser foliage, which would increase local retention times and reduce site outflows.

Internal site drainage would be accomplished through the use of open ditches and culverts. Most ditches would have a nominal slope of 0.5 percent and a width of six feet (two meters). This wide, flat shape would encourage infiltration of storm flows and would further reduce site

outflows. Where concentrated flows intersect undisturbed ground, or where existing soils are erosive, riprap would be placed to reduce flow velocities. While the 13 outfalls would be maintained, the majority of them would have a reduced drainage area. One area would remain the same size and three areas would have an increase in drainage area (8.8 to 9.0 acres, 207 to 224 acres, and 58 to 105 acres). Detention storage of seven acre-feet and four acre-feet would be provided at the two larger areas; these detention areas are labeled as North Pond and South Pond in Figure 4-3 below. This detention storage would reduce peak outflows during future storm events such that they would not exceed peak outflows experienced under existing conditions.

During site preparation and grading activities, soils in the construction areas may become exposed, rutted, and compacted. Soil exposure, rutting, and compaction have the potential to increase water yields from sites, concentrate and channelize sheet flow, increase erosion rates, and increase sediment delivery to nearby waterbodies. These effects, if unmitigated, could deliver small quantities of sediment and nutrient loadings to the Missouri River or its tributaries, which as already noted, are currently impaired by excess silt and nutrient concentrations.

Best Management Practices (BMPs), such as silt fences, straw bales, and other temporary measures, would be placed in ditches and along portions of the site perimeter to control erosion during all construction activities. At each outfall location, temporary sediment basins would be constructed and maintained until site vegetation is firmly established. These temporary sediment basins would be constructed before mass grading begins, so that they are in place and working for the entire construction period.

As with almost any construction project involving the use of heavy equipment, there is some risk of an accidental fuel or chemical spill, which could adversely affect water quality if the spilled chemical were to percolate into groundwater or directly enter and adjacent surface water body. Fuel products (petroleum, oils, lubricant) would be needed to operate and fuel both construction and water pumping equipment. Fueling activities would be restricted to the equipment staging area, away from drainages. To reduce the potential for water resource contamination, fuels would be stored and maintained in a designated equipment staging area, away from water bodies.

A person(s) designated as being responsible for equipment fueling would closely monitor the fueling operation, and an emergency spill kit containing absorption pads, absorbent material, a shovel or rake, and other cleanup items, would readily be available on site in the event of an accidental spill. Following these precautions, the potential for an accidental chemical or fuel spill to occur and result in adverse impacts on water resources would be negligible.

Direct impacts to water resources from construction activities would occur from the construction of the water intake structure in the Morony Reservoir and the installation of electrical transmission lines and water and wastewater pipeline within watersheds of the Missouri River and tributaries.

As part of the construction of the intake structure, a concrete caisson (vertical, cylindrical water-tight structure in which construction work is carried out) would be constructed several hundred feet landward from the edge of water. The pipeline would be jacked or drilled horizontally through the riverbank and extended out into the Morony Reservoir. The pipeline would emerge

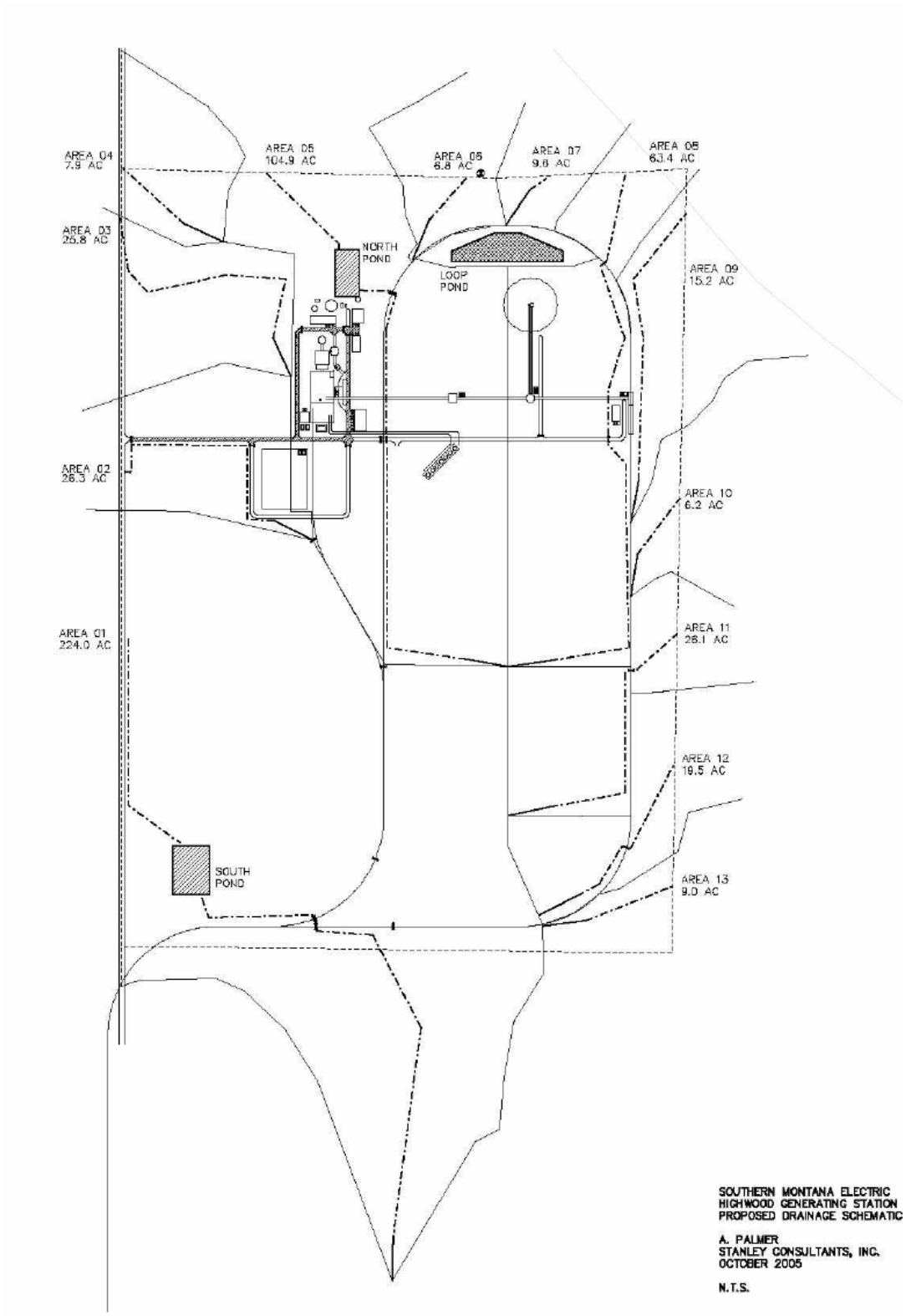


Figure 4-3. Proposed Drainage Schematic for Salem Site

Note: Solid lines represent boundaries between 13 drainage areas and dashed lines connote drainage ditches.

from the ground, well below the water surface, and there would be no anticipated impact to the riverbank or to riverbank vegetation due to construction access or pipe placement. The pipeline would extend approximately 400 feet underwater to access the deeper portion of the reservoir.

Approximately eight vertical H-pile supports would be driven into the channel bottom as supports for the proposed pipeline. The supports would be driven to a depth to be determined during construction. The pipeline would be 20" welded steel pipe approximately 400 feet (120 m) long. A stainless steel passive intake screen would be installed on the end of the pipe. No measurable effects on fish, other aquatic life, or aquatic habitat are anticipated. Intake velocity of water through the intake screen would be below impingement velocity as required by 40 CFR Part 125 Subpart I (0.5 ft/sec).

The raw water supply system would consist of a collector well which would use a passive intake screen installed on the end of a lateral pipe that extends into the Morony Reservoir. The intake screen would be located and designed to prevent sediment and debris from entering the system while also providing protection to aquatic life. The passive intake would be designed according to Section 316(b) of the Clean Water Act which applies to new cooling water facilities that withdraw between two and 10 million gallons per day (mgd). The rule states that the maximum through screen intake velocity must be less than 0.5 feet per second (fps).

A reinforced, below-grade, concrete caisson (a vertical cylinder serving as a waterproof chamber or sump) would be constructed near the river and would serve as the intake's "wet well." The caisson would be located outside of the floodplain. A fully enclosed pump house would be located on the top of the caisson with a finish floor elevation at approximately grade. The pump house would contain two pumps designed to deliver a maximum of 3,200 gallons per minute (gpm) to the plant site. The pumps would deliver the water to the HGS plant site through a buried pipe approximately 9,000 feet (2,740 m) in length. The pipe would be buried at a minimum of 6.5 feet (2 m) below the ground surface.

HGS would discharge wastewater back to the City of Great Falls for disposal at its existing wastewater treatment facility via approximately 55,000 feet (16,800 m) of newly constructed 12"sanitary force main that would run from the project site to a point near Malmstrom Air Force Base where the line would intersect an existing wastewater line owned by the City of Great Falls. A third pipeline would be constructed to supply potable water to the site from the City of Great Falls. This pipeline, constructed of 12" ductile iron or HDPE, would follow the same routing as the discharge pipe, but would be located a minimum of 10 feet (3 m) to the side. This water supply pipeline would be buried at a depth of 7 feet (2.1 m).

An additional construction activity that could directly affect water resources by nature of its location includes the installation of a transmission line. The transmission line would extend south and west from the plant site, across the Missouri River north and east of Cochrane Dam and terminate at NorthWest Energy's existing Great Falls Switchyard, located north and west of Rainbow Dam. Multiple-pole or H-frame structures would probably be required at the Missouri River crossing point to maintain proper phase-to-phase and phase-to-ground clearances.

In order to protect the water quality of the Missouri River during construction activities taking place in or adjacent to the River, any and all BMPs required by the appropriate authority would be implemented and maintained. These BMPs could include such measures as the installation of double-walled silt curtain in the river surrounding construction activities and installation of silt fencing and other erosion and sediment control measures when working in the floodplain to protect all adjacent wetlands and drainage ways. Permits and authorizations that would likely be required for all construction activities in or adjacent to water bodies include: Corps 404 and Section 10 Permits; Montana DEQ 401 Certification and 318 Authorization; MFWP SPA 124 Permit; and Cascade County 310 and Floodplain permits.

Because construction activities in or near water bodies are so heavily regulated in Montana, the temporary impacts from construction, such as increased erosion on the river banks and increased turbidity in the water column, are anticipated to be reduced below the threshold of significance. Construction is not anticipated to significantly affect floodplains or wetlands, as in the area of impact both floodplains and wetlands are generally limited to the incised drainage habitat and narrow fringes of the river. In order to minimize impacts on waterfowl and wildlife habitat, it is likely that required permits for construction in or adjacent to the Missouri River would be limited to times when spawning, nesting, or breeding of aquatic and/or wetland species is not occurring. That would probably limit construction to late summer, fall, and winter months.

4.4.2.2 Operation

The operation of the power plant would require a large amount of water, with implications for both water supply and wastewater treatment and disposal. In the U.S., water withdrawals for thermo-electric power plants are the leading use of water and accounts for approximately 48 percent of all water withdrawals in the United States. Water withdrawals for irrigation are the second largest water user and account for approximately 34 percent of all water withdrawals (USGS, 2005).

In 2000, a total of 110 million gallons per day (123 thousand acre-feet per year) of water was withdrawn in Montana for use in thermoelectric power generation. All water used in the state for thermoelectric power is surface water. Comparatively, in the same year a total of 7,950 million gallons per day (8,920 thousand acre-feet per year) of water was withdrawn for irrigation uses in Montana, over 70 times the amount used for thermoelectric power. The amount of water withdrawn for thermoelectric uses in Montana represents 0.056 percent of the total water withdrawn in the entire nation (195,000 million gallons per day) for thermoelectric uses (USGS, 2005).

The proposed power plant would withdraw surface water required for its operation from Morony Reservoir, approximately 0.4 mile (0.6 km) upstream of Morony Dam on the Missouri River. Morony Dam is owned and operated by Pennsylvania Power & Light (PPL) Montana (Figure 2-26). The land directly adjacent to the reservoir is also owned by PPL Montana. Morony Dam is operated as a run-of-the-river generation facility. Therefore, the outflow is maintained essentially equal to the inflow. The Morony Reservoir has a capacity of approximately 13,889 acre-feet and covers an area of approximately 304 acres (123 ha). Presently there is no public access to the Morony Reservoir for recreational purposes.

The plant would require a maximum of 3,200 gpm (7.8 cubic feet per second or 5,600 acre-feet per year) of "make-up water" to be pumped from the Morony Reservoir. The majority of this water (80 to 85 percent) would be a consumptive water use. This would represent almost five percent of all water withdrawn in the state for electrical power generation. The majority of make-up water would be used for cooling tower make-up due to the large evaporation, drift, and blowdown losses. A raw water tank would provide an on-site storage for service water and cooling tower make-up usage. A coal burning power plant is a thermoelectric plant which works by heating water in a boiler until it turns into steam. After the steam is used to spin the turbine-generator that produces electricity, it is sent to the condenser to be cooled back into water. Most of the water used in thermoelectric power generation is used in the condenser to cool the steam back into water. Then the condensed water is pumped back to the steam generator to become steam again while the cooling water is discharged as return flow or is recycled through cooling ponds or towers.

The annual mean flow of the Missouri River immediately downstream of the Morony Dam varies substantially, but is generally above 4,000 cfs. During extreme dry months, the monthly flow can drop down to 3,000 cfs. Assuming an extreme dry spell flow of 2,500 cfs for flows of the Missouri downstream of Morony Dam, the amount of withdrawal for the power plant (a maximum of 7.8 cfs) would reduce the river's flow by 0.31 percent.

This withdrawal would not in of itself significantly reduce flows in the Missouri River downstream of the site, though it would represent a small additional increment of consumptive use within the Missouri River Basin. This consumptive use of water has important implications for aquatic life, including threatened and endangered species, but is not cited by the state as the priority threat facing aquatic species in the Missouri River.

The water rights for supplying the water would be from an existing water reservation that is owned by the City of Great Falls. The city would continue to own the water reservation and would sell the water to the HGS through an agreement between the city and SME. The point of diversion for the existing water reservation is within city limits. The point of diversion for the preferred HGS plant site is located downstream of the city in the Morony Reservoir. Therefore, the city has prepared and submitted an application to the Montana Department of Natural Resources and Conservation for transfer of the water reservation's point of diversion to the Morony Reservoir (SME, 2005f).

The power plant would generate a maximum of 811 gpm of wastewater that must be discharged and would consist of concentrated

Consumptive Water Use

Much of the water that is withdrawn from rivers and aquifers for use by irrigated agriculture, industry and municipalities is actually returned to a watershed after being used. Often it is returned in altered form, carrying impurities like nutrients and suspended solids that can impair receiving water quality. Wastewater treatment plants endeavor to improve the quality of effluent prior to discharge so as to reduce the impact on receiving water.

In contrast, **consumptive use** is that portion of withdrawn water that is used or "locked up" and effectively removed from a watershed, like that incorporated into the tissues of growing crops. This water is sequestered, and no longer available for other uses. Consumptive use also includes water lost to a basin through diversion and evaporation, plant evapotranspiration, or conversion, or to the ground.

river water and trace amounts of cooling tower water and boiler water treatment chemicals (DEQ, 2005). Best available pollution control technologies (BACT, or Best Available Control Technology) could reduce but not eliminate the chemical loading in the discharge water.

SME proposes to discharge wastewater back to the City of Great Falls for disposal and treatment at its existing wastewater treatment facility via a 12" newly constructed sanitary force main. The City of Great Falls wastewater treatment facility is licensed and permitted to treat and discharge up to 21 million gpd into the Missouri River (MPDES MT 0021920). The facility's discharge point is 1.5 miles (2.4 km) upstream of Black Eagle Falls Dam or approximately 12 river miles upstream from the proposed water intake pipe in Morony Dam Reservoir. The facility currently discharges between 9 and 10.5 gpd. The facility thus has sufficient capacity to treat and discharge HGS' proposed 734,400 gpd maximum industrial and sanitary wastewater discharge. The environmental impacts from the discharge of the facility's treated wastewater were addressed during its MPDES permitting and 5-year review processes (Jacobson, 2006b).

The city's wastewater treatment facility has pretreatment requirements that must be met before it would accept any water from the power plant. Some of these requirements are summarized in the textbox below. Additionally, the city has set maximum allowable industrial loading (MAIL) numbers for heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, zinc). The loading numbers represent the total mass of each pollutant that the wastewater treatment plant can accept from all industrial sources combined. Wastewater discharged to the treatment facility from HGS would need to meet city-determined loading levels set below the MAIL values.

An Industrial Wastewater Application for Permit was submitted to the City of Great Falls on February 15, 2006 in order to allow the proposed power plant to discharge industrial wastewater as a Steam Electric Power Generating (40CFR Part 423) category of industry. A 12" forced main piping system would extend from the proposed plant and connect to the existing municipal sanitary sewer at the junction of the Highway 87 bypass and North 10th Avenue. Discharge from the plant would average 0.734 mgd (734,400 gpd) and have a maximum peak of 1.168 mgd (1,168,000 gpd). This wastewater would be generated from various plant operation sources, including boiler blowdown; cooling tower blowdown; turbine, boiler, and transformer sumps; and raw water treatment (softener, RO backwash).

A 5.8-million gallon basin would be constructed onsite in order to provide surge control and a limited amount of primary sedimentation for boiler blowdown, cooling tower blowdown, and sump discharges from turbine, boiler and transformer areas. The sump discharges would undergo treatment prior to entering the basin in a standard oil/water separator unit. No toxic organic compounds would be present in the discharged wastewater. SME would install wastewater sampling and monitoring equipment as per the requirements of the city. Among several compounds, trace amounts of the heavy metals arsenic, copper, zinc are expected to be present in the wastewater discharged from the plant. There is a possibility that extremely low concentrations of lead and mercury may also be present in the discharged wastewater. However, the concentration of all regulated compounds in the power plant waste stream would be below the maximum allowable discharge concentrations.

Highwood Generating Station Requirements under the Industrial Pretreatment Program:

- At least 180 days prior to discharging industrial wastes, submittal of a Disclosure Form and Permit Application. Process schematics and site plans shall be included in the application.
- Process water and domestic wastewater must be separated. Domestic wastewater shall not be discharged though the monitoring facilities.
- Highwood Station would need to install sampling facilities for process wastewater discharge. The sampling facilities must include:
  - An automatic sampler capable of collecting flow-proportioned composite samples.
  - A flow meter with totalizer that would enable daily and monthly flow totals to be determined.
  - The sample point must be such that the sample gathered by the automatic sampler is representative of the discharge of process wastewater being regulated.
  - The ability to collect grab samples of process wastewater representative of the flow at the time of sampling.
  - Reasonable access to the sampling facilities by the City of Great Falls personnel or representatives.
  - A properly calibrated open-channel type flow meter.
- A Spill Prevention Control and Countermeasure Plan.
- Secondary Containment must be provided for hazardous chemicals. Chemicals stored in containers larger than 55 gallons would probably require secondary containment depending on the degree of hazard. Storage of low-hazard chemicals in 55 gallon and smaller containers (not in use) should be in an area with no floor drain. 55 gallon and smaller containers of non-hazardous chemicals that are in use may be located at the point of application.
- Storm drainage and roof drains must not discharge into the sanitary sewer.
- Highwood Station must obtain a storm water discharge permit from the Montana Department of Environmental Quality if so required by that agency.
- Highwood Station would meet all requirements of OCCGF, particularly 13.14 and 13.20.
- Highwood Station would meet all requirements of 40CFR Part 423 as it applies to Pretreatment Standards for New Sources.
- Highwood Station would be responsible for sampling, analyzing and reporting results of sampling activity to the city. The city would also collect samples of process wastewater discharge.
- Dilution of process wastewater for the purpose of lowering pollutant concentrations would not be allowed.

Source: City of Great Falls, Water/Wastewater Treatment Plant

Other important sources of impacts associated with operations of the plant include site runoff and leaching. Runoff specifically from the coal piles on site would be directed to a dedicated, zero outflow evaporation pond. This pond would have a footprint of 3.5 acres (1.4 ha) and capacity of 12 acre-feet and is labeled Loop Pond in the proposed drainage schematic above (Figure 4-3). The ash disposal areas and the waste monofill would be located inside the southern area of the rail road loop. The ash disposal area would be constructed to include ponding areas to collect runoff from precipitation events. These containment areas would serve as evaporation ponds and would have zero discharge.

While leaching of coal and other site runoff, and the percolation of wastes into the groundwater, is an inherent concern to water resources, the clays found onsite are characterized by very slow

water transmission rates and infiltration rates. These soils should serve as efficient cell and detention pond basin liners, and groundwater below the site would be monitored on a regular basis to ensure no contamination is occurring. If any contamination is detected by means of groundwater wells or other methods, SME would be required to conduct cleanup procedures in accordance with a DEQ-approved Solid Waste Management Plan and a site-specific SPCCP.

4.4.3 ALTERNATIVE SITE – INDUSTRIAL PARK

4.4.3.1 Construction

Construction activities at the Industrial Park Site and Best Management Practices (BMPs) employed to reduce the impacts associated with construction activities, would be very similar to the Salem site. The total area of disturbance for these activities at the Industrial Park Site would include the total footprint of the power plant, approximately 300 acres (121 ha), a water intake structure and associated pipelines, and additional roadway, railspur, transmission lines, and utility corridor zones.

Though a storm water management plan has not been developed for the Industrial Park Site, the facility would be required to completely manage all storm water, to ensure that runoff from the construction areas would be minimized. Direct impacts to water resources from construction activities include the construction of the water intake structure in the Morony Pool and the installation of transmission line and pipeline within floodplain and wetland areas of the Missouri River.

A 17-mile (27-km) long pipeline (compared to less than two miles (3.2 km) for the Salem site) would be needed to transport make-up water from an intake structure upstream of the Morony Dam on the Missouri River to the plant. Insofar as this pipeline would be installed in a greater area of wetland and/or floodplain, the impacts associated with riparian habitat degradation would be greater at the Industrial Park Site.

If the Industrial Park site were to be chosen as the location of the power plant, it would almost certainly be annexed into the city (please see relevant discussion under the Farmland/Land Use, Section 4.12). Both industrial and municipal wastewater generated from the plant would then be discharged back to the City of Great Falls for disposal at its existing wastewater treatment facility. Potable water would be supplied to the plant from the city's water treatment plant. The city municipal sewer and water lines currently run to the IMC plant, located approximately one half-mile (0.8 km) southwest of the site and SME would tap into those lines.

In order to protect the water quality of the Missouri River during construction activities taking place in or adjacent to the river, SME would be required to implement and maintain any and all BMPs required by the appropriate authority would be implemented and maintained. These BMPs would be similar to the ones required for the Salem site, and could include such measures as the installation of double-walled silt curtain in the river surrounding construction activities and installation of silt fencing and other erosion and sediment control measures when working in the floodplain to protect all adjacent wetlands and drainage ways.

Because construction activities in or near water bodies are so heavily regulated in Montana, the temporary impacts from construction, such as increased erosion on the river banks and increased turbidity in the water column, are anticipated to be reduced to below the threshold of significance. The construction is not anticipated to significantly affect floodplains or wetlands, as in the area of impact both floodplains and wetlands are generally limited to the incised drainage habitat and narrow fringes of the river. In order to minimize impacts on waterfowl and wildlife habitat, permitting would likely limit construction in or adjacent to the river to times when spawning, nesting, or breeding of aquatic and/or wetland species is not occurring.

4.4.3.2 Operation

The operation of the power plant at the Industrial Park site would be almost identical to the operation of the plant at the Salem site, with similar implications for water resources. The site would have the same requirements for water withdrawals from the Missouri River, and would also withdraw water from the Morony Reservoir. However, since the Salem site is located south of the river and the Industrial Park site north of it, the water intake structure would be placed on the opposite side.

The withdrawal of Missouri River water for plant operations would not significantly reduce flows in the Missouri River downstream of the site, though it would represent an additional increment of consumptive use within the Missouri River Basin. The water rights for supplying the water would be from an existing water reservation that is owned by the City of Great Falls.

The power plant would generate industrial wastewater that would not be consumptively used and would instead require discharge. A maximum of 811 gallons per minute of wastewater would be discharged to the City of Great Falls wastewater treatment plant. The discharged water would consist of concentrated river water and trace amounts of cooling tower water and boiler water treatment chemicals (DEQ, 2005). The city's wastewater treatment facility would require pretreatment standards to be met before it would accept any water from the power plant, as described under the Proposed Action.

Other important sources of impacts associated with operations of the plant include site runoff and leaching. Runoff from the site would be contained in zero outflow evaporation ponds. Ash generated from the burning of coal would be disposed of off site, eliminating the risk of leaching from an onsite waste monofill. The risks of leaching at any off-site disposal facility are unknown and site-dependent. Use of the High Plains Landfill would result in impacts similar to that of the Salem site given the similarities in bedrock (WMA, 1995). Although the leaching of coal and other site runoff could be a concern to water resources, the clays found onsite are characterized by very slow water transmission rates and infiltration rates. These soils should serve as effective detention pond basin liners, and groundwater in the vicinity of the site would be monitored on a regular basis to ensure no contamination is occurring. If any contamination is detected, SME would be required to follow cleanup procedures in accordance with a DEQ-approved Solid Waste Management Plan and a site-specific SPCCP.

4.4.4 CONCLUSION

The No Action Alternative would not significantly, adversely affect water resources at or near the Salem site or the Industrial Park. However, negligible to minor, long-term adverse impacts would continue from existing agricultural land uses. Continuing agricultural practices such as grazing, plowing, disking, harvesting, fertilizing, and using pesticides on the Salem or Industrial Park sites would contribute incrementally to a minute extent to sedimentation and nutrient loadings of the Missouri River.

Because SME would need to meet its energy supply needs by purchasing power from generation sources located elsewhere, SME could potentially contribute indirectly to ongoing water resource impacts at different generating stations in the region or at potentially new generating stations located outside of the region.

The proposed construction and operation of the power plant and wind turbines at the Salem site would create several potential impacts to water resources. The construction of the site could involve general impacts such as increased storm water runoff carrying sediment and contamination loads into surface water, and contamination from construction equipment and activities infiltrating area soils and potentially percolating down into the groundwater.

Potential direct impacts to water resources from construction activities would include the construction of the water intake structure in the Morony Reservoir and the installation of transmission lines and pipelines within the watershed of the Missouri River and tributaries.

There would be a minimal loss of wetlands and floodplains from these actions, and water quality of the Missouri River would be protected by any and all BMPs required by the appropriate authority and permitting agency. Because construction activities in or near water bodies are so heavily regulated in Montana, the impacts from construction would be substantially reduced from what they otherwise could be in the absence of regulation. Required authorizations and permits reduce water resource impacts from the construction of the power plant to be of moderate magnitude, medium term duration, and medium extent, and have a probable likelihood of occurring. The overall rating for impacts on water resources from the construction phase of the power plant would be adverse, and while impacts would likely be non-significant, there is potential for them to become significant.

Operation of the power plant at the Salem site would involve water withdrawals from the Missouri River, which would reduce the river by 0.31 percent in a “worse-case scenario”. Though it would represent an additional increment of consumptive use within the Missouri River Basin, it is not in of itself a significant reduction in the Missouri River flows downstream of the site. The power plant would discharge a maximum of 811 gal/minute of wastewater. The operation of the power plant would result in impacts that would be of moderate magnitude, long term duration, and medium extent, and have a probable likelihood of occurring. The overall rating for impacts on water resources from the operation phase of the power plant would be adverse, and while impacts would likely be non-significant, there is a potential for them to become significant.

The construction and operation of the power plant at the Industrial Park site would involve similar activities and create many of the same impacts to water resources as the Proposed Action. The notable exceptions are the impacts associated with the installation of the longer water intake pipeline, which could potentially harm a greater area of wetland and/or floodplain, and the greater likelihood of the Industrial Park being able to hook up to city sewer and water lines. While this likelihood would make it easier for SME to manage its water resources, it does not change the impact of net water consumption amounts or water quality parameters that would be regulated and required at the plant. In other words, regardless of the alternative, the power plant operators would have to obtain and adhere to all local, state, and federal regulations, which would prevent any significant impacts from occurring to water resources.

The construction and operation of the power plant at the Industrial site, then, would have similar impacts as at the Salem site. The associated activities would result in impacts that would be of moderate magnitude, long term duration, and medium extent, and have a probable likelihood of occurring. Overall, the rating for impacts at the Industrial Park would also be adverse, and while impacts would likely be non-significant, there is a potential for them to become significant.

4.4.5 MITIGATION MEASURES

The implementation of any and all BMPs required by appropriate permitting authorities would reduce the impacts to water resources associated with both the construction and operation of a coal-burning power plant. These BMPs could include such measures as the installation of double-walled silt curtain in the river surrounding construction activities and installation of silt fencing and other erosion and sediment control measures when working in the floodplain to protect all adjacent wetlands and drainage ways. Permits and authorizations that would likely be required for construction and operation activities include: Corps 404 and Section 10 Permits; Montana DEQ 401 Certification and 318 Authorization; Montana FWP SPA 124 Permit; and Cascade County 310 and Floodplain permits.

Depending on permitting requirements, construction activities in or adjacent to the Missouri River may be limited to times when spawning, nesting, or breeding of aquatic and/or wetland species is not occurring. Additionally, during plant operations at the Salem site, groundwater would be voluntarily monitored in the vicinity of the waste monofill in order to detect any possible contamination.

4.5 AIR QUALITY

4.5.1 NO ACTION ALTERNATIVE

The No Action Alternative would not contribute directly to air emissions or air pollution at either the Salem or Industrial Park sites. However, it would require that other power generation facilities increase, or expand production, to meet SME's demand for power. The impact of the consequent changes on air quality cannot be determined, because this would depend on the mix of energy sources used to generate SME's power, which is unknown. The discussions in Chapter 2 of this EIS describe the wide ranges in air emissions from various energy sources.

Under the No Action Alternative, air pollutant emissions and impacts to ambient air quality from meeting SME's projected electricity load would not simply "go away," but would be located in different places and occur to different degrees, depending on the energy source or mix of energy sources used to generate the electricity sold to SME. In particular, emissions of mercury and greenhouse gases would likely be equal to or higher than those expected from the HGS, because power would likely be supplied from older, less efficient, "dirtier" sources.

4.5.2 PROPOSED ACTION – HGS AT THE SALEM SITE

4.5.2.1 Construction

Heavy equipment needed to build the power plant or any other heavy industrial facility would likely include, at a minimum, graders, bulldozers, backhoes, dump trucks, cement trucks, cranes and other diesel and gasoline-fueled heavy and light equipment. Intermittently, over a period of several years, this equipment would emit quantities of five criteria air pollutants: carbon monoxide (CO), nitrogen oxides (NOx), sulfur dioxide (SO_2), particulate matter (PM_{10}), and volatile organic compounds (VOCs). In addition to tailpipe emissions from heavy equipment, the temporary disturbance of several hundred acres of ground surface during excavation and grading activities to prepare the site for construction potentially could generate fugitive dust.

Construction personnel would be required to implement reasonable measures, such as applying surfactant chemicals or water to exposed surfaces or stockpiles of dirt, when windy and/or dry conditions promote problematic fugitive dust emissions. However, mines in windy areas have found that chemical surfactants do not work well. The area around Great Falls is fairly windy. High winds would peel off the treated layer, exposing dry soil or gravel beneath. Some form of soil pavement treatment might be a better solution in a windy area where equipment is in use. Adhering to these would minimize any fugitive dust emissions. Use of one or more of these mitigation measures, in addition to the fact that there are few nearby residents, would reduce the possibility of adverse impacts from fugitive dust emissions to below the level of significance.

Exhaust emissions from equipment used in construction, coupled with likely fugitive dust emissions, could cause minor to moderate, short-term degradation of local air quality, but would not be high enough to result in significant deterioration.

4.5.2.2 Operation

4.5.2.2.1 Emissions and Compliance with Regulatory Standards

The primary source of emissions from the plant would be the combustion byproducts of the CFB boiler. The combustion of coal in the boiler generates hot gases, which, in turn, generate steam. The steam powers a steam turbine that turns a generator to produce electricity. In addition to the CFB boiler, air pollutants would be emitted from the following equipment:

- Auxiliary boiler
- Coal thawing shed heater
- Building heaters
- Emergency generator and fire water pump
- Refractory brick curing heaters
- Material handling equipment and storage areas
- Cooling tower
- Fuel storage tank
- General vehicle travel

As described in Section 3.3.1, under the federal Clean Air Act (CAA), states are given the primary authority to manage their air quality resources. Compliance with applicable air regulatory programs would serve to mitigate impacts of HGS air emissions sources as described in the following sections.

Regulatory Programs

As described in Section 3.3.1, under the federal Clean Air Act (CAA), states are given the primary authority to manage their air quality resources. EPA requires air pollution control agencies such as DEQ to develop State Implementation Plans (SIPs), which are control plans based on federal statutes and regulations. The Montana SIP generally establishes limits or work practice standards to minimize emissions of the criteria air pollutants or their precursors. Among other requirements, air quality management in Montana's SIP includes general state emission standards, federal New Source Performance Standards (NSPS), hazardous air pollutant (HAP) regulations, federal Acid Rain Program requirements, federal Title V operating permit program, and the Prevention of Significant Deterioration (PSD) permitting program. The proposed generating station would be required to comply with the requirements of each of these air quality programs.

The general state standards set the most basic level of air quality control for criteria pollutants, and cover all sources in the state of Montana. These standards include a solid fuel sulfur content limitation, particulate limits for fuel burning sources based on the heat input of the source, particulate emission limits for other sources based on the weight of material processed, and limits on the opacity of visible emissions. Montana also has liquid and gaseous fuel sulfur content limits which would apply to the use of fuel oil for startup of the CFB and the fuel/gas firing of the auxiliary boiler and building heaters.

The NSPS set more stringent requirements for equipment that has been newly constructed, reconstructed, or modified since the standards were put into effect. While NSPS have historically applied only to newly constructed, reconstructed, or modified equipment, the recently promulgated NSPS, 40 CFR 60, Subpart HHHH, "Emission Guidelines and Compliance Times for Coal-Fired Electric Steam Generating Units," is applicable to certain existing emission units. The primary purpose of the NSPS program is to achieve long-term emissions reductions by assuring that the best demonstrated emission control technologies are installed as the industrial infrastructure is modernized. The specific applicability of the NSPS program upon the generating station equipment is discussed further below.

The National Emission Standards for Hazardous Air Pollutants (NESHAP) program establishes standards for certain industrial source categories for the emission of HAPs, otherwise known as the Maximum Achievable Control Technology (MACT) standards. The MACT standards can apply to existing and newly constructed or reconstructed source categories. The specific applicability of the NESHAP program upon the generating station equipment is discussed further below.

The federal Acid Rain Program is a national regulatory program applicable to certain emission units that burn fossil fuels and produce and sell electricity. The program is focused on the

reduction of NO_x and SO_2 emissions from these sources. The emissions of SO_2 are regulated and reduced through a national cap-and-trade program where SO_2 "allowances" are bought and sold on a market. The NO_x emission reductions are achieved through specific NO_x emission limits placed upon certain coal-fired utility boilers that are subject to the program. The specific applicability of the Acid Rain program upon the proposed generating station is discussed further below.

The Title V Air Operating Permit program is administered by DEQ and requires "major sources" of regulated air pollutants to obtain an operating permit that provides the required monitoring, record keeping, reporting, and compliance certification requirements necessary for the on-going operation of the plant. An operating permit application has already been submitted for the proposed project and an operating permit is expected to be issued for the plant prior to operation. DEQ has developed a revised preliminary determination, which can be found in Appendix I.

Pursuant to DEQ rules (ARM 17.8.1211(4)), sources that are required to develop and submit a Risk Management Plan (RMP) pursuant to section 112(r) of the federal Clean Air Act, are required to register such a plan. The only expected equipment to be installed that may be subject to RMP requirements is the ammonia storage tank associated with the selective non-catalytic reduction (SNCR) control system to be installed on the CFB boiler. However, this program is not triggered for aqueous ammonia storage if the quantity stored is less than 20,000 lbs at a concentration of 20 percent or greater. If the concentration of aqueous ammonia is less than 20 percent, regardless of quantity, the storage of the ammonia would not be subject to RMP (40 CFR §68.130(a) and 40 CFR §68.115(b)(1)). Before the ammonia could be brought on-site, either the inapplicability of the RMP program would be documented or an RMP would be developed and submitted.

The PSD permitting program is a federally required permitting program administered by DEQ that involves the review of proposed new and modified major air pollution sources. This review is comprised of two main parts –

- A review of ambient air impacts upon the immediately surrounding area (referred to as a Class II area) and on more distant areas in the region that are designated as environmentally sensitive Class I areas;

- An assessment of the air pollution control technologies proposed by the source to ensure that the Best Available Control Technology (BACT) is installed for each criteria pollutant.

Appendix I contains the DEQ's supplemental preliminary determination on the PSD air quality permit for SME-HGS (DEQ, 2006a), which is subject to public comment along with the DEIS. The ambient air quality review is discussed in detail later in this section.

In addition to BACT for criteria pollutants required under PSD, the DEQ requires that a BACT review must be conducted for all pollutants of concern from coal-fired generation, including HAPs, as part of the pre-construction permitting.

The following subsections discuss how the requirements of these air quality programs would be addressed for the HGS.

CFB Boiler

The CFB boiler would be subject to the NSPS standard for electric utility steam generating units (Subpart Da), and would be capable of meeting the limits provided in this subpart for visible emissions (opacity), PM, SO_2, NOx, and Hg. EPA updated the current NSPS Subpart Da requirements on February 27, 2006. This updated NSPS Subpart Da applies to any electric utility steam generating unit (>250 MMBtu/hr heat input) that is newly constructed, modified, or reconstructed after the proposal date of the updated NSPS (February 28, 2005). The NSPS Da update sets new emission limitations on PM, SO_2, and NOx. The CFB boiler is required to meet these updated NSPS Da emissions limits.

The CFB boiler would be subject to the promulgated Clean Air Mercury Rule (NSPS Subpart HHHH – Emission Guidelines and Compliance Times for Coal-Fired Electric Steam Generating Units), which allocates mercury budgets to every state. Under the federal mercury program (known as the "model rule"), mercury emission allowances are then distributed to coal-fired electric utility units. Under the model rule, these allowances may be bought and sold through a trading program administered by the EPA. The federal mercury reduction program will go into effect in 2010. It is important to note that NSPS Subpart HHHH requires states to update their SIPs to reflect how the mercury rule would be implemented. The individual states have the flexibility to develop their own mercury reduction program that is different from the EPA's "model rule." However, regardless of what type of program is used, the state is required to meet the EPA determined state mercury budget.

The state of Montana is in the process of developing a Mercury emissions and control rule. On March 23, 2006 the Montana Board of Environmental Review proposed a draft rule. The proposed Montana standard is more stringent than the federal rule and is on a lb/trillion Btu (TBtu) basis. The CFB boiler of the HGS would be subject to the requirements of any mercury rule adopted in Montana.

The Acid Rain Program also would be applicable to the proposed CFB boiler. In order to comply with the program, the following steps would be required –

- Necessary SO_2 allowances would need to be obtained
- Applicable NO_x limitations would need to be complied with
- Required continuous monitoring, record keeping, and reporting would be followed

As part of the air quality permit application for HGS, a BACT review has been conducted by DEQ for the CFB boiler for the following pollutants: SO_2, NO_x, PM/PM_{10}, VOC, CO, sulfuric acid mist, lead, mercury, acid gasses (HCl and HF), and radionuclides. The conclusions of the BACT analysis were that the following control technologies would be implemented (Table 4-2). Each chosen technology would reduce emissions to levels that would meet or exceed the level of control required by all general state standards and NSPS requirements.

Table 4-2. BACT Summary for CFB Boiler

Pollutant	Selected BACT Control Technology
Filterable PM/PM_{10}	Fabric Filter Baghouse
SO_2	CFB Design, Low-Sulfur Coal, and Hydrated Ash Reinjection
NO_x	CFB Design with Selective Non-Catalytic Reduction
VOC	Proper Design and Combustion
CO	Proper Design and Combustion
Sulfuric Acid Mist, Acid Gases, Trace Metals, and Condensable PM/PM_{10}	CFB Design, Low-Sulfur Coal, Hydrated Ash Reinjection, and Fabric Filter Baghouse
Mercury (Hg)	IECS and if necessary, ACI or equivalent
Radionuclides	Fabric Filter Baghouse

Control of filterable particulate (PM/PM_{10}) emissions from the CFB boiler would be accomplished through the use of a fabric filter baghouse. In this device, exhaust from the boiler would pass through rows of fiberglass fabric filter bags. The exhaust gases pass through the bags, while the filterable particulate remains on the upstream face of the bags.

SO_2 emissions in the boiler result from the sulfur present as an impurity in the coal that is fired. The CFB boiler primarily would fire low-sulfur, sub-bituminous coal from the Powder River Basin. This coal varies in sulfur content, but is expected to typically have sulfur contents below one percent by weight. The design of the CFB boiler employs the firing of crushed coal mixed with limestone injected into the combustor. The use of limestone provides control of SO_2 by reacting with SO_2 to form calcium sulfate ($CaSO_4$), which can be removed from the exhaust in the fabric filter baghouse. In addition to this boiler design, the boiler would be equipped with a hydrated ash reinjection system that would take a portion of the limestone and ash collected in the fabric filter baghouse, hydrate it, and re-introduce it into the exhaust in a reaction vessel upstream of the fabric filter baghouse. Hydrated ash reinjection is a type of dry flue gas desulfurization (FGD) system that allows for additional conversion of SO_2 to $CaSO_4$. Overall the use of limestone injection with hydrated ash reinjection would control 97 percent of the SO_2 emissions that would result from an uncontrolled boiler firing low-sulfur coal.

Emissions of NO_x from the boiler would be formed in two ways: thermal NO_x would be formed from the oxidation of nitrogen gas (present in the air fed to the boiler) at very high temperatures, and fuel NO_x would be formed from the oxidation of nitrogen that is bound in the coal fired in the boiler. The CFB boiler design has approximately 80 percent lower NO_x emissions than a comparably sized traditional pulverized coal boiler design. The lower emissions are due to the inherently lower flame temperature of the CFB boiler design, which helps minimize formation of thermal NO_x. The CFB NO_x emissions would be controlled through the use of a selective non-catalytic reduction (SNCR) system. This technology involves the decomposition of NO_x to nitrogen (N_2) and water. This is accomplished by injecting ammonia (NH_4) or urea ($CO(NH_2)_2$) into a high-temperature area of the furnace. The ammonia or urea reacts with the nitric oxide (NO) in the exhaust gas and reduces it to nitrogen and water. A byproduct of this technology is an increase in ammonia emissions (sometimes referred to as “ammonia slip”), resulting from a portion of the injected ammonia that does not react with the NO_x. Applying SNCR technology

to the exhaust reduces NO_x emissions by an additional 50 percent beyond the control already provided by the CFB boiler design, for an overall reduction of 90 percent of NO_x emissions.

CO and VOC emissions from the CFB boiler would be controlled through proper design and combustion in the boiler. Add-on controls such as catalytic and thermal oxidation systems have been evaluated by DEQ as part of the proposed generating station's PSD permit application, but were determined to be infeasible due to the high expense and impracticality of reheating the exhaust gas to a temperature where those controls could be effective.

Though a BACT review for HAPs is not required under the federal CAA provisions, SME has conducted a BACT evaluation of HAPs from the CFB boiler per the request of DEQ pursuant to Montana's general air quality permit rules in 17.8.740 *et seq*. Sulfuric acid (H_2SO_4) mist, acid gases (primarily hydrofluoric acid (HF) and hydrochloric acid (HCl)), trace metals (including lead), and condensable PM_{10} would be emitted from the boiler. These pollutants form as a result of combustion conditions of the boiler and impurities in the coal. Emissions of these pollutants would be minimized through the use of the CFB boiler design, the hydrated ash reinjection system, and the fabric filter baghouse. Mercury emissions result from mercury present in the coal fired in the boiler. Control of mercury emissions is addressed under Section 4.5.2.2.4. Radionuclide emissions result from trace amounts of radioactive material that is present in coal and nearly all natural materials. The use of the fabric filter baghouse for particulate control represents BACT for radionuclides, as it would reduce radionuclide emissions from the CFB boiler by more than 90 percent.

Auxiliary Combustion Devices (Auxiliary Boiler, Emergency Generator, Emergency Fire Water Pump, Coal Thawing Shed Heater, Refractory Brick Curing Heaters, and Building Heaters)

The auxiliary boiler would be subject to the NSPS for industrial, institutional, and commercial steam generating units (Subpart Db), which establishes emission limits for visible emissions (opacity), PM, SO_2, and NO_x. Given that the auxiliary boiler would operate for a limited amount of time and would fire fuel oil, the applicability of NSPS emission limits is limited. EPA has updated NSPS Subpart Db on February 27, 2006. The updated NSPS Subpart Db applies to any steam generating unit (>100 MMBtu/hr heat input) that is newly constructed, modified, or reconstructed after the proposal date of the updated NSPS (February 28, 2005). The NSPS Db update sets more stringent emission limitations on PM than exist under the current rules. This updated PM limit would not be applicable to the auxiliary boiler given that no solid fuels (e.g. coal) would be fired.

The propane-fired building heaters would not be subject to a NSPS given that each unit is less than 10 MMBtu/hr. The only potentially applicable NSPS (NSPS Subpart Dc) applies to any steam generating unit (>10 MMBtu/hr and < 100 MMBtu/hr heat input).

The EPA has proposed NSPS Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines) that applies to all owners or operators of stationary compression ignition (CI) internal combustion engines (ICE) for which construction, modification or reconstruction commences after July 11, 2005. This NSPS may be applicable to

either the emergency fire water pump or emergency generator. Any applicable requirement of this NSPS, if promulgated as a final rule, would need to be met for these engines.

Two potentially applicable MACT standards that have been promulgated for these types of combustion emission units include the following:

- 40 CFR 63, Subpart ZZZZ (National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE)) (Emergency Generator)

- 40 CFR 63, Subpart DDDDD (National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters) (Auxiliary Boiler)

Even though the emergency fire water pump would be operated with a RICE, the engine would be exempt from 40 CFR 63 Subpart ZZZZ given that the engine is less than 500 horsepower. The emergency generator would be operated with a RICE, but would be classified as an "emergency stationary RICE" and, therefore, subject only to the initial notification requirements of the standard.

The auxiliary boiler would fire only liquid or gaseous fuels and operate less than 10 percent of the year. Therefore, the boiler would be considered in the "limited use liquid fuel subcategory" of 40 CFR 63, Subpart DDDDD. New "limited use liquid fuel subcategory" boilers are subject to certain emission limits and other requirements of this standard including a particulate matter, HCl, and CO limit.

The building heaters would fire only gaseous fuels and the heat input of each heater would be less than 10 MMBtu/hr. Therefore, these boilers would be considered to be in the "small gaseous fuel subcategory" of 40 CFR 63 Subpart DDDDD. New "small gaseous fuel subcategory" boilers are subject only to the initial notification requirements of the standard.

A BACT review has been conducted by DEQ for each of the auxiliary combustion devices for the following pollutants: SO_2, NO_x, PM/PM_{10}, VOC, and CO. Each of these devices would be subject to annual limits on operation that would result in reduced annual emissions.

- The auxiliary boiler would operate only during startup, shutdown, and commissioning of the CFB boiler, and to keep the CFB boiler warm during shutdown, for a maximum of 850 hours of operation per year.

- The emergency generator and emergency fire pump would operate only in emergencies and for required maintenance, for a maximum of 500 hours of operation per year each. The coal thawing shed heater would operate only when coal needs to be thawed, for a maximum of 240 hours of operation per year.

- Because the auxiliary combustion devices would have limited hours of operation (and therefore, have low annual emissions), many add-on controls would not be cost effective.

The conclusions of the BACT analysis were that the following control technologies would be implemented (Table 4-3). Each chosen technology would reduce emissions to levels that would meet or exceed the level of control required by all general state standards and NSPS requirements.

Table 4-3. BACT Summary for Auxiliary Combustion Devices

Pollutant	Selected BACT Control Technology
PM/PM_{10}	Process Limitations Including Limited Hours of Operation
SO_2	Low Sulfur Fuels and Process Limitations Including Limited Hours of Operation
NO_x	Auxiliary Boiler: Dry Low-NO_x Burner Technology with Process Limitations Including Limited Hours of Operation Others: Process Limitations Including Limited Hours of Operation
VOC	Proper Combustion Design with Process Limitations Including Limited Hours of Operation
CO	Proper Combustion Design with Process Limitations Including Limited Hours of Operation

The dry low-NO_x burner (DLN) technology that would be used on the auxiliary boiler would reduce NO_x emissions from the boiler by 40 to 60 percent compared with conventional burners.

Material Handling and Storage

The coal, limestone, and ash material handling sources would consist of material transfer points, and would be located at conveyor transfer points, railcar and truck unloading sites, storage silos, the coal crusher, and material storage piles and bunkers.

Coal drying, cleaning, conveying, processing, storage, and transfer equipment at the site would be subject to the NSPS standard for Coal Preparation Plants, Subpart Y. This regulation sets a visible emission limit of less than 20 percent opacity for subject equipment. Equipment subject to this regulation would comply through the use of water spray and enclosures (emergency coal pile, with associated reclaim hoppers and belt feeder), and with baghouse controls (remaining subject equipment).

Limestone crushing, conveying, and transfer equipment at the site would be subject to the NSPS standard for Nonmetallic Mineral Processing, Subpart OOO. This regulation sets a visible emission limit of seven percent opacity, and a particulate emission limitation of 0.022 grains per dry standard cubic feet (a grain is 1/7000 of a pound) for subject equipment. Limestone processing equipment subject to this regulation would comply through the use of an enclosure with a baghouse.

A BACT review for particulate emissions was conducted by DEQ for each of the material handling sources. The resulting controls for all coal, limestone and ash conveyors would be partial or full enclosures. Coal and limestone belt conveyors would be partially enclosed with a

cover that extends past the conveyor belt, or is fully contained within a building. The limestone bucket elevator conveyors and ash handling pneumatic conveyors would be fully enclosed. On almost all material transfer emission points, SME would use enclosures with a baghouse or bin vent controls, which would reduce particulate emissions by 99.5 percent. Transfer points at the emergency coal pile, reclaim hoppers, belt feeder, and associated conveyor would be controlled with complete enclosure. The fly ash and bed ash conveyor and transfer emission points would be controlled with a wet dust suppression system.

The material storage areas were also evaluated by DEQ for BACT. The material to be stored on-site includes coal, limestone, fly ash, and bed ash. The proposed BACT controls for these storage areas were determined to be the use of a combination of enclosures (e.g. silos) with bin vent or baghouse control (for the active storage of coal, limestone, and ash) and best management practices (for the emergency coal and ash storage areas). Best management practices include compaction of storage piles and application of dust suppressants as necessary.

Cooling Tower

A wet cooling tower, with a design circulating water rate of 2,250 gallons per minute, would be used to dissipate heat from the power plant system. The proposed cooling tower would be an induced draft, counter-flow design. Cooling towers are a source of PM emissions given that a certain amount of cooling water becomes entrained in the air stream and is emitted from the tower as water droplets (known as “drift”). When the droplets evaporate, dissolved solids in the water crystallize and become PM emissions.

The most common method of reducing PM emissions from a cooling tower is with the use of a drift eliminator that removes water droplets prior to being emitted from the tower. Different types of drift eliminators have different associated control efficiencies. The cooling tower was evaluated for BACT and DEQ determined that a high efficiency drift eliminator (0.002% of the circulating water flow) constitutes BACT.

4.5.2.2.2 Impacts on Air Quality in Class II Areas

SME has submitted a PSD permit application to DEQ for the construction of a coal-fired, steam-electric generating station located near Great Falls, Montana, the aforementioned Highwood Generating Station (HGS). The proposed site is approximately eight miles (13 kilometers) east of Great Falls, Montana and approximately 1.5 miles (2.4 km) southeast of the Morony Dam, which is located on the Missouri River. The Universal Transverse Mercator (UTM) coordinates of the CFB stack are Zone 12, Easting 297.8 kilometers, and Northing 5,070.1 kilometers. The site elevation is approximately 3,290 feet (1,003 m) above mean sea level.

Prevention of Significant Deterioration Review

Part C of Title I of the federal CAA and ARM 17.8.801 *et seq* include preconstruction permitting requirements for new and modified major sources under the PSD program. The PSD regulations apply to new major stationary sources and modifications at existing major sources undergoing

construction in areas designated as attainment or unclassifiable, under Section 107 of the 1990 Clean Air Act Amendments (CAAA), for any criteria pollutant (42 USC 7407).

An electric generating unit is one of the 28 listed source categories (fossil fuel-fired steam electric plants of more than 250 million Btu/hr heat input) that are considered major sources under the PSD program if they have the potential to emit 100 tons per year (tpy) or more of at least one criteria pollutant. Since HGS would be a new plant, a PSD permit is required for the plant if the potential to emit for at least one criteria pollutant is 100 tpy or more. The PSD application must review each pollutant with potential emissions above the PSD significant emission rates (SERs). The potential emissions for each criteria pollutant expected to be emitted from the operation of the HGS plant were estimated in Section 3 of the PSD Application (Table 3.1-1: Facility-Wide Potential Annual Emissions Summary of Criteria Pollutants). The PSD SERs and a summary of the proposed plant PTEs are listed in Table 4-4. The plant requires PSD review for NOx, SO_2, CO, PM and PM_{10}. There are no longer any applicable air quality standards for PM so the analyses conducted for PM_{10} address PM.

Table 4-4. PSD Significant Emission Rates

	NO_X (tpy)	SO_2 (tpy)	CO (tpy)	VOC (tpy)	PM (tpy)	PM_{10} (tpy)	Pb (tpy)
PSD Significant Emission Rate	40.0	40.0	100.0	40.0	25.0	15.0	0.6
HGS Potential to Emit	847.0	442.8	1160.5	35.6	422.3	409.6	0.3
PSD Review Required	Yes	Yes	Yes	No	Yes	Yes	No

Criteria Pollutant Emissions

HGS would include the operation of the following types of emission sources:

- Circulating Fluidized Bed (CFB) Boiler
- Auxiliary Boiler
- Emergency Generator
- Emergency Fire Pump
- Coal Thawing Shed Heater
- Coal Railcar Unloading
- Coal Silos
- Coal Crusher
- Silos
- Bin Vents
- Storage Piles
- Cooling Towers
- Refractory Brick Curing Heaters

The specific emission calculation methodologies for these source types are described in Section 3 of the PSD Application.

Class II Area Modeling Analyses

Pursuant to ARM 17.8.820 and 40 CFR 52.21(k), SME must demonstrate that emissions from the proposed project would comply with the NAAQS, MAAQS, and Class II PSD Increments. DEQ reviewed all monitoring and modeling submitted by SME and found it to conform to all requirements.

Model Selection
At the time of submittal of the Application, EPA's modeling guidance (40 CFR Part 51, Appendix W) indicated that the Industrial Source Complex Short Term (ISCST3) dispersion model was the approved model for stationary source modeling for analyses including both simple and complex terrain types. The area surrounding the site is a combination of simple and complex terrain. Simple terrain has an elevation between ground level and stack release height. Complex terrain has an elevation that is at, or greater than, the height of the stack being modeled.

Further, the impacts of structures on plume travel (downwash, which can lead to elevated ground level concentrations) can be evaluated using the EPA's Building Profile Input Program (BPIP) or BPIP with plume rise enhancements (BPIP-PRIME) (EPA, 1985). Use of BPIP-PRIME requires the use of ISC-PRIME. ISC-PRIME was proposed for approval by EPA in 65 FR 21506 (April 21, 2000).

Since the date of submittal of the PSD application, 40 CFR Part 51 Appendix W was revised on November 9, 2005, with an effective date of December 9, 2005. This current version of Appendix W indicates that AERMOD should be used for appropriate applications as a replacement for ISCST3. However, during the one-year period following the promulgation, protocols for modeling analyses based on ISC3, which are submitted in a timely manner, may be approved at the discretion of the appropriate Reviewing Authority. SME has approval by DEQ to use ISC-PRIME for the analysis. Further, it is unlikely that switching to AERMOD would change any of the conclusions in the air quality analysis because of the margin of compliance with ambient air quality standards and increments.

Meteorological Data
A PSD Class II dispersion modeling analysis requires the use of either one year of onsite meteorological data or five years of representative data. In this case, onsite data were not available. The Great Falls International Airport is relatively close to the proposed plant location, and has similar topography. Consequently, the National Weather Service (NWS) data from the Great Falls International Airport was an acceptable alternative. ISC-PRIME met data requires both surface data (wind speed, wind direction, temperature, and cloud cover) and upper air data (mixing heights) to be processed in a single model-ready input file. The most recent five years of EPA SCRAM data from the airport were used (1987-1991). Concurrent upper air data from the Great Falls airport was used in the data processing.

Receptor Grids
The ISC-PRIME model calculates ground level concentrations at specific locations referred to as receptors. A gridded network of receptors is referred to as a Cartesian receptor grid. Receptors placed at increasing spacing with distance, extended to 28 km (17 miles) in all directions as well as along the HGS property boundary for the initial modeling analysis, are referred to as the

significant impact area analysis. For refined modeling at locations where impacts were above the significance levels, receptor grids extended to a distance necessary to ensure that the overall high concentration in the impact area was located.

Terrain
The terrain elevation for each receptor was determined using United States Geological Survey (USGS) 7.5-minute Digital Elevation Model (DEM) data in the UTM NAD27 datum coordinate system. The UTM grid system divides the world into coordinates that are measured in East meters (measured from the central meridian of a particular zone, which is set at 500,000 m) and North meters (measured from the equator).

The DEM files obtained from the USGS have terrain elevations at 30-m intervals. The terrain height for each receptor was calculated by interpolating the terrain height from the digital terrain elevations surrounding the receptor. This methodology ensures a consistent and accurate determination of elevation for each of the individual receptors.

Emission Rates
EPA's modeling guidance requires that modeled emission rates match the averaging period being modeled. That is, to demonstrate compliance with a 1-hour standard, the maximum 1-hour emission rate is used in the model. When demonstrating compliance with a standard based on annual average data, the annual average emission rate on an hourly basis is used. Table 6.1-1 of the PSD Application provides the specific emission rates per pollutant and averaging period that were used in the dispersion modeling analysis.

Source Types
ISC-PRIME allows emission sources to be modeled as point sources (stacks), volume sources (material handling activities), and area sources (haul roads and storage piles). Tables 6.1-2, 6.1-3, and 6.1-4 of the PSD Application provide the specific parameters utilized for these source types in the model.

Class II Area Significant Impact

In accordance with EPA guidelines, modeled concentrations resulting from the proposed project are compared to applicable Class II significant impact levels (SIL's) . If a significant impact (i.e., an ambient impact above the SIL for a given pollutant and averaging period) is not observed, no further modeling analysis (i.e., NAAQS, MAAQS, or Class II PSD Increment modeling) is required for that pollutant. If a significant impact is shown, NAAQS, MAAQS, and PSD Increment modeling are required. A Radius of Impact (ROI) is determined for each pollutant that would exceed the SIL. The ROI encompasses a circle centered on the HGS plant with a radius extending out to the farthest location where the emissions increase of a pollutant from the project would be above the SIL. All sources within the ROI are assumed to potentially contribute to ground-level concentrations and are evaluated for possible inclusion in the NAAQS, MAAQS, and PSD Increment analyses. Table 4-5 provides the results of the MSL and ROI analyses.

Table 4-5. Class II Significant Impact Modeling Results

Pollutant	Averaging Period	HGS Concentration (µg/m3)		Significant Impact?	ROI (km)
		Significance Level	Peak Model Predicted		
PM_{10}	24-hr	5	18.7	Yes	3.0
	Annual	1	3.1	Yes	1.4
SO_2	3-hr	25	13.6	No	N/A
	24-hr	5	7.4	Yes	0.7
	Annual	1	0.24	No	N/A
NO_X	Annual	1	1.6	Yes	0.7
CO	1-hr	2,000	66.2	No	N/A
	8-hr	500	26.9	No	N/A

The maximum-modeled impacts of the project exceed the SILs for PM_{10}, SO_2 (24-hr averaging period), and NO_X. The modeled impacts are below the SILs for CO for both averaging periods. Consequently, CO is considered to have an insignificant impact and is not required to be evaluated further.

Class II Pre-Construction Monitoring Analysis

The modeled concentrations resulting from the plant must also be compared to the monitoring *de minimis* levels to determine if pre-construction monitoring is required. The results of the monitoring *de minimis* evaluation are provided in Table 4-6.

The maximum-modeled concentrations of PM10 were above the monitoring *de minimis* level for PM_{10}. Consequently, one year of PM_{10} monitoring data was required. Data were collected at a location near the proposed HGS plant. The results demonstrated that ambient concentrations of PM_{10} in the area are very low. The highest 24-hr concentration was 23 µg/m³ (the 24-hr standard is 150µg/m³) and the annual concentration was 7 µg/m³ (the annual standard is 50 µg/m³).

Table 4-6. Maximum Modeled Impacts Compared to Monitoring *de minimis* Levels

Pollutant	Averaging Period	Concentration (µg/m3)		Monitoring Required?
		Monitoring *de minimis* Level	Peak Model Predicted	
PM_{10}	24-hr	10	18.4	Yes
SO_2	24-hr	13	7.4	No
NO_X	Annual	14	1.6	No
CO	8-hr	575	26.9	No
Lead	Calendar Quarter	0.1	0.0005	No
Fluorides	24-hr	0.25	0.12	No

Class II Area NAAQS and MAAQS Analysis

Since HGS has impacts above the SILs, all non-HGS sources that have the potential to impact the HGS significant impact area were included in the Class II NAAQS and MAAQS analyses. The non-HGS sources include:

- Montana First Megawatts Plant (NorthWestern Energy Development Power Plant)
- Agri-Technology Corp. (ethanol plant);
- International Malting Company (malting plant);
- Malmstrom Air Force Base (boilers); and
- Montana Refining Company (petroleum refinery).

The ambient concentrations from other activities, such as agricultural activities, highways, and naturally occurring levels of pollutants, are accounted for by adding a background concentration to the modeled concentrations prior to comparing the results to the NAAQS or MAAQS. The gaseous pollutant background concentrations used in the analysis are the typical values provided by DEQ for modeling analyses in Montana. SME's on-site PM_{10} monitoring data results were used for PM_{10} background values.

The modeling results in Table 4-7 demonstrate that the high modeled concentrations from HGS sources, non-HGS sources, and background concentrations combined are less than 25 percent of the respective NAAQS or MAAQS in all cases except 1-hr NO_X which is approximately 56 percent of the MAAQS. Consequently, it is not anticipated that the proposed plant would cause or contribute to an exceedance of a NAAQS or MAAQS. Further, although the magnitude of the NO_X impacts would be moderate, these impacts would occur at specific receptors and decrease rapidly with distance from the location of the high impact.

Table 4-7. SME NAAQS/MAAQS Compliance Demonstration

Pollu-tant	Avg. Period	Modeled Conc.[a] ($\mu g/m^3$)	Backgrnd Conc. ($\mu g/m^3$)	Ambient Conc. ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	% of NAAQS	MAAQS ($\mu g/m^3$)	% of MAAQS
PM_{10}	24-hr	10.5	23	33.5	150	22	150	22
	Annual	3.2	7	10.2	50	20	50	20
NO_2	1-hr	240[b]	75	315	------	------	564	56
	Annual	2.0[c]	6	8.0	100	8.0	94	8.5
SO_2	1-hr	87.2	35	122	------	------	1,300	9.4
	3-hr	42.7	26	68.7	1,300	5.3	------	-----
	24-hr	6.3	11	17.3	365	4.7	262	6.6
	Annual	0.8	3	3.8	80	4.8	52	7.3
Pb	Quarterly[d]	0.0005	Not. Avail.	0.0005	1.5	0.03		
	90-day[d]	0.0005	Not. Avail.	0.0005	-----	-----	1.5	0.03

[a] Concentrations are high-second high values except annual averages and SO_2 1-hr, which is high-6th-high.
[b] One-hour NOx impact is converted to NO_2 by applying the ozone limiting method, as per DEQ guidance.
[c] Annual NOx is converted to NO_2 by applying the ambient ratio method, as per DEQ guidance.
[d] SME reported the 24-hour average impact for compliance demonstration.

Class II Area PSD Increment Analysis

The determination of the emissions that consume PSD Increment is based on the current level of actual emissions in relation to actual emissions at the baseline date. The major source baseline date is the date after which actual emissions associated with construction (i.e., physical changes or changes in the method of operation) at a major stationary source affect the available PSD Increment. The trigger date is the date after which the minor source baseline date may be established. The minor source baseline date is the earliest date after the trigger date on which a complete PSD application is received by the regulatory agency. The date marks the point in time after which actual emission changes from all sources affect the available PSD Increment.

The minor source baseline dates for NO_X, SO_2, and PM_{10} all have been triggered in the Great Falls area. The non-HGS emission sources used in the PSD modeling are the same as for the NAAQS and MAAQS modeling. However, the emission rates for non-HGS sources are the two-year average actual emission rates if the source has been in operation for more than two years (otherwise, the maximum is used).

The PSD modeling results in Table 4-8 show that the high modeled concentrations from PSD increment consuming sources (HGS sources and non-HGS sources combined) are 35 percent or less of the respective PSD Increments for all pollutants and averaging periods except 3-hr SO_2 which is less than 75 percent of the PSD increment.

Table 4-8. Class II PSD Increment Compliance Demonstration

Pollutant	Avg. Period	Met Data Set	Modeled Conc. ($\mu g/m^3$)	Class II Increment ($\mu g/m^3$)	% Class II Increment Consumed	Peak Impact Location (UTM Zone 12)
PM_{10}	24-hr	Great Falls 1988	10.5	30	35%	(497701, 5266846)
	Annual	Great Falls 1987	3.2	17	19%	(497701, 5267036)
SO_2	3-hr	Great Falls 1987	11.0	512	2.1%	(497100, 526076)
	24-hr	Great Falls 1991	6.3	91	6.9%	(497290, 5268077)
	Annual	Great Falls 1987	0.4	20	2.0%	(497386, 5268078)
NO_2	Annual[b]	Great Falls 1988	1.7	25	6.8%	(497386, 5268078)

a – Compliance with short-term standards is based on high-second-high impact.
b – Annual NO_x impacts are compared to the NO_2 standards.

CFB Startup Analysis

EPA's modeling guidance recommends that, for applications where the source can operate at substantially less than design capacity, and the changes in stack parameters could lead to higher ground level concentrations, the load or operating condition that causes maximum ground-level concentrations should be determined. SME' boiler startup procedures fall into this category of analyses.

Three boiler startup scenarios were evaluated. For CFB boiler startup, SME would use both fuel oil and coal to initiate boiler operations, with the switch from fuel oil to coal firing occurring at approximately 30 percent of maximum boiler load. Firing at approximately 70 percent of maximum boiler load, all emission controls are expected to be operating. Consequently, the CFB at 30 percent of maximum load with oil only, the CFB at 30 percent of maximum load with coal only, and the CFB at 70 percent of maximum load with coal only were evaluated.

Modeling results provided in Tables 6.3-5 and 6.3-6 of the PSD Application demonstrate that the high-modeled concentrations resulting from the startup scenarios are less than the NAAQS, MAAQS, and PSD Increments for all pollutants and averaging periods.

Class II Soil and Vegetation Impacts Analysis

Montana's PSD permitting regulations require that the impacts of a proposed plant's projected emissions on soil and vegetation be evaluated. The primary NAAQS for criteria pollutants were developed to provide adequate protection of human health, while the secondary standards were designed to protect the general welfare, i.e., manmade and natural materials including soils and vegetation. EPA guidance on new source review supports this by stating:

> *For most types of soils and vegetation, ambient concentrations of criteria pollutants below the secondary national ambient air quality standards (NAAQS) will not result in harmful effects (EPA, 1990).*

The results of the air quality analysis demonstrate that the impacts of the HGS plant are insignificant (i.e. less than the PSD modeling significance levels, which are more conservative than the NAAQS) for CO. The modeled concentrations of NO_2, SO_2, and PM_{10} for the plant and other interactive sources surrounding the plant were less than the NAAQS and MAAQS. Since the air quality analysis shows that emission impacts are either insignificant or below the NAAQS and MAAQS, the plant is predicted to have a minor impact on the soil and vegetation in the area surrounding the plant.

Effects of Criteria Pollutant Concentrations on Sensitive Plant Species

The EPA also provides a screening document as a guide for determining the impacts of the projected emissions on plants, soils, and animals (EPA, 1981). The PSD Application, Table 6.4-1, provides a comparison of modeled (predicted) concentrations to sensitive species concentrations by pollutant and averaging period. The predicted impacts are below the identified sensitive species concentrations and are considered to be minor.

Effects of Trace Element Deposition on Soils, Plants, and Animals

The EPA screening document also suggests an analysis of trace elements that could be deposited and contaminate soil and plant tissue. Predicted deposition levels were estimated by calculating the ratio of total HGS annual trace element emissions to total HGS annual NO_X emissions and multiplying the highest NO_X modeled concentration by this ratio. The resulting calculated trace

element concentration was then multiplied by a deposition factor to calculate trace element deposition impacts.

The deposition analysis was performed for each of the trace elements for which screening concentrations were provided in EPA's screening document. The results of the analysis were provided in Table 6.4-3 of the PSD Application.

The calculated deposition levels were below all of the screening values for the forty-year life of the facility. Consequently, trace compound and elements deposition from the proposed plant is predicted to have a minor impact on soil, plants, or animals.

Minor Source Growth Analysis

Minor source growth is expected to occur in the surrounding area due to the construction and operation of the facility. Likely, emissions of criteria pollutants and HAPS associated with this growth would be minor.

Summary of Class II Area Impact Analysis

The Proposed Action would cause a number of on-site and off-site impacts on air quality, ranging from negligible to moderate in intensity. More specifically, the Proposed Action would result in:

- Short-term, minor to moderate degradation of local air quality from construction activities
- Long-term minor to moderate degradation of local air quality from operations
- Long-term minor impacts on sensitive species from criteria pollutant emissions and/or trace element deposition.

4.5.2.2.3 Impacts on Air Quality in Class I Areas

Based on the input requirements for the models/programs utilized in the Class I impact analysis, suitable emission rates for the Proposed Action were used.

The regional haze analysis for the Proposed Action considered visibility-affecting air pollutants, including the following –

- NOx
- SO_2
- Sulfate (SO_4)
- Elemental carbon (EC)
- Secondary organic aerosols (SOA)
- Coarse particulate matter (with aerodynamic diameter greater than 2.5 microns but not exceeding 10 microns)
- Fine particulate matter (with aerodynamic diameter not exceeding 2.5 microns)

The emission sources for the regional haze analysis included the CFB boiler and the material handling baghouses. Fugitive emissions were not included in the analysis since it is expected that these emissions would not be significant to the long-range transport (over 50 km) of emissions to the Class I areas that potentially could be affected. The same emissions were also used for the PSD Class I increment impact analysis and acid deposition analysis by considering the contributions from the appropriate air pollutants.

PSD Class I Increment Impacts from the Proposed Action

Analysis results indicate that the maximum predicted Class I increment impacts due to NOx and PM_{10} emissions from the Proposed Action would be below all applicable EPA-proposed Class I increment significance levels. As such, the adverse impacts on Class I increments for both NOx and PM_{10} emissions would be minor for all applicable long-term/short-term averaging periods.

The predicted annual SO_2 impacts from the Proposed Action would be below the Class I increment significance level for all Class I areas and thus would be considered minor. However, the predicted 3-hour and 24-hour SO_2 impacts exceed the EPA-proposed PSD Class I increment significance levels in some Class I areas (i.e., Scapegoat Wilderness Area for the 24-hour period and the Gates of the Mountains Wilderness Area for the 3-hour and 24-hour periods).

Cumulative impacts analysis including the HGS emissions and other PSD increment-consuming sources in the nearby area indicates compliance with both the 3-hour and 24-hour SO_2 Class I increments. As such, the predicted 3-hour and 24-hour SO_2 impacts would be minor. Table 4-9 summarizes the predicted impacts on the Class I increments from the Proposed Action.

Table 4-9. Predicted Adverse Impacts on Class I Increments

Air Pollutant	Class I Increment Impact
NOx	Long-term minor[a]
PM_{10}	Long-term/short-term minor
SO_2	Long-term/short-term minor

[a] NOx has only long-term increment.

Visual Plume Impacts from Proposed Action

Since all Class I areas are more than 50 km away from the site considered in the Proposed Action, a visual plume impact analysis is not required by the FLMs. ARM 17.8.1101 requires an analysis of visual plume impacts at Class I areas. Therefore, a visual plume analysis was performed at the Class I area closest to the proposed site (i.e., the Gates of the Mountain Wilderness Area, which is about 86 km to the southwest of the proposed site). The visual plume analysis examined both the plume contrast changes and color difference changes for an observer gazing both inside and outside of the Class I area. For the Proposed Action, a plume (with facility-wide emissions of NOx and PM_{10}) was modeled from the source to the Class I area at an angle of 11.5 degrees from the line of the source to the observer. The Level-1 screening analysis with the worst-case meteorological conditions was performed and results were compared with the "critical" values in the EPA Visual Plume Impact Screening and Analysis Workbook (EPA-450/4-88-015). The predicted visual plume impacts all were less than the critical values (i.e.,

less than the EPA critical thresholds) and thus minor. The total facility-wide allowable emissions rates of 103.4 lbs/hr nitrogen oxides (NOx) and 277 lbs/hr PM_{10} were used in the visual plume impact analysis of emissions from the Proposed Action.

Acid Deposition Impacts from Proposed Action

Acid deposition impacts from the Proposed Action were evaluated with respect to the annual nitrogen (N) and sulfur (S) deposition in the Class I areas that potentially could be affected. Nitrogen deposition occurs from the dry and wet deposition of nitrogen-containing chemicals, including NOx, nitric acid (HNO_3), and nitrate ion (NO_3^-). Sulfur deposition occurs from the dry and wet deposition of sulfur-containing chemicals, including SO_2 and sulfate (SO_4). The predicted annual average deposition rates for N and S were compared to the applicable FLM-established Deposition Analysis Threshold (DAT). Predicted peak annual average N and S deposition rates were below the corresponding DAT for all Class I areas. In conclusion, the acid deposition impacts from the Proposed Action would be minor (i.e., less than the FLM guidance thresholds).

Regional Haze Impacts from Proposed Action

The regional haze impact analysis was conducted with the CALPUFF modeling system, which includes three main programs: CALMET (the meteorological processor), CALPUFF (the dispersion model), and CALPOST (the post-processing utility). The CALPUFF modeling system is the EPA-preferred long-range transport model for Class I analyses. In the CALMET analysis, mesoscale (MM4 and MM5) meteorological data are used for the initial windfield predictions. CALMET then generates three-dimensional, hourly, gridded fields of met variables accounting for direct observations of meteorological variables and dispersion effects caused by terrain and surface (land use) characteristics. Direct observation data from surface, upper air, and precipitation stations within and near the modeling domain are used in this CALMET analysis. CALPUFF is a multi-layer, multi-species, non-steady-state puff dispersion model, which can simulate the effects of time- and space- varying meteorological conditions on pollutant transport, transformation, and removal. The meteorological fields predicted by CALMET are used as inputs to the CALPUFF model to ensure that the effects of terrain and surface characteristics on meteorology are considered. CALPOST takes dispersion data from the CALPUFF model and calculates air quality impacts, such as impacts to visibility, deposition of acidic species, and concentrations.

Regional haze is evaluated using the light extinction coefficient (b_{ext}). The percentage change in the light extinction coefficient (Δb_{ext}) attributable to a particular project with respect to the background light extinction is used to determine the regional haze impacts from that project. CALPUFF modeling results are processed using the CALPOST program. CALPOST compares visibility impacts from the modeled source(s) to pre-existing visual range at the affected Class I areas and calculates a percent reduction in background extinction ($\%\Delta b_{ext}$). The FLAG guideline identifies a $\%\Delta b_{ext} \geq 5\%$ as the level at which a cumulative analysis is triggered and a $\%\Delta b_{ext} \geq 10\%$ as the level at which the FLM might object to the permit.

While the FLAG document provides guidance for conducting the regional haze impact analysis, 40 CFR §51.30 states that adverse determination on visibility must be made on a case-by-case basis taking into account the geographic extent, intensity, duration, frequency and time of visibility impairments, and how these factors correlate with:

(1) Times of visitor use in the federal Class I area, and
(2) Frequency and timing of natural conditions that reduce visibility.

SME provided a preliminary regional haze analysis following the methodology described in the FLAG document (FLAG, 2000). The FLAG guideline calls for the most conservative CALPOST visibility calculation method, which compares all modeled impacts to an essentially unrestricted visual range and does not account for natural conditions such as rain, snow or fog, that reduce visibility.

SME's preliminary visibility analysis followed the FLAG guideline. SME's modeled $\%\Delta b_{ext}$ values were below 5 percent on 1,027 of the 1,081 days modeled. These results are considered preliminary results because they do not take into account the possible presence of natural conditions obscuring background visibility. SME refined the visibility modeling using weather data to more closely approximate the natural visual range on the days the modeled $\%\Delta b_{ext}$ values exceeded the FLAG guideline values. No $\%\Delta b_{ext}$ values ≥ 5 percent were modeled in the Anaconda-Pintler or Mission Mountains Wilderness Areas, so those areas were dropped from the refined analysis. The year 1990 was dropped form the Glacier National Park and UL Bend Wilderness analyses for the same reason. Preliminary visibility modeling results are contained in Table 4-10, and refined results are contained in Table 4-11.

Table 4-10. SME Preliminary Visibility Results

Class I Area	Met Data Year	Max. $\%\Delta B_{ext}$ 24-hr Average	Number of Days $\%\Delta B_{ext} \geq 5.0\%$	Number of Days $\%\Delta B_{ext} \geq 10.0\%$
Anaconda-Pintler Wilderness Area	1990	1.91	0	0
	1992	1.39	0	0
	1996	1.81	0	0
Bob Marshall Wilderness Area	1990	8.37	1	0
	1992	10.09	2	1
	1996	14.37	7	2
Gates of the Mountains Wilderness Area	1990	6.03	1	0
	1992	17.70	6	2
	1996	16.25	10	2
Glacier National Park	1990	2.78	0	0
	1992	11.84	1	1
	1996	16.25	4	1
Mission Mountains Wilderness Area	1990	1.71	0	0
	1992	2.41	0	0
	1996	1.53	0	0
Scapegoat Wilderness Area	1990	13.18	1	1
	1992	10.00	4	1
	1996	13.39	8	4
UL Bend Wilderness Area	1990	4.50	0	0
	1992	8.47	5	0
	1996	9.01	4	0

The results of the refined analysis showed six days in which the modeled $\%\Delta b_{ext}$ values from the Proposed Action were ≥ 5 percent. Cumulative impact modeling was performed for those days to determine the $\%\Delta b_{ext}$ value from all the existing permitted PSD-increment consuming sources that could contribute to visibility reduction. The modeling showed four days with cumulative modeled $\%\Delta b_{ext}$ value greater than 10 percent.

The geographic extent of the modeled visibility impacts is fairly large on the peak day, but this is expected due to the wide expanse of the modeling domain. The intensity of visibility impacts, as reflected in the modeled $\%\Delta b_{ext}$ values from SME are less than 5 percent (the FLM level of concern) for >99 percent of the days modeled and are all less than 10 percent. Cumulative modeled $\%\Delta b_{ext}$ values are less than 10 percent (the FLM level of concern) for >99 percent of the days modeled.

Table 4-11. SME Final Visibility Results (Refined Methodology)

Class I Area	Met Data Year	Max. ΔB_{ext} 24-hr Average	Number of Days $\%\Delta B_{ext} \geq 5.0\%$	Peak Cumulative $\%\Delta B_{ext}$
Bob Marshall Wilderness Area	1990	1.57	0	NA
	1992	6.90	1	14.45
	1996	9.92	2	19.21
Gates of the Mountains Wilderness Area	1990	5.62	1	5.63
	1992	4.32	0	NA
	1996	5.77	1	15.05
Glacier National Park	1992	3.92	0	NA
	1996	1.21	0	NA
Scapegoat Wilderness Area	1990	2.31	0	NA
	1992	4.30	0	NA
	1996	5.31	1	13.65
UL Bend Wilderness Area	1992	2.09	0	NA
	1996	4.47	0	NA

Peak modeled visibility impacts are strongly influenced by the high levels of humidity in the modeled air, a condition that generally results in rain, snow or fog. Although the final analysis accounts somewhat for naturally occurring visibility, it does not fully address the presence of snow or rain in the wilderness areas. DEQ has reviewed historical meteorological data to supplement the evaluation of the visibility assessment. The data records show that the meteorological conditions that result in higher modeled $\%\Delta b_{ext}$ values generally cause natural conditions that reduce visual range.

In summary, the regional haze analyses for both the proposed source only and the cumulative sources indicate that the Proposed Action would not cause a significant adverse regional haze impact in Class I areas and that impacts would be moderate. Visibility impacts that could be perceptible based on FLM guidelines were modeled primarily in November and March. Peak visitation times for the wilderness areas are July through October, when the weather is favorable and there is less chance of snow.

Summary of Class I Area Impact Analysis

The Proposed Action would cause off-site impacts on PSD Class I increments and several AQRVs (visual plume, regional haze, and acid deposition), ranging from negligible to moderate in intensity. None of these impacts would be significant, but they would contribute small, likely immeasurable increments to the impacts to identified environmental resources in the Class I areas. More specifically, the Proposed Action would result in the following impacts on the Class I areas:

- Short-term/long-term direct minor adverse impact on applicable PSD Class I increments
- Direct minor, adverse impact on visual plume
- Direct long-term, minor adverse impact on acid deposition
- Direct short-term, moderate adverse impact on regional haze

4.5.2.2.4 Mercury Emissions

Chapter 3 contains an extensive discussion of mercury in the environment – including emissions and deposition data, atmospheric transport, transformation into methylmercury, human health and ecological effects, and recent efforts to regulate mercury emissions at both the federal and state levels. This information will not be repeated here.

The sub-bituminous PRB coal that would be utilized in the Highwood Generating Station is generally low in mercury content. The average mercury concentration is approximately 0.07 parts per million (ppm). Other types of coal (*e.g.*, the anthracite coal typically mined in the Eastern U.S.) can have mercury concentrations more than three times as high (Whilhelm et al., 2003), while the national average is 0.17 ppm (USGS, 2001), or almost two and a half times as high. SME's proposed facility would also have in place emission control equipment allowing for co-benefit capture rates of mercury emissions (DEQ, 2006a).

The HGS would employ an Integrated Emissions Control Strategy (IECS), including the CFB boiler, hydrated ash re-injection or equivalent FGS system, selective non-catalytic reduction, and a fabric filter (bag house). In February 2005, in conjunction with a major international CFB manufacturer, SME conducted a test burn in a scaled model CFB test boiler located in Connecticut. The test burn was conducted using 80 tons of southeastern Montana PRB coal and 20 tons of Montana limestone. Mercury capture rates of approximately 88 percent (0.7 lb/TBtu) from the test burn indicate that the HGS would be able to meet all federal regulations utilizing the proposed IECS (SME, 2005i)

When coal burns, mercury is released in one of three forms, or species: elemental mercury vapor, oxidized mercury vapor (Hg^{2+}), or mercury adsorbed to the surface of a solid particle. The different species of mercury respond differently to different types of control technologies. Elemental mercury is the most difficult of the three mercury species to control. To date, no technologies have been demonstrated in field-testing to consistently and significantly reduce elemental mercury emissions. Most research is focused on developing effective means for converting elemental mercury to one of the other two species of mercury (DEQ, 2006a).

Bituminous coal generally contains higher levels of chlorine, contributing to oxidization of mercury to Hg^{2+}, and has therefore proven to provide enhanced capacity for reducing stack mercury emissions. Conversely, sub-bituminous coal and lignite generally contain low concentrations of chlorine. Control of mercury emissions resulting from combustion of these fuels has proven to be highly variable.

The level of mercury removal in SME's 2005 pilot test results was much greater than most utility boilers burning sub-bituminous coal and utilizing native control systems. It is also near the high end of values observed in the many test programs that have been and are being conducted on sub-bituminous coal combustion in utility boilers. However, the test burn alone does not provide sufficient data to allow boiler manufacturers to confidently extrapolate the data and guarantee mercury emissions control in a full-scale CFB unit with IECS (DEQ, 2006a).

DEQ verified information contained in the SME-HGS application for the Montana air quality permit, including mercury-specific source testing results obtained through the simulated and comprehensive combustion, performance, and emission testing program conducted prior to application. Taking into consideration this information, plus technical, environmental, and economic factors, as well as a recent mercury specific BACT determination for a similar source permitted for operation in Montana, DEQ determined that the appropriate mercury BACT emissions limit(s) for the proposed project incorporating the IECS would be either:

- 90 percent mercury reduction, based on a 12-month rolling average, or
- 1.5 lb mercury/TBtu (trillion Btu), based on a 12-month rolling average.

The two-part limit accounts for two complementary operational factors. First, coal quality is not constant, even within a given coal deposit. At the extremely low mercury content values under consideration, a small change in coal mercury content can have a significant impact in compliance potential. Second, control efficiencies generally decrease as inlet concentrations decrease, particularly as inlet concentrations become very low, as in the case of mercury concentrations in utility boiler exhaust. If SME-HGS should receive coal with higher than normal mercury content, it may be difficult to comply with the lb/TBtu limit, but compliance with the percent reduction requirement would be achievable. Conversely, if a particular coal supply contains less mercury than normal, the percent reduction requirement may be less readily attainable while the emission rate may be more so (DEQ, 2006a).

To confirm the performance of the CFB Boiler and IECS in reducing mercury emissions, SME-HGS would be required to monitor and analyze mercury control performance data after commencement of commercial operations and to report this information to DEQ. The results of the final analysis would then be used to confirm compliance with the BACT-determined mercury emissions limits.

If the CFB Boiler operating with the IECS is unable to demonstrate compliance with the mercury limits established through the BACT determination, SME-HGS would be required to achieve the BACT-determined mercury reductions/limits through the installation and operation of mercury-specific emission controls. In that case, within 18 months after commencement of commercial operations, SME-HGS shall install and operate an activated carbon injection control system or, at

SME-HGS's request and as approved by DEQ, an equivalent technology (equivalent in removal efficiency) to comply with the applicable mercury BACT emission limits.

With the proposed emission controls in place, annual mercury emissions from the HGS would be approximately 34.5 lbs. (15.7 kg), slightly less than its 2010-2014 allotment of 36.4 lbs (16.5 kg) under Montana's proposed mercury rules. Currently operating coal fired power plants in Montana have emitted as much as 1,042 lbs. (474 kg.) of mercury in a year (DEQ, 2006b). However, as seen in Table 4-12, by 2018 combined statewide mercury emissions are projected to decrease by 72 percent, from 1,042 lbs. to 290 lbs. annually, as a result of implementing the CAMR and Montana's proposed mercury limits. Under Montana's proposed mercury rules, each Montana coal-fired power plant, including SME-HGS, would have to reduce the rate of mercury emissions to 0.9 lb./TBtu by 2018 (DEQ, 2006b).

Table 4-12. Current and Projected Future Maximum Mercury Emissions from Coal-Fired Power Plants in Montana[1]

Plant		Annual mercury emissions in lbs.		
		Current	**2010-2014 (annual)**	**2018[5]**
Existing facilities	*MW*			
PPL - Colstrip Unit 1	358	152.6	75.7	28.4
PPL - Colstrip Unit 2	358	152.6	75.7	28.4
PPL - Colstrip Unit 3	778	321.1	159.2	59.7
PPL - Colstrip Unit 4	778	321.1	159.2	59.7
CELP[2]	41.5	21.0	10.2	3.8
PPL - Corette	163	41.2	36.8	13.8
MDU - Lewis & Clark	50	32.8	24.7	4.7
Total existing		**1,042.4**		
New and proposed facilities				
RMP[3]	160	NA	17.1	10.3
Roundup Power Unit 1	390	NA	49.1	29.5
Roundup Power Unit 2	390	NA	49.1	29.5
SME-HGS	250	NA	36.4	21.8
Sum Total[4]		**1,042**	**693.2**	**289.6**

Source: DEQ, 2006b

[1] Projected mercury emissions based on Draft Air Quality Permit limits, March 2006; estimated and projected mercury emissions are based on maximum capacity and average coal quality information from 1999 for existing sources and on the average coal quality information submitted in air quality permit applications for new sources; in addition, estimates are based on maximum nameplate capacity for 8,760 hours (24 hours per day times 365 days) per year, and thus on conservative operating capacity information.
[2] Colstrip Energy Limited Partnerships
[3] Rocky Mountain Power
[4] Existing plus new and proposed
[5] With implementation of CAMR and Montana's proposed mercury limits

Due to low chlorine levels in its source sub-bituminous coal, stack mercury emissions from the HGS would be primarily in the form of elemental mercury rather than ionic mercury. Ionic mercury is more easily "scavenged" from the air by attaching to particles or through precipitation, and would therefore tend to be deposited closer to the HGS. In contrast, as explained in Section 3.3.4, the elemental mercury species in the form of mercury vapor does not tend to fall out nearby and is readily transported long distances through the atmosphere. Thus, mercury emissions from the HGS would likely cause a negligible to minor change in the local deposition of mercury, while contributing a minor increment (0.0003 percent) to the global stock of atmospheric mercury – estimated at 5,200 metric tons (UNEP, 2002) – and distributed around the world due to air currents.

In conclusion, the HGS, by meeting DEQ's proposed mercury emission limits, would likely have minimal impact on environmental mercury levels both locally and in Montana as a whole.

4.5.2.2.5 Greenhouse Gas Emissions

The greenhouse effect and the potential implications of global climate change are summarized in Chapter 3 (Section 3.3.5). This section focuses on carbon dioxide and other greenhouse gas emissions from the proposed HGS as well as the potential for mitigation and offsets.

The potential facility-wide CO_2 emission rate of the HGS is 2,382,985 tons (2,161,808 metric tons) per year. In addition, the HGS would release methane and nitrous oxide, two other greenhouse gases. Per molecule, both of these gases have a higher global warming potential than carbon dioxide and their emissions are often quantified in terms of carbon equivalents. The potential facility-wide, carbon equivalents emission rate of these gases is 669,096 tons/year (606,994 metric tons/year).

HGS carbon dioxide emissions would constitute 0.037 percent of U.S. emissions of 5,843 million metric tons and 0.008 percent of global yearly emissions of 26,000 million metric tons in 2002 (Marland et al., 2005). As such, HGS's emissions would represent a very small but tangible, incremental contribution to this cumulative global issue. At the present time, U.S. emissions of greenhouse gases from all sources are unregulated and uncapped, since the United States is not a signatory to the Kyoto Protocol and therefore not bound by its mandatory national reductions.

Sequestration, Mitigation and Carbon Offsets

Increasing emissions of carbon dioxide and other greenhouse gases, rising greenhouse gas concentrations in the atmosphere, and growing concern about the possible impacts of climate change have spurred interest in mitigating CO_2 emissions. In theory, a power plant could capture CO_2 by chemically or physically combining it with something that will remain as a liquid or solid rather than as a gas. However, as a practical matter, capturing that carbon dioxide before it is released to the atmosphere is very difficult. Furthermore, once captured, the CO_2 would have to be stored ("sequestered") in such a manner as to keep it permanently out of the atmosphere.

The U.S. Department of Energy, among other agencies and institutions, is conducting various research projects on methods for efficient capture and storage of CO_2. However, research has not yet identified any commercially available technique that can capture much of the CO_2 from a large-scale power plant under normal conditions (Markel, 2005). Preliminary projections suggest that the likely cost of carbon capture would add 2-4 cents/kWh for a pulverized coal plant, and would probably also reduce the power output of the plant by roughly 25 percent (Herzog and Golomb, 2004).

As to storage of the carbon, the techniques under study include injecting it below ground such as into oil or gas reservoirs to help push out more oil and gas, or into un-mineable coal beds, to push out the natural gas (methane) that occurs with the coal. Another idea is to inject CO_2 into beds of basalt rock, letting the CO_2 become bound to the basalt. This method is being researched at Montana State University and is still in the experimental stages (Capalbo, 2005). It is not a concept this Proposed Action could count on using. Even if some form of underground carbon storage were to become practical, the transport of the CO_2 to the underground storage site would add further economic and energy costs.

Other methods for CO_2 sequestration include aforestation (planting tree stands) and agricultural sequestration. These methods seek to store carbon in standing biomass (e.g trees) or in increased organic matter in soils. Certain states and regional programs offer incentives for sequestration through these methods (Lewandrowski, e al 2004). DEQ has begun developing a draft Greenhouse Gas Project (http://www.ucsusa.org/clean_energy/energynet/energynet-policy-update-01062005.html#montana). The area of land that would have to be reforested or afforested to fully offset carbon emissions from the HGS (or any comparable fossil fuel generation) would be enormous and impractical. There is simply not enough arable land available for aforestation on the entire earth to fully offset global annual carbon emissions; therefore, while this process will measurably reduce the accumulation of CO_2 in the atmosphere while providing other environmental and socioeconomic benefits, it cannot be considered as an option that would make coal consumption/combustion "carbon neutral".

Therefore, while direct capture and storage of the carbon emitted by coal fired power plants is not practicable at this time, offsetting the power plant's emissions with programs that tie up increased amounts of carbon in biomass are technically feasible and may become economically attractive depending on the program's structure. In the meantime, SME and the City of Great Falls are exploring various other means of offsetting carbon emissions from the HGS and SME's overall energy portfolio.

SME customers may currently purchase "green" power, other than hydropower, at a load of 0.08 MW at an add-on rate of $10.50/MWh. Because green power, such as wind and solar power and geothermal heat, is more expensive than existing power supply contracts, SME has found most customers are reluctant to utilize green power. SME currently provides hydropower from both BPA and WAPA to meet overall customer load. The BPA power purchase agreement will begin to decrease in 2008 and completely expire by 2011 (See Section 1.4 for more detailed information).

SME has asserted that it would continue to purchase up to 20 MW of hydropower from WAPA as allowed. 20 MW of hydropower equates to 194,416 tons per year of CO_2 emissions avoided, based on less efficient Montana coal-fired boilers. In addition, SME plans to install 6 MW of wind power at the HGS site. 6 MW of wind power equates to 23,330 tons per year of CO_2 emissions based on less efficient Montana coal-fired boilers. Moreover, SME has asserted that as demand dictates, it would continue to offer additional "green power" beyond the installed wind power at HGS. The amount of this power provided to customers will vary depending upon cost and interest at that time.

SME and the City of Great Falls have applied for a one million dollar grant – a federal appropriation request through Senators Baucus and Burns and Congressman Rehberg – to help study GHG mitigation options and develop a GHG mitigation strategy for HGS. At this point in time, the grant has not been awarded; the study plan and options are to be completed if the grant is awarded; a decision is expected in the August-November 2006 time frame.

SME has asserted that it would continue to promote use of geothermal heat pumps and it plans to provide incentives to member systems for geothermal heat pump installations for all of the five member cooperatives and the City of Great Falls. A total of 425 geothermal heat pumps are currently in service in the SME service area. Each geothermal heat pump avoids approximately 3.62 tons of CO_2 emissions per year (GeoExchange, 2006). The current number of geothermal heat pumps equates to an offset of approximately 1,539 tons per year of CO_2 emissions. At this point in time, the type of incentive has not been defined, and the future number of geothermal heat pumps on the SME system is unknown. Therefore, future GHG offset estimates from additional use of heat pumps were not calculated.

SME has asserted that it has promoted and would continue to promote energy efficiency for residential, industrial, and agricultural energy consumers. SME states that it would further develop and implement energy conservation ideas and projects as they are identified and shown to be economically feasible.

SME asserts that it is examining urban reforestation as a GHG mitigation option. A paper entitled *Tree Planting in Great Falls, The Surrounding Region and in Other Montana Urban Areas* by the City of Great Falls City Forester discusses tree canopy goals and costs. The cost of a two-inch caliper balled and burlapped tree is estimated at $300 per tree. One tree is estimated to offset approximately 0.82 ton per year of CO_2 (CarbonNeutral Company, 2005). At this time, SME has not finalized a plan for an urban reforestation mitigation option and has not estimated potential GHG offsets from this concept. SME is also evaluating other terrestrial carbon sequestration options (SME, 2006).

The use of the new HGS coal-fired boiler would emit approximately 0.997 tons of CO_2 per MW. Less efficient existing boilers in Montana emit approximately 1.110 tons of CO_2 per MW (based on 2003-05 data from EPA Acid Rain Database and Montana Annual Emission Inventory Reports).

4.5.3 ALTERNATIVE SITE – INDUSTRIAL PARK SITE

4.5.3.1 Construction

Potential short-term, construction-related impacts on air quality at the alternate site in the Industrial Park would be very similar to those of the Proposed Action at the Salem site. Exhaust emissions from equipment used in construction, coupled with likely fugitive dust emissions from the disturbed ground surface, could cause minor to moderate, short-term degradation of local air quality, but would not be high enough to result in significant deterioration. See Section 4.5.2.1 for further discussion. The closer proximity of low-density residential development to the Industrial Park site might result in somewhat greater exposure of residents to dispersed diesel exhaust and smoke than in the case of the Proposed Action, but not significantly greater.

4.5.3.2 Operation

The potential long-term, operation-related impacts on air quality at the alternate site in the Industrial Park would be virtually identical to those of the Proposed Action.
Operating the HGS at the alternative site would cause a number of on-site and off-site impacts on air quality in Class II areas, ranging from negligible to moderate in intensity. More specifically, using the alternative site would result in:

- Short-term, minor to moderate degradation of local air quality from construction activities
- Long-term, minor to moderate degradation of local air quality from operations
- Long-term, minor impacts on sensitive species from criteria pollutant emissions and/or trace element deposition.

Operating SME's generating station at the Alternate Site would cause off-site impacts on PSD Class I increments and several AQRVs (visual plume, regional haze, and acid deposition), ranging from negligible to moderate in intensity. None of these impacts would be significant, but they would contribute small, but measurable, increments to the impacts for identified environmental resources in the Class I areas. More specifically, the Alternate Site would result in the following impacts on the Class I areas of interest:

- Short-term/long-term direct minor adverse impact on applicable PSD Class I increments
- Direct minor adverse impact on visual plume
- Direct long-term, minor adverse impact on acid deposition
- Direct short-term, moderate adverse impact on regional haze

Releases of mercury and greenhouse gases at the Alternate Site and small, but tangible, incremental contributions to long-term cumulative effects from those emissions would be identical to those of the Salem site.

4.5.4 CONCLUSION

The No Action Alternative would not result in any direct air quality impacts on either the Salem or Industrial Park sites, though it would contribute indirectly to air quality impacts by those power plants from which SME would purchase electricity. These impacts cannot be quantified because the fuel or energy source for the purchased electricity is not known.

Impacts of the Proposed Action – the Highwood Generating Station at the Salem site – and the alternative site – the Industrial Park site – would be similar to one another. Utilizing BACT, both alternatives would result in up to minor to moderately adverse, non-significant impacts on air quality. The wind turbines that would be installed under the Proposed Action would have no long-term adverse effect on air quality, but would indirectly have a beneficial effect by displacing up to 6 MW of electricity from other sources, potentially involving fossil fuel combustion and air emissions.

Using the impact significance definitions described at the beginning of Chapter 4 and presented for "Air Quality Degradation" in Appendix J, the air quality impacts of the Proposed Action would be of minor to moderate magnitude, long-term duration, and large extent, and have a probable likelihood of occurring. Overall then, the rating for air quality impacts from the Proposed Action would be adverse, but while impacts would likely be non-significant, they would have the potential to become significant.

The air quality impacts of the Industrial Park site would be rated the same as the Proposed Action.

4.5.5 MITIGATION MEASURES

During construction, at whichever alternative site is chosen, SME and its construction contractors and sub-contractors would be required to comply with DEQ regulations to minimize emissions of fugitive dust. Construction personnel would be required to implement reasonable measures, such as applying surfactant chemicals or water to exposed surfaces or stockpiles of dirt, when windy and/or dry conditions promote problematic fugitive dust emissions. Measures such as sprinkling to keep the disturbed area damp or applying approved chemical treatments may be used.

Mitigation measures to minimize air quality degradation are already incorporated into the project design, starting from the selection of the CFB boiler itself. These measures, which include both air pollution control equipment and practices, are summarized in Table 4-2 (the BACT Summary for CFB Boiler).

Mitigation measures intended to offset GHG emissions are listed in Section 4.5.2.2.5.

4.6 BIOLOGICAL RESOURCES

Adverse effects to flora and fauna may occur through construction or operation of the facilities or infrastructure as described in the Proposed Action. Wildlife can be directly affected by mortality due to construction or operation of the facility or its infrastructure, or indirectly through habitat loss, fragmentation, or conversion. Vegetation can be directly affected by its removal as the ground surface on which it occurs is developed, or indirectly through changing populations of wildlife that feed on plants.

Construction, maintenance, and operation of facilities in an area that contains wildlife habitat could constitute an adverse effect on those habitats. An adverse effect is found when an undertaking or action alters, directly or indirectly, any of the characteristics of a habitat that provides for life history needs such as feeding, cover, travel, or breeding.

The biological resource survey conducted in support of this EIS documented wildlife presence species and suitable habitats within the surveyed portions of the proposed project areas (WESTECH, 2005). The biological resources survey was conducted based on preliminary designs and locations of the proposed facilities. Once final design is completed and immediately prior to construction, an additional field survey will be needed to ensure that sensitive biological resources are identified, considered, and protected.

4.6.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, no CFB coal-fired generating station would be constructed at either the Salem or Industrial Park sites. In addition, no 230-kV electrical transmission line interconnections would be developed in the Great Falls area. Thus, there would be no direct impacts on biological resources under the No Action Alternative, including threatened and endangered species, other species of concern, and noxious weeds.

However, SME would need to purchase power from another generation source within the WSCC to meet its projected baseload needs beginning in 2008. If generation and transmission capacity have to be expanded to meet a general growth in load to which SME would contribute, SME could be contributing indirectly and incrementally to the impacts on biological resources that occur at other locations in the Rocky Mountain West and Pacific Northwest. Depending on the type of generation (e.g., hydro, coal, natural gas, wind, solar, nuclear, geothermal) as well as the specific location of that generation and related transmission, a wide range of adverse impacts of varying intensity could occur on biological resources.

4.6.2 PROPOSED ACTION – HGS AT THE SALEM SITE

4.6.2.1 Threatened and Endangered Species and State Species of Special Concern

Bald Eagle

There is a bald eagle nest near the confluence of Belt Creek and the Missouri River, approximately one mile (1.6 km) downstream from Morony Dam. The site is about two miles (3.2 km) from both the Salem plant site and the proposed raw water pipeline intake, and is not visible from either site. The nest was active in 2005. The Montana Bald Eagle Management Plan (DOI 1994) provides guidelines for management activities within 2.5 miles (4.0 km) of a bald eagle nest, which define this project as within the home range of these nesting eagles. Zone III (Home Range) is defined as including all suitable foraging habitats within 2.5 miles (4.0 km) of all nest sites that have been active within five years. This zone is managed to maintain suitability of foraging habitat, minimize disturbance within key areas, minimize hazards, and maintain the integrity of the breeding area. Although the project is located within Zone III, it is located within an area with no potential habitat, no perch trees, and no screening vegetation to attract eagles. Disturbance to transitory bald eagles during construction would be minimal and limited to the time of construction.

Activities (connected actions) conducted by the contractor could conceivably be conducted outside of the project limits and closer to these nests, or other nests along the Missouri River. The Montana Bald Eagle Management Plan places limits on these high intensity activities. They should not be conducted within 0.5 mile (0.8 km) of nest locations or any other known bald eagle nests between March 1 and May 15, or within 0.25 mile (0.4 km) of nest sites from May 15 to July 15. If the contractor anticipates any construction operations, including the construction of transmission line interconnections and the spanning of the Missouri River by power lines, within the vicinity of an active bald eagle nest, roost site, or seasonal concentration area, or has any questions concerning the application of the regulations promulgated to protect this species, the Plan directs them to contact the USFWS and/or MFWP. The agencies can identify any restrictions that may apply to project planning, anticipated construction activities, and project scheduling. If these precautions are adhered to, the project would have no adverse effect on bald eagles.

Canada Lynx

The USFWS has published a proposed rule to designate critical habitat for the lynx which will replace the current habitat maps used by MNHP. This action is in response to a court-order, which requires that USFWS complete a final critical habitat designation for the lynx by November 1, 2006. The published map shows critical habitat west of Browning, Montana, in the high elevation habitats of Glacier National Park and the Bob Marshall Wilderness complex. There will be no designated critical habitat near the project area. The project area does not support suitable Canada lynx habitat, and lynx have not been reported within 10 miles (16 km) of the project vicinity; therefore this project would have no adverse effects on this species.

Animal Species of Concern

Habitat exists in the project area for the state listed species of concern that occur in the area. The blue sucker and spiny softshell turtle are likely to occur below Morony Dam, far enough away from the proposed project that there would be no adverse effects to these species. The sauger population may be impacted by activities during the raw water pipeline construction and placement of the intake, but these impacts would be short-term. The intake structure would be adequately screened to exclude all fish species.

The incised drainage habitat and uplands associated with the Missouri River are considered nesting habitat for the ferruginous hawk, prairie falcon, Swainson's hawk, and red-tailed hawk. No active nests were found during the survey; however, surface access limitations precluded searches of large portions of these habitats (WESTECH, 2005). Ferruginous hawks, along with many other species of raptors, would be expected during migration to be present in the HGS project vicinity. Similarly, the burrowing owl is a ground-dwelling bird associated with burrows of ground squirrel, prairie dogs, and badgers in prairie grasslands. Migratory songbirds can also be expected to use these sites for nesting and foraging. These species could occur in the incised drainage and grassland habitat of the HGS project vicinity.

The white-faced ibis, black-crowned night heron, Franklin's gull, common tern, and black tern are generally associated with wetlands and large rivers. All five species could occur along the Missouri River in the HGS project vicinity during migration, but none would be expected to nest there. All nesting records of these species are associated with Benton Lake National Wildlife Refuge, about 7-12 miles (11-19 km) from the HGS project.

Avoiding disturbance of shrub, tree, and wetland habitats would reduce adverse effects on these species by the proposed project. If these habitats must be removed, disturbed, or altered for construction or maintenance, construction contractors should avoid initiating these activities during spring nesting season. If these precautions are adhered to, the project would have no adverse effect on state listed species of concern.

Plant Species of Concern

Within 10 miles (16 km) of the HGS there are records of eight species of plants that are considered species of concern in Montana (MNHP, 2005d). Suitable habitats for most of these species (Table 3-6) are not available in the HGS project area, although roundleaf water hyssop, many-headed sedge, Guadalupe water-nymph, and California waterwort occur in shallow waters, edges of wetlands, and muddy shores of ponds and streams. These types of habitats may occur in the vegetated edge habitat created in the backwater area where the raw water intake would be located. Two species of moss (*Entosthodon rubiginosus* and *Funaria americana*) were recorded along the Missouri River upstream of the current Cochrane Dam in the late 1880s and early 1900s. Since Cochrane Dam was constructed in 1957, it is likely that the habitat for these two species was inundated. All of these records are comparatively old (Table 3-6), and were made prior to much of the human development in the area. Thus, impacts of the HGS on plant species of concern in Montana are likely to be non-existent to negligible.

Noxious Weeds

A noxious weed survey was not conducted during the field survey (WESTECH, 2006f), although a number of weedy species were observed in the field and recorded in Table 3-12. Noxious weeds tend to flourish in disturbed habitats and their expansion into new areas in particular is facilitated by linear construction projects such as roads and pipelines that disrupt soils and clear vegetation. Thus both the Salem site and the Industrial Park site, as well as the various connecting pipeline, transmission line, and road corridors would be expected to be susceptible to contributing to the spread of noxious weeds.

SME recognizes that a noxious weed inventory and Noxious Weed Management Plan must be prepared and submitted to the Cascade County Weed and Mosquito Management District prior to construction (WESTECH, 2006f; Cascade, no date-b). This plan would contain noxious weed control measures that would limit the adverse impact of the Proposed Action and Alternative site on the dispersion and expansion of noxious weeds. The district's requirements for weed management and revegetation of disturbed areas in Cascade County are located at: http://www.co.cascade.mt.us/getfile.phtml?ido=97 . Overall impacts are expected to be of a minor intensity, short-term duration and localized context.

Other Species of Interest

Several important species valued for hunting and wildlife viewing occur in the proposed project area. Mule and white-tailed deer and pronghorn antelope can be expected to occur on the proposed project site. Other game/furbearer species that could occur in the proposed project area include sharp-tailed grouse, gray partridge, coyote, red fox, mountain lion, and bobcat. No direct mortality is expected to occur from construction of the power plant and related infrastructure, but individual animals may be killed on the railway spur and on the access road.

4.6.2.2 Evaluation of Specific Proposed Action Components

Potential impacts on biological resources were derived from surveying the proposed project area and related infrastructure sites to determine whether any such biological resources exist in these areas (WESTECH, 2005). The majority of the facilities and infrastructure would be constructed on agricultural land that has been farmed for small grain for decades. Some shrub and tree habitat exists in small coulees that drain into the Missouri River on the north end of the project, and along the banks of the Missouri River.

Plant and Railroad Spur

The power generating plant and proposed railroad spur running south would be located on lands almost entirely cultivated for small grains. No vegetated drainages are crossed by the rail route. The entrance road to the plant will be upgraded to accommodate larger vehicles for construction, supply, and maintenance to the plant facility. Adverse effects on wildlife or suitable habitat by the construction or operation of the plant could occur if small mammals or birds are killed during construction or maintenance. Some individual wildlife, especially mule deer, white-tailed deer, or pronghorn could experience adverse effects through direct mortality caused by collision with

trucks on the access road or nearby trains on the spur route. Scavengers such as coyotes, mountain lions, and birds could be killed when feeding on carrion on or near railway tracks.

Transmission Lines

The proposed electrical transmission line #1 from the Salem plant to the Great Falls substation north of the Missouri River would cross cultivated grain fields, several gentle-to-moderately steep incised drainages, Box Elder Creek, and the Missouri River including its associated upland habitats and rolling grasslands. The line would cross the Missouri River downstream of Cochrane Dam, above the reservoir formed by Ryan Dam. The river in this reach has steep banks with little or no emergent vegetation. Transmission line #2 would be placed in cultivated fields and would span Box Elder Creek parallel to Transmission Line 1. The shrub and tree habitats concentrated in Box Elder Creek and vegetated incised drainages would be most sensitive to disturbance. Songbirds and raptors, small mammals, and reptiles concentrate in these areas, especially during spring breeding season. Disturbance caused by construction and maintenance should be timed to avoid breeding season, and should leave as much of the vegetation intact and undisturbed as possible.

The actual amount of each habitat disturbed by construction of the transmission line would depend on the final route location, spacing and location of structures, etc. If construction requires disturbance of the bed and banks of any drainage, such as Box Elder Creek, Stream Protection Act (SPA 124) permits would be required by FWP. If construction requires placement of fill in or near a drainage, then the Corps should be consulted to ensure compliance with Section 404 of the Clean Water Act. A 318 authorization for temporary increases in turbidity may also be required by DEQ for work in or near state waters with a potential to deliver sediment to those waters.

Fresh Water and Wastewater Pipelines

The proposed route for the fresh and wastewater pipelines follows an existing gravel county road and an abandoned railroad grade. It would cross Box Elder Creek on the existing railroad grade. As long as the final design follows this route placement, there would be no adverse effects to biological resources from burying the pipelines along an already disturbed linear route.

Raw Water Pipeline and Associated Infrastructure

The raw water pipeline is comprised of two segments: 1) the portion that would run from the plant site to the directional drill site on top of the escarpment above the Missouri River, and 2) the portion that will be drilled down to the collector well at the river. The first portion is approximately 1.5 miles (2.4 km) long, and would be buried in existing grain fields. Surface disturbances would be reclaimed to grain fields and previous land use and habitat. The second portion would create construction disturbance associated with the drill pad in the existing grain field and the collector well at the bottom of the grade. Associated infrastructure improvements consist of upgrading the existing vehicle trail in the coulee, constructing the pump house on the river bank, and building the subsurface intake located on the bed of the Missouri River.

Upland and drainage habitats would not be affected by segment one and two, and disturbed areas around the pad and well site would be reclaimed to previous habitat. If drilling were not successful and the drill pad was relocated, or drilling failed and standard trenching techniques were required, appropriate state and federal agencies would be notified prior to relocation (e.g. MFWP, DEQ, Corps). Trenching may disturb sensitive shrub and trees habitats concentrated in the coulee. Upgrading the existing vehicle trail in the coulee could also impact sensitive habitats. Song birds and raptors, small mammals, and reptiles concentrate in these areas, especially during spring breeding season. Disturbance caused by construction and maintenance should be timed to avoid breeding season, and should leave as much of the vegetation intact and undisturbed as possible. The actual amount of each habitat disturbed by burying the pipeline and the drill pad would depend on the final route location, level of road upgrade required to accommodate construction and service vehicles, success of drilling, etc. Direct mortality to individual animals could occur during construction or during routine road use for maintenance.

The intake structure for the raw water pipeline would be placed on the bed of the Missouri River in the reservoir created above Morony Dam. Method and placement of the pipeline and well, and post-construction reclamation, are described in Chapters 2 (Section 2.2.2.1) and under Water Resources (Section 4.4.2.1) of this chapter. Several fish species are known to be present in Morony Reservoir, and FWP and PPL Montana are using Morony Reservoir to rear sauger (a Montana species of concern) for reintroduction into riverine habitats. The proposed method of installing the intake is unlikely to cause more than a localized temporary disturbance for fish in the reservoir and a minor amount of turbidity; extreme stressing or any mortality would be unlikely. Similarly, fish would be not be harmed by the process of withdrawing water at the intake.

As noted above, several permits would be required by state and federal agencies if construction or operational activities would impact the bed, banks, or water quality of water bodies. These permits often apply even when live water is not present year-round. The water quality of wastewater returned to the Missouri River would need to comply with current federal and state water quality regulations, including any restrictions on pollutant loads due to ongoing Total Maximum Daily Load (TMDL) program imposed on the City of Great Falls' sewage treatment plant's discharge permit.

If the final design follows the proposed route placement and no drilling complications arise, there would be no adverse effects to biological resources from burying the pipelines and directional subsurface drilling.

Wind Turbine Generators

Chapter 2 (Section 2.1.3.1) discussed the potential impacts of wind energy development on wildlife. In general, impacts consist of habitat fragmentation and the potential for direct mortality to birds and bats from collisions with the stationary tower/pole or spinning blades; the latter impact is usually of greater concern. This would also be true in the case of the HGS and Salem site, where fragmenting low-value wheat field habitat by installing wind turbines would constitute a negligible impact on wildlife.

In recent years, low-speed, tubular-constructed wind turbine technology has been emphasized, and the design of the proposed HGS wind turbines reflects this broader trend. These larger and slower-moving turbines can still kill raptors, passerines (perching birds), waterbirds (e.g. waterfowl, wading birds), other avian species, as well as bats, though at a substantially lower rate than earlier, smaller lattice-supported WTGs with faster-moving blades. Low wind speed turbine technology like that employed by the proposed HGS WTGs requires much larger rotors whose blade tips can exceed 200 mph (323 km per hour) under windy conditions. A bird approaching rapidly spinning turbine blades may experience "motion smear" – the inability of its retina to process high speed motion stimulation, similar to reaction of the human eye to an airplane propeller spinning faster and faster until it becomes virtually transparent. Motion smear occurs primarily at the tips of the wind turbine blades, making them deceptively transparent at high velocities. This increases the possibility that a bird could fly through this arc, get struck by a blade, and be killed (USFWS, 2003).

The USFWS has issued guidance for wildlife biologists and wind developers on ways to avoid and reduce mortality to birds and bats from WTGs (USFWS, 2003). The USFWS's site development recommendations follow, along with HGS-specific comments (in italics).

1. Avoid placing turbines in documented locations of any species of wildlife, fish, or plant protected under the federal Endangered Species Act. *No federally listed species are documented at the proposed location of the four proposed WTGs on the Salem site*.
2. Avoid locating turbines in known local bird migration pathways or in areas where birds are highly concentrated, unless mortality risk is low (e.g., birds present rarely enter the rotor-swept area). Examples of high concentration areas for birds are wetlands, state or federal refuges, private duck clubs, staging areas, rookeries, leks, roosts, riparian areas along streams, and landfills. Avoid known daily movement flyways (e.g., between roosting and feeding areas) and areas with a high incidence of fog, mist, low cloud ceilings, and low visibility. *The proposed location is not located within any known local bird migration pathway or area of bird concentration.*
3. Avoid placing turbines near known bat hibernation, breeding, and maternity/nursery colonies, in migration corridors, or in flight paths between colonies and feeding areas. *The proposed location is not located near any known bat hibernation or breeding area, or within a migration pathway.*
4. Configure turbine locations to avoid areas or features of the landscape known to attract raptors (hawks, falcons, eagles, owls). For example, Golden Eagles, hawks, and falcons use cliff/rim edges extensively; setbacks from these edges may reduce mortality. Other examples include not locating turbines in a dip or pass in a ridge, or in or near prairie dog colonies. *The landscape where the WTGs would be located does not contain features known to attract raptors.*
5. Configure turbine arrays to avoid potential avian mortality where feasible. For example, group turbines rather than spreading them widely, and orient rows of turbines parallel to known bird movements, thereby decreasing the potential for bird strikes. Implement appropriate storm water management practices that do not create attractions for birds, and maintain contiguous habitat for area-sensitive species (e.g., Sage Grouse). *The orientation of the proposed turbine configuration at the Salem site in comparison with the predominant direction of bird movements locally is unknown.*

6. Avoid fragmenting large, contiguous tracts of wildlife habitat. Where practical, place turbines on lands already altered or cultivated, and away from areas of intact and healthy native habitats. If not practical, select fragmented or degraded habitats over relatively intact areas. *The HGS wind turbines would be installed on cultivated farmland and thus would not fragment wildlife habitat.*
7. Avoid placing turbines in habitat known to be occupied by prairie grouse or other species that exhibit extreme avoidance of vertical features and/or structural habitat fragmentation. In known prairie grouse habitat, avoid placing turbines within 5 miles of known leks (communal pair formation grounds). *The proposed farmland location of the HGS WTGs is not known to be occupied by prairie grouse but these could occur nearby.*
8. Minimize roads, fences, and other infrastructure. All infrastructure should be capable of withstanding periodic burning of vegetation, as natural fires or controlled burns are necessary for maintaining most prairie habitats. *The proposed wind turbine development at the HGS site would comply with this guideline*.
9. Develop a habitat restoration plan for the proposed site that avoids or minimizes negative impacts on vulnerable wildlife while maintaining or enhancing habitat values for other species. For example, avoid attracting high densities of prey animals (rodents, rabbits, etc.) used by raptors. *A habitat restoration plan would not be necessary because wildlife habitat would not be disrupted. Landscaping would take place to restore vegetation and soil cover after excavation and construction are complete.*
10. Reduce availability of carrion by practicing responsible animal husbandry (removing carcasses, fencing out cattle, etc.) to avoid attracting Golden Eagles and other raptors. *Carrion is not expected to be available near the HGS wind turbines. However, animals may be killed by coal supply trains on the railroad spurs associated with and in the vicinity of the power plant and wind turbines. SMC would need to remove these kills to prevent attracting Golden Eagles and other raptors.*

Considering the above landscape and site development issues, the relatively small scale of the proposed HGS wind development, the proposed design of the WTGs and the low quality of wildlife habitat present on site, the proposed HGS wind development would likely have minor to moderate impacts on wildlife, especially birds. These impacts would be localized and of long-term duration.

4.6.3 ALTERNATIVE SITE – INDUSTRIAL PARK SITE

As described in Chapter 3, the alternative Industrial Park plant site appears to have been cultivated at some time in the past, but is currently vegetated in a mixture of grasses that includes smooth brome, crested wheatgrass, thickspike wheatgrass, and Kentucky bluegrass, as well as a variety of weedy forbs. Parts of this site have already been disturbed by human activities apparently associated with other developments in the industrial park. Wildlife species recorded during the biological survey at the site included the western meadowlark, unidentified vole (probably the meadow vole), Richardson's ground squirrel and badger.

Construction of the SME generating station at this site would entail negligible to at most minor adverse impacts on wildlife habitat on the site itself. It would not be expected to have any adverse impacts on threatened and endangered species or state species of special concern at the

site itself. Of greater possible concern would be temporary construction-related and long-term or permanent impacts on the biological resources as-yet unselected transmission, pipeline, and rail spur corridors

Because the Industrial Park site is currently considered to be an alternative to the Salem site, specific locations and lengths of corridors and connections have not been formally identified. If this site were to be selected, most of the connections would likely be shorter than for the Salem site due to closer proximity to established infrastructure. However, connection lines for water, wastewater, railroad transport, and electric transmission lines to the plant site could potentially have some adverse effects on biological resources. Since water, wastewater, and transmission lines are buried and elevated respectively, their installation would entail at most temporary and short-term impacts on possible wildlife habitat, since this habitat could be restored on the surface within the corridor; in contrast, a rail spur could potentially eliminate a small amount of habitat equal to the length of the track and bed times the width, as well as fragment habitats. However, most of area through which the spur is likely to pass has long been disturbed. If the Industrial Park site were to be selected instead of the Salem site, these corridors would have to be identified and their biological resources surveyed prior to project construction to avoid or mitigate potential adverse impacts.

4.6.4 CONCLUSION

Table 4-13 lists the impacts on biological resources resulting from the site preparation, construction, operation, and connected actions associated with a dam, reservoir, and raw water transmission main for each of the alternative project sites, including the No Action alternative.

Overall, the No Action Alternative would have no direct effects on biological resources at either of the proposed sites. However, it would contribute indirectly and cumulatively to adverse impacts on biological resources in other parts of the region, from SME's purchase of power from unspecified generating sources.

Using the impact significance definitions described at the beginning of Chapter 4 and presented for "Aquatic Biological Resources Degradation" and "Terrestrial Biological Resources Degradation" in Appendix J, the biological impacts of the Proposed Action would be of minor to moderate magnitude, long-term duration, and small extent, and have a probable likelihood of occurring. Overall then, the rating for biological resources impacts from the Proposed Action would be adverse, but although impacts would most likely be non-significant, there is some potential for the impacts to become significant.

The biological impacts of the Industrial Park site would be of minor magnitude, long-term duration, and small, and have a probable likelihood of occurring. Overall then, the rating for biological resources impacts from the alternative site would be adverse, but although impacts would most likely be non-significant, there is some potential for the impacts to become significant. The caveat for the analysis of the Industrial Park site alternative is that this rating must be considered preliminary, in that specific routes and corridors for transmission lines, pipelines, and the rail spur have not yet been selected. However, given the generally developed

and disturbed habitats of the area as well as the nature of the proposed developments, any biological impacts from this alternative are likely to be at most minor.

Table 4-13. Summary of Direct Impacts on Biological Resources

Alternative	Impacts	Rating of Impacts
No Action	• The No Action alternative would not change any land use or disturb existing habitat, and therefore would not have a direct adverse effect on biological resources.	• None
Highwood Generating Station - Salem site	• Temporarily displace terrestrial wildlife due to removal of vegetation and disturbance from construction equipment; • Eliminate potential habitats, but unlikely to adversely affect, state-listed species of concern from permanent removal of vegetation; • Short-term harm to wildlife/vegetation by degrading air quality; • Short-term harm to aquatic biota from degraded water quality; • Long-term increase in mortality of terrestrial mammals by rail strikes and increased traffic on access road; • Increase mortality to birds and bats from blade strikes on wind turbines; • Temporarily disturb habitats along water & power line routes during construction activities; • Temporarily or permanently disturb wetland habitats for installation of water intake; • Contribute to the potential spread of noxious weeds by disturbing existing vegetation cover and soils.	• Negligible • Negligible to minor • Negligible • Minor • Minor to moderate • Minor to moderate • Minor to moderate • Minor • Minor
Industrial Site	• Temporarily displace terrestrial wildlife due to removal of vegetation and disturbance from construction equipment; • Eliminate potential habitats, but unlikely to adversely affect, state-listed species of concern from permanent removal of vegetation; • Short-term harm to wildlife/vegetation by degrading air quality; • Damage habitat along water pipeline routes during construction activities; • Contribute to the potential spread of noxious weeds by disturbing existing vegetation cover and soils.	• Negligible • Negligible • Negligible • Minor • Minor

4.6.5 MITIGATION

Mitigation measures are suggested for the Salem site only; no mitigation measures are likely to be necessary for the highly disturbed, developed Industrial Park site itself. Information was not developed regarding biological resources on corridors connecting to the Industrial Park site.

Therefore no impacts or mitigation can be evaluated, although some of the measures suggested for the Salem site may be applicable.

Threatened and Endangered Species

Activities conducted by the contractor such as developing aggregate sources, gravel crushing, locating staging and stockpile sites could be conducted outside of the project limits and closer to the nests of bald eagles along the Missouri River. The Montana Bald Eagle Management Plan places limitations on these high intensity activities. They should not be conducted within 0.5 mile (0.8 km) of the Morony Dam nest location or any other known bald eagle nests between March 1 and May 15, or within (0.25 mile (0.4 km) of nest sites from May 15 to July 15. If the contractor anticipates any construction operations within the vicinity of an active bald eagle nest, roost site, or seasonal concentration area, or has any questions concerning the application of the regulations promulgated to protect this species, they should contact the USFWS and/or MFWP. These agencies can identify any restrictions that may apply to project planning, anticipated construction activities, and project scheduling.

State Species of Concern

Avoiding disturbance of shrub, tree, and wetland habitats would reduce adverse effects on raptors and breeding bird species by the proposed project. If these habitats must be removed, disturbed, or altered for construction or maintenance of the proposed project or infrastructure, construction contractor(s) should avoid initiating these activities during spring nesting season.

Power Lines

Mitigation for birds of prey in the project area would include raptor-proofing all power poles that are to be erected or relocated for the proposed plant site and/or infrastructure. SME and its contractors should follow the "Suggested Practices for Raptor Protection of Power Lines", Edison Electric Institute (EEI, 1996) recommendations for proper techniques.

Aquatic Resources

Since the Morony Reservoir is being used by MFWP to rear sauger, a state species of concern, close consultation with MFWP would be needed during installation of the raw water intake and water outflow into this reservoir. Consultation with MFWP for this managed population would insure that construction and maintenance activities take place during appropriate seasons, and ensure that any turbidity, dewatering, or entrainment problems do not affect sauger.

In general for protection of fish species, it would be necessary to install adequate screening on the raw water intake to prevent death or injury to fish in the Morony Reservoir. The recommended state and federal permitting processes would address mitigation for affected resources.

If raw water is returned to the Missouri River, it should be tested and treated to meet all water DEQ quality standards before discharge. Under the Montana Water Quality Act, any waters

discharged to this reach of the Missouri River would need to be below the numeric water quality trigger values for these pollutants. Further, a 318 permit would be needed for construction to address any temporary increases in turbidity.

Wind Turbines

The following recommended mitigation measures concerning wind turbine design and operation are derived from the U.S Fish and Wildlife Service's 2003 guidelines on minimizing impacts to wildlife from WTGs (USFWS, 2003).

- Use tubular supports with pointed tops rather than lattice supports to minimize bird perching and nesting opportunities.
- Avoid placing external ladders and platforms on tubular towers to minimize perching and nesting.
- Avoid use of guy wires for turbine or meteorological tower supports.
- If the turbines require lights for aviation safety, the minimum amount of pilot warning and obstruction avoidance lighting specified by the Federal Aviation Administration (FAA) should be used.
- Unless otherwise requested by the FAA, only white strobe lights should be used at night, and these should be the minimum number, minimum intensity, and minimum number of flashes per minute (longest duration between flashes) allowable by the FAA.
- Solid red or pulsating red incandescent lights should not be used, as they appear to attract night-migrating birds at a much higher rate than white strobe lights.
- If feasible, place electric power lines underground or on the surface as insulated, shielded wire to avoid electrocution of birds.
- Use recommendations of the Avian Power Line Interaction Committee for any required above-ground lines, transformers, or conductors.
- Follow USFWS guidance (USFWS, 2003) and protocols in establishing an avian and bat mortality monitoring program.

Carrion Removal from Railroad Spur and Access Roads

SME would cooperate with the USFWS and MFWP to preclude making the wind turbine vicinity attractive to raptors such as the Golden Eagle and hawks, thereby exposing them to the hazard posed by spinning turbine blades. SME would remove carrion resulting from larger mammals and lizards (e.g. snakes) killed by rail or road traffic to a site well-removed from the turbines, to a distance of at least 0.5 mile (0.8 km) away.

Noxious Weeds

SME would follow the requirements identified in the Cascade County Weed and Mosquito Management District's document, "Weed Management and Revegetation Requirements for Disturbed Areas in Cascade County, Montana." This document specifies the actions that need to be taken prior to disturbance, during operation, and upon reclamation, to prevent the spread of noxious weeds in the county.

4.7 ACOUSTIC ENVIRONMENT

For the noise analysis of the Proposed Action, acoustical consultants BSA used typical noise level data related to the construction and operation activities of a 250-MW coal-fired power plant. Noise generated by the power plant under the Salem and Industrial Park alternatives would vary in frequency and intensity during construction and operation activities. Although the power plant design is not complete, BSA evaluated a preliminary list of equipment and noise levels based on similar facilities (BSA, 2005).

During the construction of the power plant, noise would be produced by heavy equipment (e.g., scrapers, bulldozers, graders, loaders, dump trucks, pneumatic hammers), and building construction equipment (e.g., saws, drills, compressors, hammers, welding, etc.). Noise produced by diesel-powered equipment is typically 85 dBA at a distance of 50 feet (15 m) from the equipment (FTA, 1995). However, the noise of individual pieces of equipment can vary considerably depending on age, condition, manufacturer, use, and a changing distance from the equipment to a receptor location. Operation of the equipment also would vary considerably throughout the construction phase and from day to day. Although construction noise may be audible at a receptor located within several miles, construction activities and noise would be temporary and short-term compared to the operations of the proposed power plant.

Near the end of the construction phase, the steam lines of the plant must be thoroughly cleaned before the plant could begin operation by using high-pressure steam that would be blown out to the atmosphere. Although the noise produced by a steam blow-out varies due to stream pressure, temperature and moisture, the size and shape of the vent opening and the valve used, the noise of steam blow outs are typically 80 to 95 dBA at 1,000 feet (305 m) and last for several minutes.

The primary noise sources associated with the daily operation of the power plant would include transformers, primary air fans (PA fans), secondary air fans (SA fans), two induced draft fans (ID fans), a cooling tower (seven towers in array), a turbine, a boiler, and a coal crusher (EEI, 1984; Stanley, 2005a; Stanley 2005b). For this analysis, the noise levels created by a typical 250-MW coal-fired power plant were evaluated per the criteria cited in Section 3-6-2 of this EIS.

During initial start-up of the plant and restart operations after maintenance shutdowns, high-pressure steam would be intermittently discharged to the atmosphere. Although the noise produced by a steam vent would vary, the noise of start-up steam vents would be typically 75-80 dBA at 1,000 feet (305 m).

Brief and intermittent trips along the roads leading to either site would not significantly affect the L_{dn} value at a receptor, and therefore, the road traffic was evaluated separately. Assuming, worst case, that 55-60 employee vehicles and six heavy trucks transporting limestone travel the roads during the same hour at approximately 35 miles (56 km) per hour, the estimated noise level at 50 feet (15 m) from the road would be approximately L_{eq}(h) 56 dBA (FHWA, 1998). Noise of individual trucks might be audible within approximately 1-2 miles of the road (BSA, 2005).

Coal would be brought to the power plant using two trains per week, and would typically consist of 110 cars per train. Diesel locomotives typically are 87 to 96 dBA at 100 feet (30 m) from the track (Harris, 1998). For the prediction of the power plant noise levels, BSA assumed that one train would deliver coal to the plant during daytime hours and would travel at approximately 5-10 miles (16 km) per hour around the site. Although a single train during the day would not significantly affect the L_{dn} value near the tracks, the brief, intermittent noise of the diesel locomotives passing by can significantly exceed existing ambient levels at a receptor during the pass-by and be audible for several miles.

ID fans used in power plants can produce distinct, and typically annoying, audible tones intermittently at certain operating conditions of the fan and inlet dampers. The fans produce tones at the blade pass frequency of the fan, typically during partial-load operation, but the level of the resulting tone cannot be accurately predicted (EEI, 1984). The preliminary ID fan selection for the proposed power plant would have 12 blades and would operate at 1180 rpm. Using these data, BSA calculated the blade pass frequency of this preliminary fan would be at approximately 236 Hertz, and added 10 dB to the blade pass frequency of the typical ID fan data used for the calculations (EEI, 1984).

Using the Cadna-A Version 3.5 noise prediction software from DataKustik, BSA developed noise level contours for the combined typical power plant equipment and train operations at both the Salem and Industrial Park sites. This standard specifies the calculations to determine the reduction in noise levels due to the distance between the noise source and the receiver, the effect of the ground on the propagation of sound, and the effectiveness of natural barriers due to grade or man-made barriers such as walls. The calculations conservatively assume that the atmospheric conditions are favorable for sound propagation.

4.7.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, no power plant would be constructed at either the Salem or Industrial Park sites to meet SME's projected base load needs. Rather, SME would purchase electricity from existing generation sources in the Northern Rockies or Pacific Northwest, which could be a mix of large-scale hydro, natural gas, coal, nuclear, and to a smaller extent, wind, solar, and other renewables. Under this alternative, during the immediate future, the acoustical environments of both the Salem and Industrial Park sites would be expected to remain much as they are at present.

Around the Salem site, L_{90} ambient short-term noise levels would continue to range from about 20 to 47 dBA, a range characteristic of rural or agricultural settings. The L_{90} ambient noise levels would continue in the 18 to 35 dBA range from 8:00 p.m. to 8.00 a.m., which is also typical of quiet rural environments at night. The overall L_{dn} at the Salem site would remain approximately 47 dBA, what it is today, with an estimated L_{dn} of 30 dBA during quiet periods. The acoustic environment of the Salem site would continue to be representative of a rural, agricultural area.

During the immediate future, around the Industrial Park site, noise levels would continue to range from about L_{90} 28 to 44 dBA, higher than the Salem site because of nearby traffic. The L_{90}

ambient noise levels would continue in the 36 to 45 dBA range from 8:00 p.m. to 8:00 a.m., typical of quiet suburban areas at night. The overall L_{dn} at the Industrial Park site would remain approximately 53 dBA, what it is today, with an estimated L_{dn} of 45 dBA during quiet periods. The noise profile of the Industrial Park site would continue to reflect that of an outer suburb on the edge of town, roads and an industrial area. However, unlike the Salem site, which is likely to remain rural, agricultural and thinly populated for the foreseeable future, the Industrial Park site is in an area that is undergoing development, both residentially and industrially. These developments would raise overall noise levels (expressed as L_{dn}) in the vicinity over the coming years and decades.

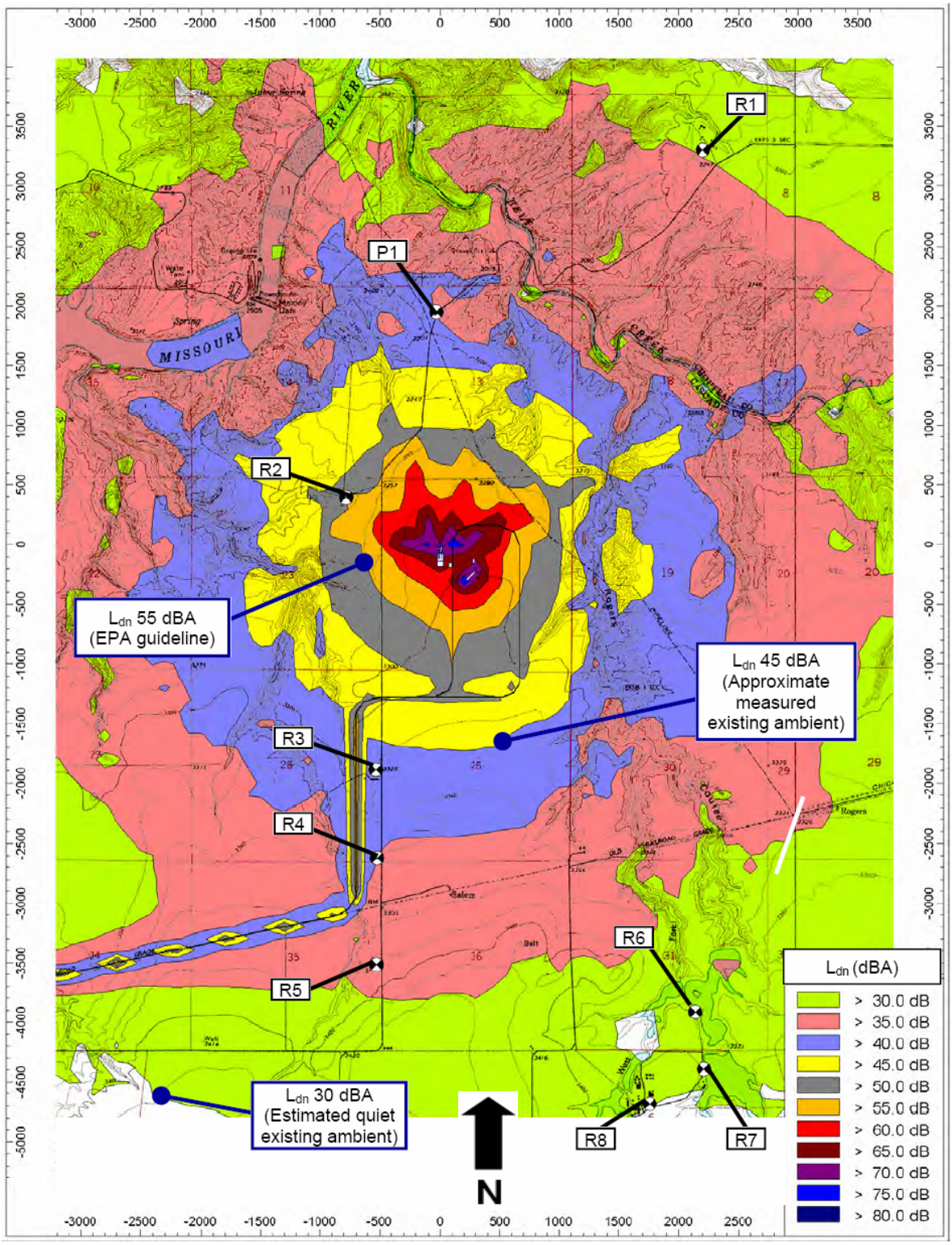
The No Action Alternative would not contribute directly to noise at either the Salem or Industrial Park sites. However, by purchasing an equivalent amount of power from generation sources elsewhere, SME would be contributing indirectly to ongoing noise impacts at existing generating stations in the region. To the extent that expanding demand for electricity in the wider region drives construction of new generating facilities elsewhere, SME would be contributing indirectly to noise impacts associated with construction and operation of those facilities.

4.7.2 PROPOSED ACTION – HGS AT THE SALEM SITE

As described in Chapter 3, approximately eight scattered rural residences are located within three miles (5 km) of the Salem site. The closest residence is located approximately 0.5 mile (0.8 km) northwest and is owned by the current property owner of the Salem site. A Lewis and Clark Interpretative Site (i.e., the Portage Staging Area) is located within one mile (1.6 km) north of the Salem site. Onsite, human noise-sensitive receptors would be the power plant workers. Wildlife (e.g., deer, antelope, birds, etc.) that live, forage, and pass through the site area are also noise-sensitive receptors.

Figure 4-5 shows the predicted L_{dn} noise level contours for the power plant and train operations overlaid on USGS topographic maps for the Salem and Industrial Park sites. As the figure reveals, the noise levels are not predicted to radiate equally in all directions. Noise contours were developed assuming that all the power plant equipment operated 24 hours per day and includes the effect of one coal delivery train traveling to the site during the day. The noise contours that are equal to the estimated quiet ambient noise levels at the Salem site (Table 3-15) are shown for reference in the figure. However, since the predicted power plant noise would be typically a low-frequency hum and the measured existing ambient level around the site was influenced by high-frequency insect noise, the plant might still be audible during quiet periods beyond the location of the estimated quiet ambient noise contour shown on Figure 4-5.

The Salem site noise contours and receptors are shown in Figure 4-4, while the predicted noise levels at the receptors are listed in Table 4-14. The EPA L_{dn} 55 dBA guideline is predicted to be met within 0.6 mile (1 km) from the Salem site. The measured existing ambient noise level of L_{dn} 47 dBA is predicted to be met within approximately 1.2 miles (1.9 km) of the Salem site, and the estimated quiet ambient noise level of L_{dn} 30 dBA is predicted to be met within approximately 3.1 miles (5 km). As shown in Table 4-14, the typical L_{eq} noise levels of the plant are predicted to be less than the 50 dBA nighttime residential noise limit of the Great Falls Municipal Code for residences (Table 3-16) at all of the receptor locations, and the typical L_{dn}



R1 - Receptor location: Single-family residence or groups of residences.

P1 - Receptor location: Lewis & Clark Portage Site.

Figure 4-4. HGS L_{dn} Noise Contours at Salem Site

Source: BSA, 2005

Table 4-14. Predicted Noise Levels at Nearby Receptors – Salem Site

Receptor Locations	Type of Receptor	Noise Level L_{eq} (dBA)	Noise Level L_{dn} (dBA)
R1	Single-family residence	28	35
P1	Lewis and Clark Interpretive Site (i.e., Portage Staging Area)	32	39
R2	Single-family residence	48	55
R3	Single-family residence	40	44
R4	Single-family residence	38	40
R5	Single-family residence	31	36
R6	Single-family residence	25	32
R7	3 single-family residences	24	31
R8	Single-family residence	24	30

Source: BSA, 2005

noise levels are predicted to be less than or equal to the L_{dn} 55 dBA EPA guideline at all the receptor locations.

On-site workers, nearby residents, as well as wildlife, would be exposed to various noise sources during the construction and operation activities. Noise-induced hearing loss is the primary effect of exposure to excessive noise. Federal workplace standards for protection from hearing loss allow time-weighted average level of 90 dBA over an 8-hour period, 85 dBA averaged over a 16-hour period and 70 dBA over a 24-hour period. The primary human effect due to prolonged noise would be annoyance. Other non-auditory human effects include speech interference, stress reactions, sleep interference, lower morale, efficiency reduction, and fatigue (Harris, 1998).

Numerous studies have been conducted attempting to document the effects of noise on wildlife. Wildlife responses to noise vary considerably and are a function of many other variables besides noise, including the characteristics of the noise and its duration, life history characteristics of the species, habitat type, season and current activity of the animal, sex, age, previous noise exposure, as well as other physical stressors such as drought (CST, 1996). General wildlife responses to human-made noise are attraction, tolerance and aversion, which are summarized in the following list of potential responses (CST, 1996; EPA, 1971; Bowles, 1995).

- Most animals habituate to sounds (e.g., truck and equipment noise) disassociated with other threatening stimuli.
- Animals (e.g., ungulates) that habituate to traffic noise are vulnerable to oncoming vehicles.
- Steady sounds are less prone to startle animals than sudden onset noise.
- Human-made noise can mask meaningful noise (e.g., mating and other communication).
- Motivation to find food can make animals tolerant of noise.
- Different species have different levels of noise tolerance and habituation.
- Most effects of noisy disturbances are mild enough that they may never be detectable as changes in population size or population growth.
- Animal aversion is measured in avoidance responses and can be lessened if animals can predict exposure (e.g., warning signal before conveyor startup).

Wind turbine design modifications such as orienting rotors to face upwind have reduced noise from even larger turbines like those proposed at the Salem site (AWEA, no date). Big Sky Acoustics LLC has prepared noise level predictions for the proposed wind turbine generators associated with the HGS (BSA, 2006). BSA developed noise level contours for the combined noise of the coal-fired power plant equipment and the four proposed wind turbine generators. The noise prediction model and assumptions for the Salem Site (BSA, 2005) was modified to include the wind turbines. For the analysis, it was assumed that all four wind turbines and the power plant were operating simultaneously and continuously during a 24-hour period. This assumption should be considered conservative because the operation of the wind turbines would vary with the wind speed at the site. The octave-band sound power levels associated with a wind speed of 8 meters per second (18 mph) at 10 meters (33 feet) above the ground were used for the calculations as a representative wind speed (BSA, 2006).

The L_{eq} noise levels at the receptor locations due to the combination of the power plant and the wind turbines are predicted to be between 0 and 1 dBA greater than the noise levels predicted for the power plant only. The L_{dn} noise levels at the receptors due to the power plant and wind turbines are predicted to be 0 to 2 dBA greater than the noise levels predicted for the power plant only. Therefore, the dominant noise source(s) associated with the project would be the power plant equipment, and not the wind turbines (BSA, 2006).

4.7.3 ALTERNATIVE SITE – INDUSTRIAL PARK SITE

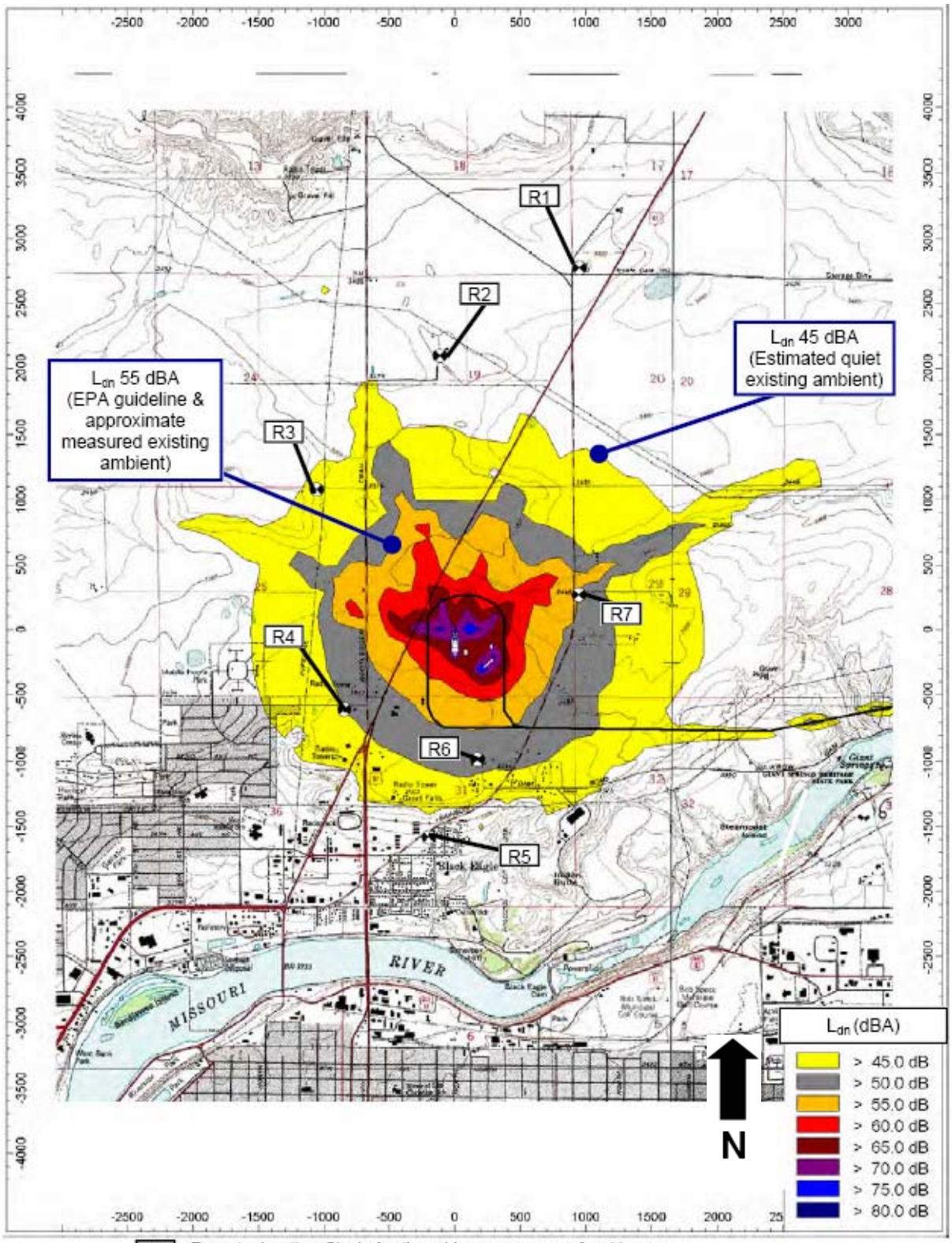
As described in Chapter 3, approximately seven groups of residences are located within one mile (1.6 km) of the Industrial Park site, primarily off of Black Eagle Road, Rainbow Dam Road, and Bootlegger Trail. Onsite, human noise-sensitive receptors would be the power plant workers.

The Industrial Park site noise contours and receptors are shown in Figure 4-5, and the predicted noise levels at the receptors are listed in Table 4-13. The EPA L_{dn} 55 dBA guideline is predicted to be met within 0.7 mile (1.1 km) from the Industrial Park site. The measured existing ambient noise level of L_{dn} 53 dBA (Table 3-16) is predicted to be met within approximately 0.8 mile (1.3 km) of the Industrial Park site and the estimated quiet ambient noise level of L_{dn} 45 dBA (Table 3-16) is predicted to be met within approximately 1.2 miles (1.9 km) (Figure 4-5). As shown in Table 4-11, the typical L_{eq} noise levels of the plant are predicted to be less than the 50 dBA nighttime residential noise limit of the Great Falls Municipal Code for residences (Table 3-13) at all of the receptor locations, and the typical L_{dn} noise levels are predicted to be less than the L_{dn} 55 dBA EPA guideline at all the receptor locations (Table 4-15).

4.7.4 CONCLUSION

The No Action Alternative would not result in any direct noise impacts on either the Salem or Industrial Park sites, though it would contribute indirectly to noise impacts at those power plants from which SME would purchase electricity.

Impacts of the Proposed Action – the Highwood Generating Station at the Salem site – and the alterative site – the Industrial Park site – would be similar to one another. Both alternatives would result in minor adverse, non-significant impacts on the acoustic environment.



R1 - Receptor location: Single-family residence or groups of residences.

Figure 4-5. HGS L_{dn} Noise Contours at Industrial Park Site
Source: BSA, 2005

Table 4-15. Predicted Noise Levels at Nearby Receptors – Industrial Park Site

Receptor Locations	Type of Receptor	Noise Level L_{eq} (dBA)	Noise Level L_{dn} (dBA)
R1	Single-family residence	34	41
R2	Single-family residence	35	42
R3	Group of single-family residences	39	46
R4	Group of single-family residences	43	50
R5	Group of single-family residences	36	42
R6	Group of single-family residences	45	52
R7	Group of single-family residences	47	54

Source: BSA, 2005

Noise levels associated with the daily operation of a typical 250-MW coal-fired power plant would be primarily determined by the Induced Draft fans, Primary Air fans, Secondary Air fans, transformers, cooling tower, turbine, boiler, coal crusher and trains for coal delivery. Intermittent noise sources associated with the power plant that would not significantly affect the daily operation L_{dn} but could be audible for several miles from the site, including steam line cleaning, start-up steam vents, tonal noise produced by the ID fans, and locomotives used to deliver coal.

The noise levels of typical daily plant operations are not predicted to exceed the EPA guideline of L_{dn} 55 dBA beyond 0.6 mile (1 km) from the Salem site and 0.7 mile (1.1 km) from the Industrial Park site. The predicted noise levels are equal to or less than the EPA guideline at the receptor locations around each site, but do not radiate equally in all directions.

Noise levels are predicted to be approximately equal to the existing ambient noise levels during quiet periods at approximately 3.1 miles (5 km) from the Salem site and 1.2 miles (1.9 km) from the Industrial Park site. However, because the predicted power plant noise is typically a low-frequency hum and the measured existing ambient levels around both sites were influenced by high-frequency insect noise, the plant may still be audible during quiet periods beyond the location of the estimated quiet ambient noise contours shown on the figures.

At all of the receptor locations as defined in of this report, the power plant noise levels are predicted to be less than the 50 dBA nighttime noise limit of the Great Falls Municipal Code for residences, and less than or equal to the EPA L_{dn} 55 dBA guideline. Employee vehicle traffic and delivery truck noise is predicted to be less than MDT's L_{eq}(h) 66 dBA impact criteria at 50 feet (15 m) from the road. Therefore, the overall results indicate that the noise levels associated with a typical 250-MW coal-fired power plant are predicted to be within applicable noise guidelines and ordinances at the receptor locations near the Salem and Industrial Park sites.

Using the impact significance definitions described at the beginning of Chapter 4 and presented for Noise Impacts in Appendix J, acoustic impacts of the proposed HGS and wind turbines at the Salem site would be of minor magnitude, long-term duration, and small extent, and have a probable likelihood of occurring. Overall then, the rating for noise impacts from the Proposed Action would be adverse, but while impacts would most likely be non-significant, there is some potential for the impacts to become significant.

Using the impact significance definitions described at the beginning of Chapter 4 and presented for Noise Impacts in Appendix J, acoustic impacts of building and operating a 250-MW power plant at the Industrial Park site would be of minor magnitude, long-term duration, and small extent, and have a probable likelihood of occurring. Overall then, the rating for noise impacts at the alternative Industrial Park would be adverse, but while impacts would most likely be non-significant, there is some potential for the impacts to become significant. As shown in Table 4-13, predicted noise levels at residential receptors near the Industrial Park site are greater than those predicted for the Salem site, but probably not enough to cause a significant adverse impact.

4.7.5 MITIGATION

Since no significant, adverse impacts are anticipated on the acoustic environment, no mitigation measures are planned or proposed for either of the action alternatives.

4.8 RECREATION

4.8.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, no CFB coal-fired generating station would be constructed at either the Salem or Industrial Park sites. In addition, no 230-kV electrical transmission line interconnections would be developed in the Great Falls area. Thus, there would be no direct impacts on recreation from the No Action Alternative. That is, there would be no direct impacts on recreational facilities, recreational opportunities, or the quality of recreational experiences in the Great Falls area.

However, SME would need to purchase power from another generation source within the Western System Coordination Council (WSCC) to meet its projected baseload needs beginning in 2008. If generation and transmission capacity have to be expanded to meet a general growth in load to which SME would contribute, SME could be contributing indirectly and incrementally to the impacts on recreation that occur at other locations in the Rocky Mountain West and Pacific Northwest. Depending on the type of generation (e.g., hydro, coal, natural gas, wind, solar, nuclear, geothermal) as well as the specific location of that generation and related transmission, a wide variety of impacts could occur on recreation facilities, opportunities, and recreational quality, ranging from effects on fishing, hunting, hiking, camping, access, visual resources, and cultural resources. Most but not all of these impacts would be adverse.

4.8.2 PROPOSED ACTION – HGS AT THE SALEM SITE

Construction and operation of the HGS at the preferred Salem site would entail negligible to at most minor impacts on recreation in the immediate project vicinity and wider Great Falls area. As indicated in Section 3.7, there are no recreational facilities or activities present on the Salem site itself. There are two recreational sites of in the immediate vicinity that would be impacted by the Proposed Action: the Lewis and Clark staging area historic site and the Morony Reservoir. The former is a site for heritage recreation/tourism while the latter offers fishing.

The Proposed Action would not restrict access to either of these facilities, which appear to receive relatively little visitation or public use.

The presence of the power plant 0.8 mile (1.3 km) to the south of the Lewis and Clark interpretive site would degrade the recreational experience there to some extent for the few visitors the site receives. The open vista and relatively empty landscape would no longer be appear so open and empty, at least looking toward the south, with the prominent presence of the power plant (discussed both under visual resources and cultural resources sections) and additional transmission lines in the area. In addition, noise levels at the staging area historic site would be slightly elevated over background levels (see Section 4.8.2). However, neither the staging area historic site, nor access to it, nor the educational message it conveys about the important historic event that occurred nearby two centuries ago, would be adversely affected by the Proposed Action.

The small amount of fishing that takes place in the Morony Reservoir would be affected even less by the Proposed Action. The power plant and appurtenant facilities and activities (such as the water supply intake in the reservoir) should have no impact on either fish populations or the quality of the fishing experience, such as it is, within the reservoir. Most of the generating station would not be visible to anglers in the reservoir.

Potential impacts of the Proposed Action to the quality of distant recreation opportunities in Class I national park and wilderness areas are discussed under air quality, Section 4.4.

4.8.3 ALTERNATIVE SITE – INDUSTRIAL PARK SITE

Construction and operation of the HGS at the alternative Industrial Park site would entail negligible to at most minor impacts on recreation in the immediate project vicinity and wider Great Falls area. As indicated in Section 3.7, there are no recreational facilities or activities present on the Industrial Park site itself; the site is an undeveloped, previously farmed portion of a designated industrial park.

The closest recreational facilities to the Industrial Park site that support high levels of recreation are several parks along the Missouri River, specifically, Giant Springs State Park, Lewis and Clark National Historic Trail Interpretive Center, and Elks Riverside Park, operated by the state, federal, and city governments, respectively. In addition, the River's Edge Trail, managed by a group of agencies and an NGO, runs along the Missouri, approaching within approximately a mile (1.6 km) of the proposed plant. As discussed in Section 4.11.3, upper portions of the proposed generating station would be visible to park visitors and recreationists along the river. However, given the already urban setting and the absence of a scenic background, the view of which the power plant could potentially detract from, its visual impact would be low.

4.8.4 CONCLUSION

The No Action Alternative would result in any direct impacts on recreation facilities or opportunities at either the Salem or Industrial Park sites, though it would contribute indirectly to

recreation impacts associated with those generating stations from which SME would purchase electricity.

Construction and operation of the HGS at the preferred Salem site would entail negligible to at most minor impacts on recreation in the immediate project vicinity and wider Great Falls area. There are two recreational sites in the immediate vicinity that would be impacted by the Proposed Action: the Lewis and Clark staging area interpretive site and the Morony Reservoir. The Proposed Action would not restrict access to either of these facilities, which appear to receive relatively little visitation or public use. The presence of the power plant 0.8 mile to the south of the Lewis and Clark interpretive site would degrade the recreational experience there to some extent for the few visitors the site receives. Overall, the rating for recreation impacts from the Proposed Action would be adverse but non-significant.

Similarly, construction and operation of the SME power plant at the alternate Industrial Park site would entail negligible to at most minor impacts on recreation in the immediate project vicinity and wider Great Falls area. There are no recreational facilities or activities present on the Industrial Park site itself, which is an undeveloped, previously farmed portion of a designated industrial park. Upper portions of the proposed generating station would be visible to park users and recreationists along the Missouri River in Great Falls. However, given the already urban setting and the absence of a scenic background, the view of which the power plant could potentially detract from, its visual impact for recreationists would be low. Overall then, while the rating for recreation impacts from the alternate Industrial Park site would be adverse, it would be non-significant.

Using the impact significance definitions described at the beginning of Chapter 4 and presented for "Recreation Degradation" in Appendix J, the recreation impacts of the Proposed Action would be of minor magnitude, long-term duration, and small extent, and the likelihood would be probable. Overall then, the rating for recreation impacts from the Proposed Action would be adverse, but while impacts would most likely be non-significant, there is some potential for the impacts to become significant.

The alternative Industrial Park site would be unlikely to cause other adverse impacts on local recreation in the Great Falls area. Using the impact significance definitions described at the beginning of Chapter 4 and presented for "Recreation Degradation" in Appendix J, the recreation impacts of the Industrial Park alternative would be of minor magnitude, long-term duration, and small extent, and the likelihood would be probable. Overall then, the rating for recreation impacts from the alternative Industrial Park site would be adverse; while impacts would most likely be non-significant, there is some potential for the impacts to become significant.

4.8.5 MITIGATION MEASURES

At the Salem site, during construction, SME would attempt to accommodate ongoing access by motorists and visitors to the Lewis and Clark staging area historic site and the National Historic Landmark more generally.

Over the long term, after construction has been completed, SME would cooperate with the SHPO and local historic preservation interests to enhance the Lewis and Clark staging area interpretive site and Great Falls Portage NHL experience, as discussed further under Cultural Resources. Such enhancements may include adding one or more kiosks, interpretive signs, parking, benches, or additional interpretive facilities closer to the confluence of Belt Creek and the Missouri River.

At the alternate Industrial Park site, no measures to mitigate recreation impacts would be necessary.

4.9 CULTURAL RESOURCES

4.9.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, no CFB coal-fired generating station would be constructed at either the Salem or Industrial Park sites. In addition, no 230-kV electrical transmission line interconnections would be developed in the Great Falls area. Thus, there would be no direct impacts on cultural resources, including Traditional Cultural Properties, from the No Action Alternative.

However, SME would need to purchase power from another generation source within the WSCC to meet its projected baseload needs beginning in 2008. If generation and transmission capacity have to be expanded to meet a general growth in load to which SME would contribute, SME could be contributing indirectly and incrementally to the impacts on cultural resources that occur at other locations in the Rocky Mountain West and Pacific Northwest. Depending on the type of generation (e.g., hydro, coal, natural gas, wind, solar, nuclear, geothermal) as well as the specific location of that generation and related transmission, a wide range of adverse impacts of varying intensity could occur on cultural resources.

4.9.2 PROPOSED ACTION – HGS AT THE SALEM SITE

The proposed project is an undertaking as defined by 36 CFR 800, Protection of Historic Properties. Construction, maintaining, and operation of facilities in an area that contains historic properties could constitute an adverse effect on those properties. An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

An archaeological site consists of a definable spatial arrangement of cultural features, artifacts, or both, and can be either prehistoric or historic. Isolated finds are locations where few artifacts are noted or recovered, but which could not be defined as an archaeological site using the criteria defined by the Montana SHPO. For the purposes of Section 106/110 consultation and evaluations of eligibility for listing on the National Register of Historic Places (NRHP), a site must of sufficient age (50 years or older) to be considered an cultural resource property.

The potential impacts on cultural resources were derived from surveying the project area and Area of Potential Effect to determine whether any such cultural resources exist in these areas.

As stated previously, the cultural resource survey conducted in support of this EIS was a preliminary inventory and evaluation. It was conducted to identify historic properties within the surveyed portions of the proposed project areas and to determine the potential for significant historic properties to be located within the proposed project areas. In the event that a site discovered during the survey is considered potentially eligible for inclusion in the NRHP, Phase II testing would be recommended for that site. Phase II testing is a more in-depth evaluation of identified cultural resources. Such a study would consist of the excavation of selected test units or areas to examine and evaluate on a more comprehensive basis the cultural property documented during the preliminary survey. The excavation would determine the possibility of intact, subsurface cultural deposits and/or features.

Additional archaeological work beyond the Phase II level would depend on the results of the Phase II excavations. If no intact buried deposits and/or features were identified, no additional work would be recommended. If such deposits were encountered, then additional work would be recommended prior to impacting or damaging the site by the project.

If the procedures implementing Section 106 of the NHPA, and other relevant Federal statutes are followed correctly, then the adverse effects on cultural resources could be mitigated. If the procedures were not followed, significant environmental consequences could occur. If potential historical properties were discovered during construction of the project, construction would be halted and the Montana SHPO would be contacted. Construction would not continue until proper investigation of the artifacts and resources could be conducted. In some cases where construction would occur in the immediate vicinity of known cultural resources, a planned cultural resource monitoring program would be prearranged. Such a stipulation would allow a qualified cultural resource professional to be on-site to deal with any inadvertent discoveries of cultural remains.

As described in Chapter 3 (Section 3.7), 10 cultural properties lie within the APE of SME's HGS Salem site. The ten include five previously recorded sites, and five discovered and recorded as part of investigations supporting this EIS. Of these 10 properties (listed in Table 3-17), only one would be impacted by the Proposed Action, the Great Falls Portage NHL (24CA238).

This NHL's integrity is based predominantly on the visual landscape qualities that are very similar to that which existed during the early 19th century when the Corps of Discovery traveled through the area. Because of the specific situation of this NHL site, most of the facilities planned for both alternatives of the SME project present a high likelihood of negatively impacting the significant historic scene of the property (Figures 4-6 and 4-7). Mitigation of such impacts to the views of a relatively undeveloped landscape can be potentially addressed with creative design to assure the preservation of key resource and landscape views. Figure 4-6 is an artist's rendition of the HGS power plant (excluding the wind turbines) superimposed on the landscape within the NHL while Figure 4-7 shows an existing view within the NHL that would remain unaffected by the construction of the power plant and wind turbines.

Figure 4-6. Artist's Rendition of HGS within Great Falls Portage NHL looking east toward Highwood Mountains

Figure 4-7. View of Open Landscape within NHL north of Proposed HGS, Looking North toward Missouri River; this view would remain unaffected by Proposed Action

At the present time, it appears that no Traditional Cultural Properties at the Salem site would be impacted by the Proposed Action, as none have been identified.

4.9.3 ALTERNATIVE SITE – INDUSTRIAL PARK SITE

Since no cultural resource properties or TCPs have been identified within the alternate site area, there would be no effects (adverse or otherwise) to cultural sites for construction, maintenance or operation of a plant in that specific location. However, connection lines for water, wastewater, railroad transport, and electric transmission lines to connect the plant site could adversely affect cultural resources, including the Great Falls Portage National Historic Landmark, although any such effects would not be as pronounced as in the case of the Proposed Action.

4.9.4 CONCLUSION

The following table lists the impacts on cultural resources resulting from the site preparation, construction, operation, and connected actions of the project, including the No Action Alternative.

Table 4-16. Impacts on Cultural Resources

Alternative	Impacts	Rating of Impacts
No Action	· No impacts	· No impacts
HGS and wind turbines with connecting lines at Salem site	· Adversely affect NHL and, possibly, other undiscovered cultural resources from site preparation, staging, construction, maintenance, operations, and connected actions associate with power plant, water lines, transmission lines, rail supply lines.	· Insignificant, through mitigation · Impacts to Great Falls Portage NHL likely significant.
Industrial Park Alternate Site	· No effect to cultural resources within alternate site. · Connecting lines to GFIP alternate site would have same adverse effects as above.	· No impacts · Insignificant, through mitigation

The No Action Alternative would have no direct impacts on cultural resources at either the Salem or Industrial Park sites.

The Proposed Action would adversely affect cultural resources from site preparation, staging, construction, maintenance, operations, and connected actions associate with power plant, water

lines, transmission lines, rail supply lines. Using the impact significance definitions described at the beginning of Chapter 4 and presented for "Cultural/Archeological Resources Degradation" in Appendix J, cultural resource impacts of the HGS at the Salem site would be of major magnitude ("Disturbance of a site listed on or eligible for listing on the National Register of Historic Places or National Historic Landmark diminishes the significance or integrity of the site"), long-term duration ("Cultural resources are non-renewable; any adverse effect is permanent/long-term"), and medium or localized extent ("Part of a cultural resource or site is affected [5 to 50%]"), and the likelihood is probable. Overall then, the rating for cultural resources impacts from the Proposed Action would be significantly adverse.

At the alternative Industrial Park location, there would likely be no effect on cultural resources due to their apparent absence from the site. Connecting pipelines and power lines to the alternate site would likely have the same adverse effects as above for the Salem site.

4.9.5 MITIGATION MEASURES

If the procedures implementing Section 106 of the NHPA and other relevant federal statutes are followed correctly, then adverse effects on cultural resources can be mitigated.

The Great Falls Portage National Historic Landmark exhibits extremely high levels of historic significance, mostly related to the natural landscape and views that remain very similar to those apparent in 1805. To this end, care should be taken to utilize creative design and facility siting techniques to assure the preservation of this unique resource. RUS and SME would work with the Montana SHPO, ACHP, and NPS to reduce impacts on the historic landscape and viewshed.

The additional nine historic sites recorded within the project area have been evaluated for their historic significance and integrity, resulting in recommendations for determinations of eligibility for listing on the NRHP. Prior to further design work for this project, the recommendations for eligibility, or determination of non-eligibility, should be presented to the Montana SHPO for consultation and possible consensus determinations.

Due to the potential for buried archaeological deposits in the various locations of the project area, and the potential that these deposits could be eligible for inclusion on the NRHP, it is recommended that a cultural resources monitoring program be established for all preparation, staging, and construction phases of the project. Similarly, an emergency discovery plan would be developed prior to commencing construction. Such a plan would address protocols and procedures for dealing with the inadvertent discovery of archaeological or buried human remains. The development of such a plan would be conducted in consultation with the Montana SHPO and interested Tribal representatives.

Given the documented pre-historic and historic presence of Blackfeet Indians in the general area, in the event that any cultural materials are discovered during excavation and construction for the HGS, SME and/or its contractors would immediately notify the Blackfeet Tribal Historic Preservation Office. Alternatively, a monitor from the tribe would be present during construction at SME's cost.

4.10 VISUAL RESOURCES

The extent of impacts to visual resources can be determined qualitatively by comparing the visual quality of the existing landscapes at the proposed Salem, Industrial Park, and transmission line interconnection routes with the expected visual quality of the areas upon completion of the Proposed Action. In Section 3-8 of this EIS, the Bureau of Land Management's Visual Resource Management (BLM VRM) system was used to conduct an abbreviated Visual Resource Inventory (VRI) of both alternative power plant sites. While a VRI was not performed on the potential transmission line corridors, these areas were described in words and illustrated with photos. In this section, VRM's Visual Resource Contrast Rating is used to determine the significance of aesthetic impacts at both sites and along the interconnection routes. The BLM VRM Visual Resource Contrast Rating classifications are shown in Table 4-17 below:

Table 4-17. BLM VRM Visual Resource Contrast Rating Classifications

Class	Dominance	Description
I	Not noticeable	The change would generally be overlooked.
II	Noticeable	Visually subordinate; change is subtle but noticed by most without being pointed out.
III	Distracting	Visually co-dominant; change competes strongly for attention and is equally conspicuous with other features.
IV	Dominant	Demands attention; change to landscape is the focus of attention and becomes the primary focus of the viewer.

Source: BLM, no date-b

4.10.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, no CFB coal-fired power plant would be constructed at either the Salem or Industrial Park sites. In addition, no 230-kV electrical transmission line interconnections would be developed in the Great Falls area. Thus, there would be no direct impacts on visual resources from the No Action Alternative.

However, SME would need to purchase power from another generation source within the Western System Coordination Council (WSCC) to meet its projected baseload needs beginning in 2008. If generation and transmission capacity have to be expanded to meet a general growth in load to which SME would contribute, SME would be contributing indirectly and incrementally to the impacts on scenic resources that occur at other locations in the Rocky Mountain West and Pacific Northwest.

4.10.2 PROPOSED ACTION – HGS AT THE SALEM SITE

In Section 3.9.2, BLM's VRM Visual Resource Inventory classified the aesthetic resources at the Salem site as III. Class III visual resources are considered to have moderate scenic values. Figures 4-8 and 4-9 are rough photo-simulations of the Salem site before and after the HGS is placed on the site. From these, it is evident that the Visual Resource Contrast Rating would be Class IV – dominant (demands attention; change to landscape is the focus of attention and becomes the primary focus of the viewer).

Figure 4-8. View of Salem site Looking South without HGS

Figure 4-9. View of Salem site Looking South with HGS power plant (proposed wind turbines not visible in this photo-simulation)

Thus, at the Salem site itself, the Proposed Action would entail a large visual change to a scenic setting of moderate value. Figure 4-10 depicts the viewshed of the HGS at the Salem site; that is, it shows those areas from which the 400-ft. high power plant stack and wind turbines would be visible. This figure shows that the power plant would be visible from most, but not all, of the Great Falls Portage National Historic Landmark. It would not be visible from the south and east banks of the Missouri River, nor from stream and creek corridors and coulees. Figure 4-11 represents the HGS and wind turbines, to scale, within the NHL and in the context of other major landscape features, such as Belt Creek, the Missouri River, and the Highwood Mountains.

Figure 4-12 depicts a simplified rendition of the HGS and wind turbines, once again to scale, from the Staging Area interpretive site approximately 1.25 miles north of the proposed plant. As is evident, the proposed facility would have a pronounced effect on the viewshed; however, as Figure 4-13 shows, the existing view from this vantage point is not pristine. In particular, power poles are much in evidence. Finally, Figure 4-14 is the existing view north from the staging area toward the confluence of Belt Creek and the Missouri River; however, this existing view would remain the future view as well, even after implementation of the Proposed Action. In other words, the view north towards the Missouri – arguably a more important view than the view south across a rolling, cultivated plateau, because of the historic portage from the river commemorated by the NHL – would not be impinged upon by the Proposed Action.

The VRM methodology and criteria can also be applied to the two transmission interconnections that would also be constructed to carry electricity to the grid from the HGS. The electrical wires would be supported by monopoles, which are less visually obtrusive to most people than multiple-pole (usually two and three-pole structures with 230-kV lines) transmission towers. In the less developed eastern areas (closer to the Salem site), which the interconnections would traverse, scenic values are somewhat higher because the landscape is relatively open and less cluttered with existing transmission lines, communications towers, and other conspicuous structures. As the proposed interconnections continue west and approach the Great Falls-Broadview Tap Switchyard and the Great Falls Switchyard, respectively, they would converge with other existing transmission lines and enter an area in which the scenic value is already compromised by the presence of numerous, prominent structures, primarily existing power lines.

Thus, in the eastern portion of the proposed transmission routes, the impact would consist of a noticeable (Class II) change to a scenic setting of moderate value. In the westernmost portions of the proposed transmission routes, impacts would consist of a noticeable (Class II) change to a scenic setting of low value.

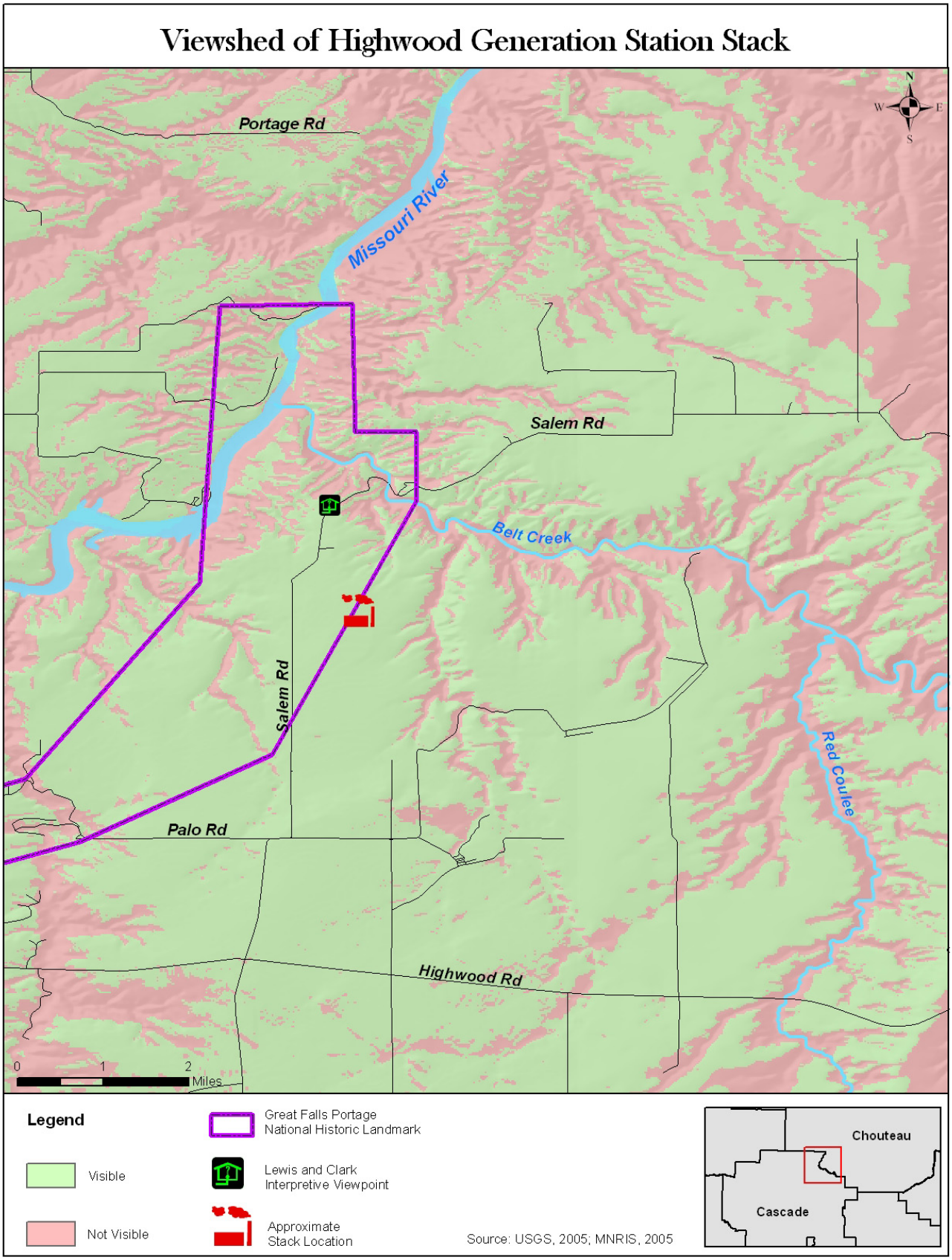


Figure 4-10. Viewshed of the HGS at the Salem Site

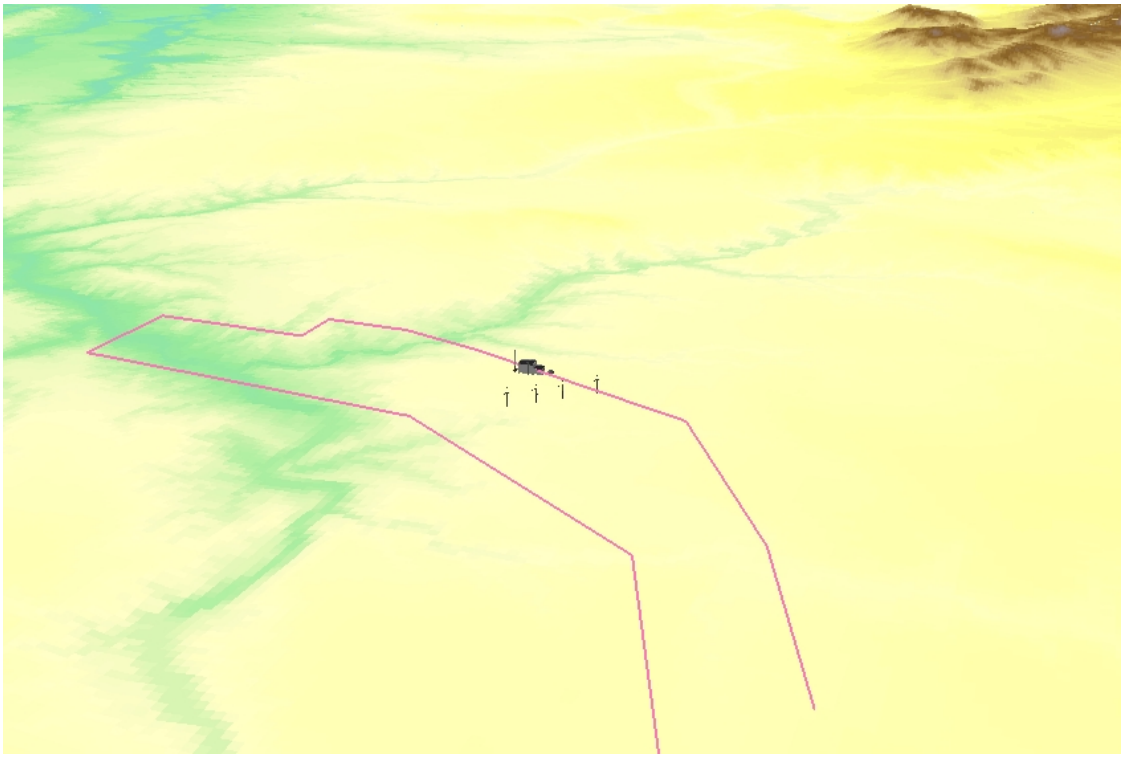


Figure 4-11. View Southeast toward Great Falls Portage NHL depicting HGS and other Landscape Features to Scale, including Missouri River, Belt Creek and Highwood Mountains

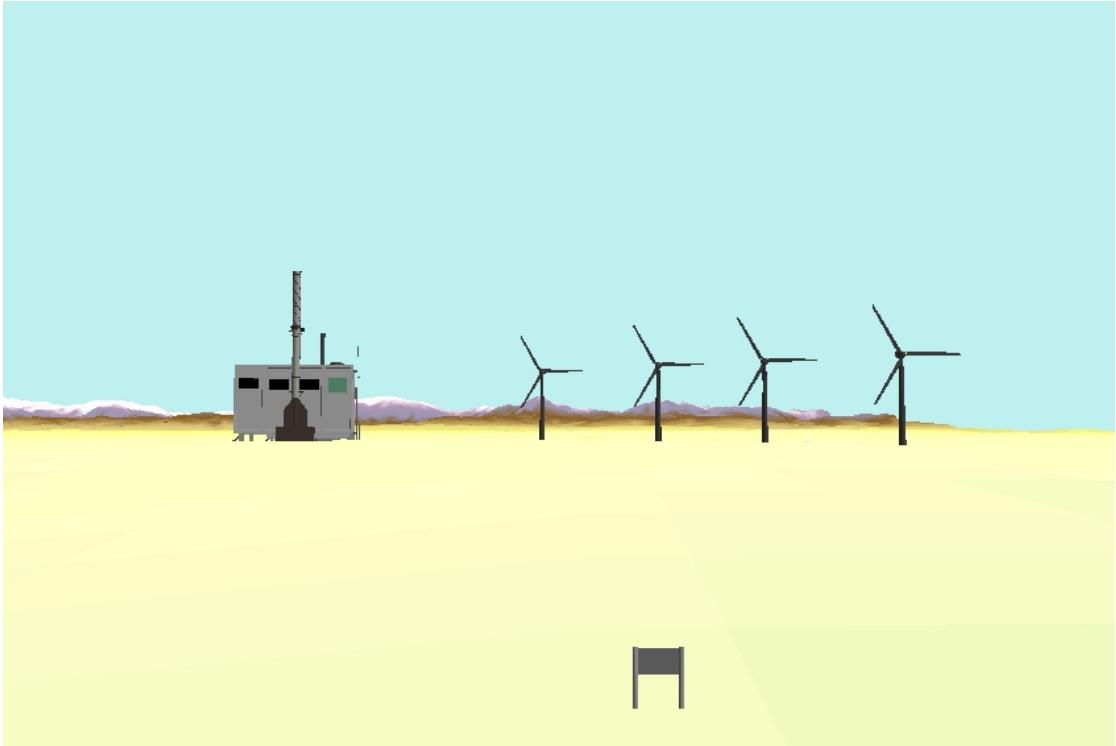


Figure 4-12. Simplified Rendition of View from Portage Staging Area Site south toward HGS (to scale) and Little Belt Mountains in Background

Figure 4-13. December 2005 View from Great Falls Portage Staging Area looking south toward proposed HGS Site (Salem site)

Figure 4-14. View from Great Falls Portage Staging Area looking north toward Confluence of Missouri River and Belt Creek (December, 2005)

4.10.3 ALTERNATIVE SITE – INDUSTRIAL PARK SITE

In Section 3.9.2, BLM's VRM Visual Resource Inventory classified the aesthetic resources at the Salem site as IV. Class IV visual resources are rated as having low scenic values. While no photo-simulation has been made of the Industrial Park site, the Visual Resource Contrast Rating would likely be Class III – distracting (visually co-dominant; change competes strongly for attention and is equally conspicuous with other features). The generating station would be co-dominant rather than dominant because of the existing presence of the large IMC malt plant and other development nearby. Thus, at the alternative Industrial Park site, the proposed generating station would entail a moderate visual change to a scenic setting of low value.

The taller structures within the generating station, especially the 400-ft. high stack, would be visible from much of the Great Falls area (Figure 4-16), including from certain scenic overlooks above the Missouri River, such as along the River's Edge Trail and the Lewis and Clark Interpretive Center. The IMC malt facility is conspicuous at present, as are other structures in the vicinity to the north of the river. The generating station, if built and operated, would be visible to the left (west) of the IMC plant. It would become one of the two dominant manmade features north of the river.

The same methodology and criteria can be applied to the two transmission interconnections that would also be constructed to carry electricity to the grid from the Industrial Park site. As in the case of the Proposed Action, the electrical wires would be supported by monopoles. As described previously, in the vicinity of the Industrial Park site and Great Falls Switchyard, the proposed interconnections would be built in an area in which the scenic value is already compromised by the presence of numerous, prominent structures, especially existing power lines. Thus, impacts would consist of a noticeable (Class II) change to a scenic setting of low value.

Because the Industrial Park site is already bordered by development and large manmade structures, and zoned for more of the same, whereas the Salem site rests in a rural setting within a National Historic Landmark, siting the power plant at the Industrial Park would have less of an adverse impact on visual resources than at the Salem site.

4.10.4 CONCLUSION

There would be no direct impacts on visual resources from the No Action Alternative. However, by making power purchase, SME may contribute indirectly and incrementally to the impacts on scenic resources that occur at other locations in the Rocky Mountain West and Pacific Northwest.

Using the impact significance definitions described at the beginning of Chapter 4 and presented for "Alter Scenic Quality" in Appendix J, the visual impacts of the Proposed Action would be of major magnitude, long-term duration, and small extent, and with a probable likelihood of occurring. Overall then, the rating for visual impacts from the Proposed Action would be significant and adverse.

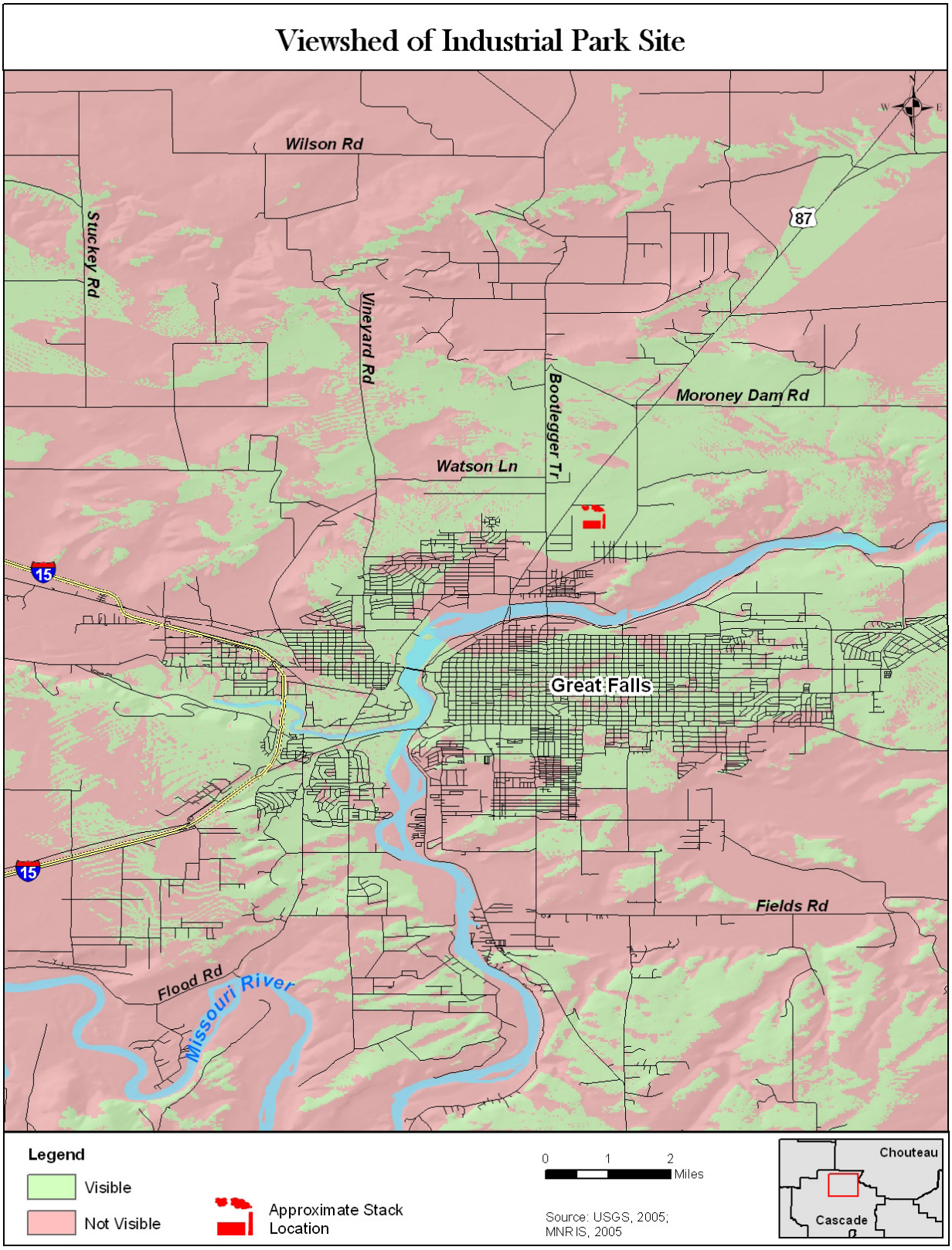


Figure 4-15. Viewshed of the SME Generating Plant at the Industrial Park Site*

- viewshed does not take into account the buildings in Great Falls, which would obstruct the views of the stack from town

The alternative Industrial Park site would have scenic impacts of moderate magnitude, long-term duration, and medium or localized extent, and have a probable likelihood of occurring. The overall rating for visual impacts from the alternative Industrial Park site would be adverse, but while impacts would most likely be non-significant, there is some potential for the impacts to become significant.

4.10.5 MITIGATION

Implementing mitigation measures to reduce visual resource impacts would be more important at the Salem site than the Industrial Park site, because the former has scenic resources of greater value. The following measures are examples of steps that can be taken to diminish visual impacts from constructing a generation station, appurtenant facilities, and transmission line interconnections at either site (BLM, no date-b):

1. Minimize the Number of Visible Structures.
2. Minimize Structure Contrast. Consider:
   a. using earth-tone paints and stains.
   b. using cor-ten steel (self-weathering).
   c. selecting paint finishes with low levels of reflectivity (i.e., flat or semi-gloss).
3. Redesign Structures that do not Blend/Fit. Consider:
   a. using rustic designs and native building materials.
   b. using natural appearing forms to complement landscape character (use special designs only as a last resort).
   c. relocating structure.
4. Minimize Impact of Utility Crossings of Roads.* Consider:
   a. making crossings at right angles.
   b. setting back structures at a maximum distance from the crossing.
   c. leaving vegetation along the roadside.
   d. minimizing viewing time.
   e. utilizing natural screening
5. Recognize the Value and Limitations of Color. Consider:
   a. that color (hue) is most effective within 1,000 feet (305 m). Beyond that point color becomes more difficult to distinguish and tone or value determines visibility and resulting visual contrast.
   b. that using color has limited effectiveness (in the background distance zone) in reducing visual impacts on structures that are silhouetted against the sky.
   c. painting structures somewhat darker than the adjacent landscape to compensate for the effects of shade and shadow.
   d. selecting color to blend with the land and not the sky.

* Most of this set is more applicable in areas covered with forest rather than the open range and prairie characteristic of the Great Falls area.

In addition, the selective planting of trees and shrubs in certain locations may help screen views of the facility.

4.11 TRANSPORTATION

Impacts from the proposed HGS at the Salem or Industrial Park sites on transportation and traffic could potentially occur during both the construction and operational phases of the Proposed Action. These impacts would be related to the transport of materials, supplies and equipment to the site during the construction phase, long-term transport of raw materials, primarily coal and limestone, during operation of the generating station, and the commutes of workers to and from the site both during construction and operation.

Both roads and railroad would be used to transport materials and equipment during construction. While the total number of truck or train trips needed to import materials to either the preferred or the alternative site over a period of 2-3 years is not known, in general the potential problems presented by construction traffic would not be the sheer volume, but slower speeds than normal traffic, road damage from heavy loads, and materials dropping onto roads, typically dirt being removed from construction sites in dump trucks, and road damage from heavy loads. Though somewhat lengthy in duration, these factors could still be considered localized, minor impacts at either site.

During construction, an average of 300 to 400 workers at any one time (with an estimated peak of 550) would be working in the area of the site and a number of these would be commuting to it, though an undetermined number may stay on the site in RVs or campers. In addition, an undetermined percentage of workers would car-pool with fellow employees in their commute. For the purpose of this analysis, the worst case scenario of 650 vehicles each making two trips per day (or 1,100 ADT) is assumed. Around the country, the construction workday typically starts at 7 a.m., earlier than the average start time for most workers. This would have the effect of distributing total daily trips along routes traversed to construction sites across a wider number of hours and thus would reduce traffic flows, and therefore traffic congestion, during peak commuting times.

Over the long term, during the decades-long operation of the facility, approximately 50-60 workers would commute there on a daily basis. Two trainloads a week of coal would be delivered to the plant along the proposed rail spur from one of the BNSF railways in the Great Falls area.

Transportation of ash at the Salem site would be done on internal roadways in 50 ton trucks at about 5 truckloads per day. Transportation to an off-site disposal facility required at the Industrial Park site would require the use of road-worthy trucks. These trucks typically carry no more than 30 tons each. Ash transportation would require approximately 8 round trips per day to the selected disposal site.

4.11.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, no power plant or wind turbines would be constructed at either the Salem or Industrial Park sites to meet SME's projected base load needs. Rather, SME would purchase electricity from existing generation sources in the Northern Rockies or Pacific

Northwest, which could be a mix of large-scale hydro, natural gas, coal, nuclear, and to a smaller extent, wind, solar, and other renewables. Under this alternative, during the immediate future, traffic volumes and road conditions in the vicinity of both the Salem and Industrial Park sites would be expected to remain much as they are at present. Over time, if current demographic and growth trends hold into the future, traffic volumes at the Industrial Park site would be expected to increase gradually.

The No Action Alternative would not contribute directly to transportation impacts at either the Salem or Industrial Park sites. However, by purchasing an equivalent amount of power from generation sources elsewhere, SME would be contributing indirectly to ongoing transportation impacts at existing generating stations in the region. To the extent that expanding demand for electricity in the wider region drives construction of new generating facilities elsewhere, SME would thus be contributing indirectly to any transportation impacts associated with construction and operation of those facilities.

4.11.2 PROPOSED ACTION – HGS AT THE SALEM SITE

4.11.2.1 Construction

Under the Proposed Action, SME and its contractors would maintain existing aggregate roadways to be used for construction access. They would regrade and place additional aggregate on the existing roadways at the end of the construction period. A 1,800-ft (545 m) long paved access road into the site would be constructed and maintained from the existing Cascade County road, Salem Road. SME and its contractors would also construct and maintain an additional 6,600 feet (2,000 m) of paved internal roadways to facilitate plant construction and operations. These on-site, paved roads would be aggregate-based during construction and would be paved upon completion of heavy construction. This internal road construction would take six months and would require 100 to 150 workers, including heavy equipment operators and mechanics, laborers, concrete finishers, surveyors and others. Construction equipment to be used would consist of bulldozers, backhoes, earth scrapers, motor graders, heavy haul trucks, large tractors, concrete trucks, asphalt pavers, concrete pavers, rollers, compactors and others.

From Great Falls, plant access would be from southbound U.S. Route 87/89 to eastbound State Route 228 (referred to as SR 228 or Highwood Road) to northbound Salem Road, thence to the site. Under this alternative, over the short term, during the 2-3 year busiest construction period, the combined ADT of Salem Road would increase considerably, jumping from 36 to a peak of about 1,340. Most of the traffic would occur early in the morning and mid- to late afternoon when workers are arriving at and departing the construction site. At other times – most of the morning, mid-day, evening, and nighttime – traffic would be relatively minimal, except for occasional truck traffic. Thus, during both the morning and afternoon commutes, a peak of approximately 550 vehicles per hour could be entering and exiting the construction site for a short duration. According to the *Highway Capacity Manual* of the Transportation Research Board of the National Research Council, this traffic volume would represent an LOS of B (see Table 3-26 in Section 3.9.1 for a description of LOS B). That is, there would be "stable flow, but presence of the users in [the] traffic stream becomes noticeable." Both commuters to the project and existing residents who venture out during busiest traffic periods could potentially face

generally minor delays and inconvenience. The greatly increased flow of traffic on the aggregate Salem Road would create plumes of fugitive dust, which could potentially constitute a minor annoyance or inconvenience for the few nearby residents and local motorists.

On the Highwood Road (SR 228), the ADT would go from 549 to potential maximum of approximately 1850. Unlike the Salem Road, SR 228 is paved, so that even though both are one-lane each direction, it can accommodate greater traffic flow. Traffic impacts on the subject segment of SR 228 would be comparable to those along the Salem Road: LOS should not degrade to below B or C even during early morning and mid-afternoon commute times.

The potential for increased accidents is addressed in Section 4.15.2.1.

Construction of the rail spur line to the Salem site from the existing BNSF rail line approximately 6.2 miles south of the project site near Fife would have a minor, short-term impact on existing rail and road facilities. The preferred railroad alignment intersects SR 228. The State of Montana would likely require that the railroad be grade-separated from the existing highway. To do so would require construction of a new roadway bridge, and reconstruction of approximately 5000' (almost a mile) of highway pavement. Roadway construction and maintenance as required providing site access is controlled in part by the route selected for the railroad spur. The minimum width of the Right-of-Way for the construction and operation of the rail spur is 160 feet (50 m) on level terrain and could extend to 400 feet (123 m) depending on the depth of cut or fill in the terrain.

4.11.2.2 Operation

During the long-term operation of the HGS, traffic impacts from 50-60 commuting workers would be negligible to minimal. The main bulk material – coal – would be transported to the site using rail, so that impacts on road systems would be non-existent to negligible.

When tall structures like the stack or stacks associated with a coal-burning power plant, or the proposed wind turbines, are located in close proximity to an airport and might interfere with aviation, the FAA would require a study of the project's impact on navigable airspace. During the project proposal stage, the FAA requires the filing of FAA Form 7460-1, Notice of Proposed Construction or Alteration with the Air Traffic Division to the FAA's Central Regional Office. Before actual construction occurs, the FAA requires the filing of FAA form 7460-2, Notice of Actual Construction or Alteration to the regional office (FAA, 2004). However, because the HGS at the Salem site would be located approximately 12-13 miles from the Great Falls International Airport, this would be unnecessary. Both the stack and the wind turbines may require the placement of lights for aviation safety.

Potential impacts of the Proposed Action on rail transport could hypothetically include congestion and the concomitant need for expanded capacity to accommodate delivery of coal by rail to the HGS. On behalf of SME, Stanley Consultants inquired with Burlington Northern Santa Fe Railroad, owner/operator of the nearest tracks to the Salem site. During these conversations, BNSF commented positively about the proposed route and was not concerned that the HGS could cause congestion on existing railways that it would use (Walters, 2006).

The new delivery route would transport coal northwest from the Spring Creek – Decker area to the Great Falls area. BNSF stated that current congestion is south and east from the Powder River Basin. Therefore, the approximate two train loads of coal per week from the Spring Creek – Decker area to HGS would not contribute to current or future projected congestion and would actually help BNSF (i.e., revenues would grow and no infrastructure investments would be needed for this delivery).

4.11.3 ALTERNATIVE SITE – INDUSTRIAL PARK SITE

4.11.3.1 Construction

If the alternative site were to be used, SME and its contractors would maintain existing aggregate roadways to be used for construction access across the Industrial Park. They would regrade and place additional aggregate on these existing roadways at the end of the construction period. SME and its contractors would also construct and maintain all paved internal roadways to facilitate plant construction and operations. These on-site, paved roads would be aggregate-based during construction and would be paved upon completion of heavy construction. As with the Salem site, this internal road construction would take approximately six months and would require 100 to 150 workers, including heavy equipment operators and mechanics, laborers, concrete finishers, surveyors and others. Construction equipment would consist of bulldozers, backhoes, earth scrapers, motor graders, heavy haul trucks, large tractors, concrete trucks, asphalt pavers, concrete pavers, rollers, compactors and others.

From Great Falls, plant access would be from northbound U.S. Route 87. Under this alternative, over the short term, during the several year construction period, the combined ADT of the U.S. 87 would increase notably, going from 7,718 to a peak of just over 9,000. Most of the project-related traffic would occur early in the morning and mid- to late afternoon when workers are arriving at and departing the construction site, largely avoiding typical morning and evening rush hours for Great Falls. At other times – most of the morning, mid-day, evening, and nighttime – construction-related traffic would be relatively minimal, except for occasional truck traffic. Thus, during both the morning and afternoon commutes, a peak of approximately 550 vehicles per hour could be entering and exiting the construction site. The volume of traffic on U.S. 87 between the off-peak hours of 6 and 7 a.m. and 3 and 5 p.m. is unknown (Combs, 2006), but assuming it is 5% of the ADT for each of these hourly periods, then about 400 vehicles in both directions would be transiting this segment during each of these hours without the power plant construction traffic. Adding 650 vehicles of construction-related traffic would represent a total of approximately 1,050 vehicles per hour.

According to the Highway Capacity Manual of the Transportation Research Board of the National Research Council, 1,050 vehicles per hour would represent an LOS of between B and C (see Table 3-23 in Section 3.9.1 for a description of LOS B). That is, traffic movement would be somewhere between “stable flow, but presence of the users in [the] traffic stream becomes noticeable” (LOS B) and, “stable flow, but operation of single users becomes affected by interactions with others in traffic stream” (LOS C). Both commuters to the project and existing residents who venture out during busiest traffic periods could potentially face generally minor delays and inconvenience.

For this alternative, whether a new rail spur is necessary, or whether the power plant could utilize the existing rail spur to the IMC malt plant, is unknown at this time. No specific route for the possible construction of a rail spur line to the Industrial Park site from the existing, nearest BNSF rail line has been identified, as in the case of the Salem site. However, based on what is known of transportation infrastructure in the surrounding area and the nature of such construction, it would likely have a minor, short-term impact on existing rail and road facilities.

4.11.3.2 Operation

During the long-term operation of the HGS, traffic impacts from 50-60 commuting workers along the U.S. 87 corridor would be negligible to minimal. Up to eight truckloads of ash may have to be hauled on the highway daily, depending on the disposal site selected. The main bulk material – coal – would be transported to the site using rail, so that impacts on road systems would be non-existent to negligible. There would be some potential for an increase in rail traffic in Great Falls causing minor traffic delays at street crossings, but one train per day would constitute a minor impact at most.

As stated above in Section 4.11.2.2, when tall structures like the stack or stacks associated with a coal-burning power plant are located in close proximity to an airport, the FAA would require a study of the project's impact on navigable airspace. However, because the Industrial Park site is located approximately four miles from the Great Falls International Airport, this would probably not be necessary. The stack would likely require aviation safety lights, however.

Potential impacts of the alternative site on rail transport would essentially be the same as with the Proposed Action. These could hypothetically include congestion and the concomitant need for expanded capacity to accommodate delivery of coal by rail to the HGS. However, as noted in the case of the Proposed Action, Stanley Consultants' inquiry with BNSF indicated that the railroad owner/operator was not concerned that this project could cause congestion on existing rail routes that it would use (Walters, 2006).

4.11.4 CONCLUSION

The No Action Alternative would not contribute directly to transportation impacts at either the Salem or Industrial Park sites. However, by purchasing an equivalent amount of power from generation sources elsewhere, SME would be contributing indirectly to ongoing transportation impacts at existing generating stations in the region. To the extent that expanding demand for electricity in the wider region drives construction of new generating facilities elsewhere, SME would thus be contributing indirectly to any transportation impacts associated with construction and operation of those facilities.

Using the impact significance definitions described at the beginning of Chapter 4 and presented for "Traffic Congestion" in Appendix J, construction-related impacts on traffic from the Proposed Action would be of minor magnitude, medium-term duration, and small extent, and have a probable likelihood of occurring. The overall rating for impacts on traffic congestion from the Proposed Action would be non-significant and adverse. There would be no appreciable construction-related impacts on air transportation in the Great Falls area from construction at the

Salem site. There would be minor, temporary construction-related impacts on rail transport on the BNSF line to which a rail spur would connect; coordination between SME and BNSF would minimize any disruption of service or transport. Over the long term, during operation of the proposed HGS, impacts on road, rail and air transportation would be generally negligible.

Construction-related impacts of the alternate site – the Industrial Park site – would be comparable to those of the Proposed Action. Temporary construction-related impacts on roads, traffic and rail would be greater than long-term operational impacts, and although they would be adverse, they would generally be minor and not-significant.

4.11.5 MITIGATION

Mitigation would consist of standard measures used to minimize traffic congestion and damage to public roads during large construction projects. This would include appropriate signage to alert motorists approaching turnoffs to the construction site from both directions at distances of approximately 200 to 400 yards. If temporary detours and/or street closures would be necessary at any location, road crews and signs would safely and efficiently redirect oncoming traffic to the detour. Any material, such as dirt, falling from trucks would be removed promptly so as not to present a traffic hazard. Any damage to road surfaces from heavy equipment movement would also be repaired promptly.

4.12 FARMLAND AND LAND USE

4.12.1 NO ACTION ALTERNATIVE

The No Action Alternative would not adversely affect or alter existing land uses at or near the Salem site or the Industrial Park site. The Salem site would continue to be maintained in agricultural production and the Industrial Park site would continue to be open space.

Insofar as SME would need to meet energy supply needs in the service area by purchasing power from existing generation wholesale suppliers located elsewhere, SME could potentially be contributing indirectly to ongoing farmland and land use impacts where other suppliers have developed highly valued farmland and converted it to industrial uses at different generating stations in the region or at potentially new generating stations located outside of the region.

4.12.2 PROPOSED ACTION – HGS AT THE SALEM SITE

Impacts to farmland and land use can either be direct or indirect. Direct impacts include the actual conversion or alteration of land use in a specific area caused by physical changes in the land, and indirect impacts include those that can change or alter land uses on adjoining properties or in the region, and are caused by social, economical, or ecological changes associated with the power plant. Direct impacts, the actual physical conversion or alteration of land in order to make the plant operation-ready, would be captured under the construction subsection. Indirect

impacts, those caused by the influence the power plant could have on adjacent area land uses, would be captured under the operation subsection.

4.12.2.1 Construction

The area of land that would be directly impacted and/or altered by the construction of the power plant at the Salem site includes the footprint of the power plant, and the roadways, rail lines, and utility corridor zones required to make the plant operation-ready. Specifically, the power plant would require the construction of the following elements:

- The power plant and associated facilities on a total footprint of approximately 545 acres (221 ha);
- A 1,800-foot long paved access road from the existing Cascade County road (Salem Road) into the site;
- A 6.3-mile railroad spur, extending south from the plant and tying into an existing main line track that is located three miles south of the city of Great Falls;
- Two short segments of electrical transmission line with new 100-foot rights-of-way; the first line would be approximately 4.1 miles long and would extend from the plant site to a new switchyard site proposed for a location south and west of the Salem site, while the second line would be approximately 9.21 miles in length and would extend south and west from the plant site, across the Missouri River north and east of Cochrane Dam;
- A raw water supply system which would include a collector well extending into the Morony Reservoir and associated water intake pipelines extending approximately two miles to the plant site;
- 55,000 feet (16,800 m) feet of fresh potable water supply and waste water pipelines from the power plant to the City of Great Falls water and sewer lines; and
- The installation of two nearly 400-ft (121-m) tall wind turbines that would be used to supplement power from the generating station.

The footprint of the power plant and all lands adjacent where construction would take place are currently agricultural lands. No homesteads would be moved as a result of activities, and the only structure that would be moved would be Highway SR 228, Highwood Road, which would need to be raised in order to the accommodate the new railroad spur. The conversion of agricultural lands in and of themselves, to an industrial plant with supporting facilities and infrastructure, would be considered only a minor impact, though the impact would be permanent. Because the agricultural land that would be converted is not protected farmland and does not have a significant productivity rating, the conversion of this land in context to the amount and quality of farmland in other areas of Cascade County is not considered significant.

SME would negotiate the purchase of easements with other property owners in the vicinity whose land may be required for transmission line and/or pipeline rights-of-way. Although the easements would be likely held in perpetuity, various activities would be allowed to continue in the electrical transmission right-of ways. The right-of-ways would be approximately 100 feet (30 m) across in total width, with the poles being centered at around the 50-foot (15-m) mark. Activities that would probably be able to continue in the rights-of-way include agricultural

activities, grazing, and most types of recreation. The location and presence of the right-of ways is not anticipated to affect land use in the area.

In the event that an easement or sale in fee simple cannot be obtained for a specific right-of-way, the land may be taken by eminent domain. This would involve condemning the piece of property for the "public use". In condemning the property, the landowner would be fairly compensated for the land, and the land would become publicly owned. Any activities determined to be compatible with the presence of the transmission lines can continue in condemned rights-of-way, including most types of recreation.

Construction activities could potentially cause some moderate to major indirect nuisance impacts to adjacent land owners, especially to the residents of the home located northwest of the site near where the raw water intake pipeline would be installed. Impacts such as noise, dust, and increased traffic would be moderate to major, short-term, small extent, and probable. While these nuisance impacts would affect the quality of life for nearby residents, they would not have an effect on the actual uses of adjacent land. Insulation and other noise reducing equipment, dust abatement, and restrictions on the timing of construction activities, whenever possible, would help reduce the potential construction associated impacts to area residents.

Minimal impacts would be anticipated to the farmstead located northwest of the facility, where the railroad spur line and fresh- and waste-water pipelines would be installed, as it is currently unoccupied. However, if the farmstead owners were to establish residency in the home, they could potentially be exposed to the same construction-associated impacts as described above. Impacts to residents and area visitors from facility operations, including increased traffic, railcars, noise, and light, are all discussed in their respective impact topics. The effect that all of these impacts may have on the changes in land use are discussed below, in the operations section.

If the Salem site were to remain unincorporated county land, the county could issue a special use permit for the plant in order to allow it to operate on agriculturally zoned land. In order to issue the permit, the county would hold a pre-application meeting, generate a staff report where it identifies potentially contentious issues, and then hold public hearings on the project. At the end of the hearing, a final decision would be made. If the decision were made to allow the project to operate on agriculturally zoned lands, and the permit would be issued, potentially with conditions. These conditions could involve requirements for such mitigations as additional landscape buffers, road maintenance/upgrades, noise abatement, and security fencing (Clifton, 2006).

If the site remained as county land, it would be ineligible to hook up to the City of Great Falls municipal water and sewer systems. The site would have to import bottled water for a potable drinking water source, drill a well, or install a treatment system in order to use diverted Missouri River water as the drinking water source for the plant. Additional land would have to be developed into septic fields in order to treat human wastes. The wastewater generated from plant operations would have to be discharged into the Missouri River, possibly traveling through an industrial wastewater treatment system first. While all these activities could create large impacts to water resources, there would be no additional impacts to land use.

If the Salem site were to become annexed into the city, and thus incorporated, it would hook up to the city sewer and water lines which would lessen the impacts to water resources, as discussed in under water resources, Section 4-4. However, in addition to annexing the Salem site, a corridor extending out to the site from current city land would have to be annexed. This corridor would include the location of city's utility lines, which would be installed from the west side of Malmstrom Air Force Base, where the city utility lines currently end, out to the site (Walters, 2006).

The preferred method of annexation is to annex the land in question prior to the application of any city/county permits, so that the responsible local governing body has jurisdiction of the site's permits. Thus, if the Salem site were to be incorporated, it would apply for annexation prior to the commencement of construction activities. The steps for annexing county land into city land are outlined in the box below.

GENERAL PROCEDURES FOR LAND ANNEXATION

1. Potential applicant discusses feasibility of annexation, annexation requirements, City zoning, general procedures and time frame with Planning staff followed by a pre-application conference, if appropriate.
2. Applicant is encouraged to visit with surrounding property owners and representatives of the neighborhood council in which the annexation is located to present the project and solicit input.
3. Applicant submits formal annexation and zoning petitions, initial fees and preliminary site plans and engineering documents to Planning Office.
4. Planning staff transmits necessary materials and information to review officials.
5. "Zoning Notice of Public Hearing before Planning Board" is published in Tribune at least 15 days prior to hearing.
6. Planning staff mails copy of public hearing notice to all property owners within 150 feet radius of area requested to be annexed and zoned.
7. Planning staff works with applicant and review officials to develop final annexation requirements and prepares report and recommendation to Planning Board.
8. Planning staff posts public hearing notice sign on property requested to be annexed and zoned.
9. Planning Board holds public hearing and arrives at a recommendation.
10. Applicant submits:
    - Final engineering drawings;
    - Agreement containing terms and conditions for annexation;
    - Payment of applicable fees;
    - Financial guarantee;
    - Any other documents required as a condition of approval.
11. Planning staff provides final documents to appropriate officials for review and approval.
12. Planning staff prepares a resolution of intent to annex and a zoning ordinance, and submits them to City Commission.
13. City Commission adopts resolution of intent to annex and accepts zoning ordinance on first reading and sets date for public hearing.
14. Notice of public hearing is published in *Tribune* for two successive weeks with first publication at least 20 days prior to hearing.
15. Planning staff submits Board recommendation, annexation agreement, and related documents to City Commission.
16. City Commission conducts public hearing for final annexation resolution and zoning ordinance, acting on each separately, together with the annexation agreement and any related documents.

Source: Great Falls City-County Planning Board; January, 2000.

Once annexed into the city, the city would establish zoning on the land. Zoning for a coal burning power plant would most likely be category I-2: heavy industry, which permits the operation of major electrical installations (Walters, 2006).

It is possible that objections could be raised to the annexation of the Salem site and its utility corridors, especially from the county. A main concern is anticipated to be the potential changes in land use surrounding the plant area, due to the city's infrastructure extending six miles east of the city, and the heavy industry zoning that would be established at the plant. These impacts are all associated, indirect impacts caused by the influence of the power plant and will be discussed in the operation subsection below.

4.12.2.2 Operation

The operation of the power plant would cause no additional direct impacts to land use or farmland. No additional amounts of land would be developed for the plant once the construction phase is completed. However, the presence, influence, and impacts of the power plant and its associated support facilities could all indirectly influence land uses on adjoining or nearby properties in the vicinity of the site.

The power plant at the Salem site would be an industrial facility situated amidst agricultural lands. The siting of the plant, and the reliable infrastructure and possible cogeneration energy that would be available in this area once the plant is operational, could well attract additional business to the surrounding area, particularly those industries requiring high energy inputs or power plant byproducts as inputs. The possibility of cogeneration, using waste heat from the power plant, is attractive to certain kinds of industries. Ethanol refineries, concrete manufacturers, and wallboard companies are examples of firms that would benefit from being located immediately adjacent to a power plant.

Additionally, impacts associated with air quality, noise, visual resources, and traffic would all potentially decrease the quality of life for area residents downwind of the facility or adjacent to transportation routes. Though these impacts are all discussed in their respective sections, they could potentially cumulatively affect one particular area and be perceived as adverse enough to residents that they would choose to relocate. While the relocation of any residents would not cause a land use change in of itself, land put up for sale in the area may be attractive to an industrial developer. The addition of any industry would perpetuate the impacts of decreasing the quality of life for residents of this rural agricultural area, and over time this cycle could continue and the predominant land use in the area could change from being primarily farmland to being primarily industrial land.

While increased industrialization of the area in the vicinity of the Salem site is a possibility, it is a possibility fraught with many uncertainties. It is also a trend that could either be perpetuated or stopped by both the county and city Planning Boards. Regardless of whether or not the Salem site stays as county land or becomes annexed into the city, all adjacent and surrounding lands would remain zoned for agriculture. Any new industry would have to obtain either a land use permit or a zoning change for the area of interest, which would involve public hearings and planning board approval. Notwithstanding that, the development of the Salem site in and of

itself may reduce the property values of nearby rural, agricultural land, with repercussions on land assessments and property taxes. If they occur, these impacts would be very localized and the actual land uses of surrounding properties are not anticipated to be significantly affected.

4.12.3 ALTERNATIVE SITE – INDUSTRIAL PARK SITE

4.12.3.1 Construction

The area of land that would be directly impacted and/or altered by the construction of the power plant at the Industrial Park site includes the footprint of the power plant, and the roadways, rail lines, and utility corridor zones required to make the plant operation-ready. Specifically, the power plant would require the construction of the following elements:

- The power plant and associated facilities on a total footprint of roughly 300 acres (121 ha);
- A 5-mile railroad spur, beginning north of the Missouri River and extending west to the plant site;
- At least one short segment of electrical transmission line with new 100-foot rights-of-way, extending from the site one mile east to the Great Falls switchyard site;
- A raw water supply system which would include a collector well extending into the Morony Reservoir and associated water intake pipelines extending approximately 17 miles to the plant site; and
- Fresh potable water supply and waste water pipelines of undetermined length from the power plant to the City of Great Falls water and sewer lines.

The footprint of the power plant and many of the lands adjacent to the areas where construction would take place are currently agricultural or open space lands. Some adjacent areas are industrial, and to the southwest and southeast of the site there are low-density residential lands. No homesteads or structures would be moved as a result of construction activities. The conversion of agricultural lands in of themselves, to an industrial plant with supporting facilities and infrastructure, would be considered a minor impact. Land that would be developed includes a minor amount of land that is classified as agricultural land of statewide importance, an additional minor amount of land with no designation, and a majority of land that is protected as prime farmland only if it is irrigated cropland. Much of this land is generally of good quality for agricultural uses according to the land evaluation productivity rating. However, the development and conversion of this land is considered not significant because the area is not actively irrigated or cultivated, is located next to several industrial developments, and is a very small amount of farmland in context with other areas of Cascade County.

Most activities in the area would be allowed to continue in the electrical transmission right-of ways, as described under the Salem site. Construction activities could potentially cause some moderate indirect nuisance impacts to adjacent land owners. However, these nuisance impacts would not have an effect on the actual uses of adjacent land. Because the site would be situated next to another major industrial facility, the IMC plant, these impacts would be considered an adverse incremental impact to the quality of life for residents, but one that is not significant.

The Industrial Park site is currently located on unincorporated county land, but there is an almost certain probability that it would be annexed into the city if the plant were to be constructed on the site (Clifton, 2006). The IMC plant, located approximately one half mile southwest of the site, is located on annexed, or incorporated, city land. The city municipal sewer and water lines currently run to the IMC plant.

The preferred method of annexation is to annex the land in question prior to the application of any city/county permits, so that the responsible local governing body has jurisdiction of the site's permits. The Industrial Park site would follow the same steps for applying for annexation into the city as outlined for the Salem site. Once annexed into the city, the city would establish zoning on the land. The zoning for the coal burning power plant would most likely be category I-2: heavy industry, which permits the operation of major electrical installations (Walters, 2006).

It is anticipated that there may be fewer objections raised to the annexation of the Industrial Park site than to the Salem site. The Industrial Park site is located closer to the current city boundaries (about a half-mile compared to six miles for the Salem site), and adjacent land is already industrialized. However, because of the proximity of the Industrial Park site to the city and to a greater amount of residential and developed areas, there exists a greater potential for user conflicts and impacts from the plant, as discussed in the operation subsection below.

4.12.3.2 Operation

The operation of the power plant would cause no additional direct impacts to land use or farmland. No additional amounts of land would be developed for the plant once the construction phase is completed. However, the presence, influence, and impacts of the power plant and its associated support facilities could all indirectly influence land uses on adjoining or nearby properties in the vicinity of the site.

The greater proximity of residential areas and other businesses to the Industrial Park site could potentially create more conflicts than at the Salem site. And while there may be more competing interests, and many more receptors for potential impacts from plant operations, the actual influence that a power plant could exert on nearby land development would be less at the Industrial Park site than at the Salem site. Because there is much more land in the vicinity of the Industrial Park site that has been developed, additional industrial growth would be under greater public scrutiny, pressures, and land constraints.

The development of the Industrial Park site in and of itself may reduce the property values of nearby agricultural or residential land, with repercussions on land assessments and property taxes. These impacts will be localized and the actual land uses of surrounding properties are not anticipated to be significantly affected.

4.12.4 CONCLUSION

The No Action Alternative would not adversely affect or alter existing land uses at or near the Salem site or the Industrial Park site. The Salem site would continue to be maintained in agricultural production and the Industrial Site would continue to be open space.

Insofar as SME would need to meet energy supply needs in the service area by purchasing power from existing generation wholesale suppliers located elsewhere, SME could potentially be contributing indirectly to ongoing farmland and land use impacts where other suppliers have developed highly valued farmland and converted it to industrial uses at different generating stations in the region or at potentially new generating stations located outside of the region.

The construction of a power plant at either the Salem or the Industrial Park site would involve the direct conversion of agricultural lands to an industrialized facility with supporting infrastructure. No homesteads or residences would be moved under either alternative. In the context of the amount of quality farmland in other areas of Cascade County, the actual conversion, or development, of the land required for the plant, impacts would be of minor magnitude, long-term duration, medium extent, and have a probable likelihood of occurring. The overall rating for impacts on land use from the construction phase of the power plant would be adverse, and while impacts would most likely be non-significant; there is some potential for impacts to become significant at both sites.

The operation of the power plant at the Salem site would cause no additional direct impacts to land use or farmland. However, the influence and impacts of the power plant and its associated support facilities could indirectly influence land uses on adjoining or nearby properties in the vicinity of the site. The impacts associated with operating the plant could potentially cumulatively affect one particular area and be perceived as adverse enough to residents that they would choose to relocate. Over time this cycle could continue and the predominant land use in the area could change from being primarily farmland to being primarily industrial land.

Additionally, the development of the Salem site in and of itself may reduce the property values of nearby rural, agricultural land, with repercussions on land assessments and property taxes. These impacts would be localized and the actual land uses of surrounding properties are not anticipated to be significantly affected. The impacts on land use from the operation of a power plant at Salem would be of moderate magnitude, long-term duration, and medium extent, and have a possible likelihood of occurring. Overall, the rating for impacts at the Salem site would be adverse, and while impacts would most likely be non-significant, there is some potential for impacts to become significant.

Similar to the Salem site, the operation of the power plant at the Industrial Park site would cause no additional direct impacts to land use or farmland. Indirectly, however, the greater proximity of residential areas and other businesses to the Industrial Park site could potentially create more land use conflicts than at the Salem site. These conflicts would place greater public scrutiny, pressures, and land constraints on development at the Industrial site, reducing the influence or impact of the power plant on nearby properties when compared to the Salem site. That said, the development of the Industrial Park site in and of itself may reduce the property values of nearby agricultural or residential land, with repercussions on land assessments and property taxes. The impacts on land use from the operation of a power plant at the Industrial Park site would be of minor magnitude, long-term duration, medium extent, and have a possible likelihood of occurring. Overall, the rating for impacts at the Industrial Park site would also be adverse and non-significant; however, with this alternative as with the Proposed Action, there is some potential for impacts to become significant.

4.12.5 MITIGATION

While there are no significant impacts from the action alternatives on the actual physical land development at the sites, there are somewhat significant adverse impacts on land use from the influence and impacts of the power plant. Measures to control the impact of the plant on surrounding land uses include ensuring that adjacent lands remain zoned as agricultural lands. Any new industry interested in the area would then be required to individually obtain either a land use permit or a zoning change, in addition to all other applicable permits.

Additionally, mitigation measures taken to minimize construction and operation impacts to other resource areas (e.g. reduction in noise, visibility, and air quality impacts) would also directly lessen the impacts that could potentially decrease the quality of life for area residents to the point that residents would choose to relocate. Stemming residential relocations as much as possible by the extensive use of other mitigation measures would help prevent land use changes and conversions.

4.13 WASTE MANAGEMENT

4.13.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, no site development would occur, no waste would be generated from the sites, and no waste management would be needed at the sites. However, by purchasing power from generation sources elsewhere, SME would be contributing indirectly to ongoing waste management needs at different generating stations in the region or at potentially new generating stations located outside of the region.

4.13.2 PROPOSED ACTION – HGS AT THE SALEM SITE

The Montana DEQ's Waste and Underground Tank Management Bureau (WUTMB) regulates solid waste facilities and hazardous waste generators in Montana. WUTMB responsibilities include conducting inspections at businesses that generate hazardous waste and used oil, and at solid waste management facilities, to ensure compliance with management standards. Additionally, the WUTMB provides technical assistance for those businesses and waste management facilities to promote and maintain federal and state compliance. Tools to achieve compliance include technical reviews, licensing, certifications, and compliance monitoring programs.

Electrical generating facilities that dispose of solid wastes on-site are specifically exempted from the requirements of the Montana Solid Waste Management Act in § 75-10-214(1)(b), MCA. This was done because the facilities were formerly regulated under the Major Facilities Siting Act and the exemption was granted to prevent double regulation of a single waste management unit. DEQ will be proposing to repeal the exemption provided to electric generating facilities to the 2007 Montana Legislature since electrical generating facilities were removed from regulation under the Major Facility Siting Act in 2001. SME has voluntarily agreed to license the monofill and be subject to the requirements of the Solid Waste laws and rules. The license conditions

would include installing a clay liner, appropriately managing the wastes, and installing a groundwater monitoring system in the vicinity of the monofill. DEQ would review and, if adequate, approve each element of the waste management and proposed monitoring system.

4.13.2.1 Construction

The construction of the potential power plant would generate large quantities of construction debris waste, which would require proper disposal or reuse. Construction is estimated to take approximately 3 ½ years, and would begin with site preparation, foundations, and underground utilities, while design of the above-ground mechanical, piping, buildings, structures, and electrical systems is being finalized.

Any non-hazardous construction debris that could not be reused/recycled would be disposed of at the High Plains Sanitary Landfill and Recycle Center (HPSL). This landfill is licensed Class II landfill. The construction contractor would be responsible for ensuring that the waste material generated was properly disposed. Portable restrooms for employee use during the construction period would be provided by a private contractor. Portable toilets would be serviced by a septic tank pumper licensed by the DEQ to perform these services.

4.13.2.2 Operation

The operation of the potential 250 MW coal-fired power plant would produce large amounts of waste that would have to be disposed of or recycled in an environmentally acceptable manner. Proper maintenance and plant management should minimize any possible negative impacts associated with the production of large quantities of solid waste.

Ash and Water Treatment System Byproducts

The majority of solid waste generated from power plant operations would be ash. At full generation capacity, the plant would produce approximately 220 tons of ash and three tons of activated carbon per day. The ash would have a compacted density of approximately 75 pounds per cubic foot.

Ash is a coal combustion byproduct which can be recycled in some instances, or managed as a waste. Coal combustion wastes include large volume wastes, consisting of coal combustion products (CCPs), and low volume wastes. In 2002, approximately 117 million metric tons per year of large-volume wastes, consisting primarily of ash, were generated by coal burning power plants (Kelly and van Oss, 2004).

Federal regulations encourage the beneficial reuse of coal combustion byproducts, and currently, about one-quarter of all coal combustion wastes are reused in beneficial uses (EPA, 2000b). CCPs are classified as non-hazardous solid waste (EPA, 2000b); however, CCPs that are disposed of in off site landfills, surface impoundments, or used as mine backfill, are regulated under RCRA subtitle D, regulation for the disposal of certain non-hazardous solid wastes, and are thus subject to stricter federal regulation than reused CCPs. In Montana, CCPs disposed of in

off-site landfills are subject to Montana solid waste laws and rules and are licensed and regulated by the DEQ as Class II landfills (ARM 17.50.508 and 509).

In general, CCPs, and specifically ash material, can be given away or sold. The material is often reused as a component of cement, road base, waste stabilization, soil stabilization, and other various construction materials. Two other general byproducts of coal-combustion air-pollution control technologies are flue-gas desulfurization (FGD) wastes (from pulverized coal-fired plants only) and fluidized-bed combustion wastes. In 2002, fly ash represented the major component (59 percent) of CCPs produced, followed by FGD material (23 percent), bottom ash (16 percent), and boiler slag (2 percent – from PC plants only). All CCPs have potential for beneficial reuse, and the amount of material being reused has been steadily increasing since the mid-1960s. More than 80 percent of the boiler slag produced in 2002 was reused, followed by fly ash, of which 35 percent was reused (Kelly and van Oss, 2004). CFB boilers produce only fly ash and bed drain ash.

Because fly ash is the main component of CCPs, approximately 65 percent of all CCPs are not currently reused. By reusing the CCPs as much as possible in concrete, production of road base materials, manufactured aggregates, flowable fills, structural fills, embankments, waste stabilization, wallboard manufacturing, roofing tiles and shingles, snow and ice control, and soil modification, the power plant would be able to minimize the volume of solid waste. There are no current plans to recycle the ash from the HGS, but a beneficial use may be developed in the future.

Large volume wastes are categorized by the process in which they are generated in the coal plant and their application. Ash is the incombustible inorganic matter of coal, and on average, the ash content of coal is 10 percent (USEPA, 2004). The ash is composed primarily of metal oxides and alkali. Coarser ash material settles to the bottom of the combustion chamber, while the fine portion, fly ash, is removed from the flue gas.

Specifically, a hydrated ash reinjection system would convert SO_2 and other gases in the flue gas to a particulate to be captured in the baghouse (fabric filter) installed at the proposed power plant "downstream" of the boiler. The baghouse would collect the fly ash for disposal. Flue gas would enter the baghouse through an inlet plenum, and the particulate matter would be collected on the outside surface of the bags. Pulsating air would be used to remove the ash from the filter media and discharge the ash to the baghouse hoppers. The fly ash would be removed from the baghouse and transported to a filter separator and then to a storage silo. Bed ash would be removed from the fluidized bed and cooled in bed ash coolers. Cooled bed ash would be discharged into a storage silo, which would be sized for 3-day storage. From the silos, the fly ash and bed ash would be mixed with wastewater to control dust and then trucked to an ash storage landfill, where the wet ash would solidify (SME, 2004b). The total daily solid waste byproduct of the combustion process at the HGS would be approximately 223 tons of fly and bed ash.

In addition to the ash, the plant would produce approximately 2.8 tons per day of other solid waste byproducts from the water treatment system. This material would consist predominantly of particles suspended in the river water. This material would be dewatered to a filter cake consistency and would be disposed of along with the ash or in an off-site licensed landfill.

Based on consultations with DEQ about solid waste management, SME plans to dispose of the ash that cannot be reused and/or recycled and water treatment system byproducts onsite within a constructed monofill located within the confines of the railroad loop, immediately southeast of the boiler. A design and application for the proposed ash monofil has been submitted to the DEQ. The licensing information contains all of the elements required of a Class II landfill in Montana. The design submitted consists of a recompacted clay lined cells with ET caps and appropriate revegetation and will be discussed in detail below. Once the area is properly zoned to allow for the operation of the plant and the monofill, the DEQ could issue a license for the operation of the monofill.

The monofill area within the rail loop would be laid out in a rectangular grid consisting of approximately 100 acres (40 ha). The monofill would be constructed as twelve cells in a 3 by 4 grid. Each cell would be an excavated pit approximately 36 feet (11 m) deep. Each cell would be sized to accommodate the ash produced during three years of facility operation. Once filled and covered, the monofill grid would have a height of roughly 22 feet (7 m) above grade and would have an overall footprint, at the perimeter, of roughly 1,700 feet by 2,600 feet (100 acres (40 ha)). Excavated material would be predominantly fat clays. These clays would be used to construct a compacted clay liner and perimeter containment berms with the balance stockpiled for use as final cover. Both liner and berms would be constructed in moisture controlled and compacted lifts.

Each cell would be designed as a self-contained unit. During initial construction, only one cell with the associated containment berms would be constructed. The cell would be used for ash and disposal. Toward the end of the first three year period, the second ash disposal cell would be constructed. Cover material and topsoil for the first cell would be obtained from the excavation for the next adjacent cell. Cover material for this second cell would be obtained from the excavation for the third cell. This process would continue until all cells have been constructed. As each cell was filled, final cover and topsoil would be placed, and the cell would be vegetated. The monofill facility would have a storage capacity for solid waste byproducts commensurate with the estimated life of the HGS – in excess of 35 years.

The monofill would be encircled by a raised perimeter containment berm constructed from on-site fat clays. This berm would ensure that surface waters do not drain into the monofill. Any storm water that fell within the berm would be contained within the monofill, where it would evaporate.

The monofill would operate continuously, as solid waste was produced by the plant. Ash and, if appropriate, filter cake would be conveyed to the monofill by truck and would be dumped within the active storage cell. On a scheduled basis, tracked machinery would distribute and spread the solid waste. The material would have sufficient moisture to allow workability by tracked equipment. As the ash dries, it would form a hard lightweight cover similar to concrete. In this form, the ash would not be subject to wind erosion. If erosion should occur, an onsite water wagon would be used to moisten the ash and regenerate the hard cover.

As each cell is filled, a gravel layer 12 inches thick would be placed to provide a capillary break for the final cover. This would be followed by 48 inches of the material excavated from the adjacent cell and placed as final cover. This cover would be topsoiled with stockpiled material and seeded to minimize water and wind erosion. The seeded areas would be maintained along with the balance of the site landscaping for the life of the plant. Upon closure of the final cell, the site would be seeded and can be reused as appropriate. This design creates what is known as an ET cap. ET caps are designed to mimic natural soils and provide for the in-cap storage of all precipitation that does not run off. This storage and capillary action allows the plants to use the moisture thru ought the growing season and promotes good vegetative cover. ET caps have been tested in Polson and Helena, Montana, as part of a national study. They are rapidly becoming the design standard for landfills due to their low maintenance and high performance in the Montana climate. The DEQ has approved several designs of this type at Class II landfills across Montana. Designs of this type have also been used at other waste repositories in Montana.

Coal, like soil, rocks and other natural materials found in the earth's crust, does contain trace amounts of heavy metal elements. The burning of coal results in the release of heavy metals such as arsenic, boron, cadmium, chromium, copper, lead, mercury, selenium and zinc. Despite the large volumes of ash produced, the total quantity of heavy metals contained within the ash is relatively small, and an even smaller amount of these elements has potential for release to the environment.

The U.S. EPA has extensively studied the risk that coal ash presents to the environment and published reports in February 1998, March 1999, and May 2000 stating that ash resulting from the combustion of fossils fuels was not hazardous and did not need to be regulated as a hazardous waste under Subtitle C of the Resource Conservation and Recovery Act (RCRA) (USEPA, 2004).

Studies conducted by the University of North Dakota indicate that for most heavy metals, even if released directly into groundwater, the concentrations are low enough that they would not adversely affect drinking water quality. A U.S. Geological Survey (USGS) fact sheet states that a "standardized test of the leachability of toxic trace elements such as arsenic, selenium, lead and mercury from fly ash shows that the amounts dissolved are sufficiently low to justify regulatory classification of fly ash as non-hazardous solid waste." However, it is important to note that despite these relatively low concentrations, if improperly managed, coal combustion products can have a negative impact on the environment and pose a risk for groundwater and/or soils contamination (ACAA, no date).

As part of its license application, SME has submitted a No Migration Demonstration for the monofill to the DEQ. Waste management units have the potential to impact groundwater and SME has addressed the issue in the No Migration Demonstration submitted to the DEQ Solid Waste Program. The information submitted demonstrates that based on the unit design, the nature of the ash, and the soils and hydrogeology of the site, there would be no migration of contaminants from the waste management unit to the underlying aquifers. (PBSJ, 2006a) Class II landfills that meet the requirements of the No Migration Demonstration found in ARM 17.50.723 are exempt from liner and groundwater monitoring requirements. SME has

voluntarily agreed to construct recompacted clay liners in the waste management cells and to monitor the underlying aquifer as part of an ongoing demonstration.

Other Wastes

Additional wastes generated from operations of the power plant include routine office and non-hazardous facilities wastes that would be disposed of at the HPSL. Wastes of potential concerns from the potential power plant operation include waste heat emitted into the atmosphere, and the buildup and release of low-volume wastes. Low-volume wastes from coal combustion would be generally aqueous and include boiler blowdown waste, cooler blowdown waste, coal pile runoff waste, demineralizer regenerant, and boiler chemical cleaning wastes. Water would comprise a substantial portion of these wastes.

The characteristics of low-volume wastes are extremely variable and can contain various hazardous materials such as strong acids or bases, cadmium, chromium, lead, mercury, and silver (EPA, 2000). Unless properly managed, these wastes have the potential to oxidize and generate acids that could contaminate nearby water resources. A dedicated, zero outflow evaporation pond would be constructed onsite to capture and manage all runoff from stored coal.

Other potentially hazardous wastes generated from the routine maintenance of a power plant could include waste oils containing solvent residuals, waste paint and paint thinner, and solvents and degreasers. Hazardous wastes would be disposed of off site at a licensed facility. The state of Montana does not have any permitted hazardous waste disposal sites, and any waste regulated as hazardous would have to be transported out of state by a DOT certified hazardous waste contractor to an appropriate facility. Hazardous waste disposal facilities are located in Salt Lake City, Utah, and Columbia Ridge, Oregon. Alternatively, some hazardous waste such as solvents may be cleaned and recycled onsite by a permitted handler such as Safety-Kleen.

The Waste Management Unit of DEQ's WUTMB is responsible for regulating storage, treatment, and transport of hazardous waste and used oil for all hazardous waste generators in the State of Montana. The existence of hazardous waste and hazardous materials at the power plant would require a hazardous materials management plan and associated emergency and contingency plans. These plans would include training and handling guidelines for staff, procedures to follow in the event of a hazardous waste or hazardous materials spill or release, and a list of measures to mitigate such a spill or release.

The power plant would most likely be regulated as a "conditionally exempt small quantity generator" of hazardous waste. Conditionally exempt small generators must determine which of the wastes they generate are hazardous; keep records of any test results, waste analysis or other determinations used to characterize hazardous waste for at least three years from the date of final disposition of the waste. They may dispose of hazardous waste at a legitimate recycling facility, a permitted hazardous waste treatment, storage, or disposal facility, or a Class II municipal solid waste landfill. Either of the first two options would be used for disposing HGS's regulated hazardous wastes.

4.13.3 ALTERNATIVE SITE – INDUSTRIAL PARK SITE

4.13.3.1 Construction

The construction of the potential power plant would generate large quantities of construction debris waste, similar to construction at the Salem site. Any non-hazardous construction debris that cannot be reused/recycled would be disposed of at the High Plains Sanitary Landfill and Recycle Center (HPSL). The construction contractor would be responsible for ensuring that the waste material generated is properly disposed.

4.13.3.2 Operation

Disposal of fly and bed ash would not take place onsite at the Industrial Park site, because of the smaller footprint area. Instead, ash would be routinely disposed of at an off-site waste disposal facility and/or reused as an industrial byproduct. Disposal would have to be done at a solid waste management facility licensed by the DEQ.

Additional wastes generated from operations of the power plant at the Industrial Park site would be the same as those generated under the Proposed Action, the Salem site. All non-hazardous wastes that could not be reused/recycled would be disposed of at the HPSL and all hazardous waste that could not be cleaned and reused would be disposed of out of state at a permitted hazardous waste disposal facility. As a result of accepting the ash from HGS, HPSL would fill up faster than anticipated and would be either required to request an expansion of its facilities or shut down and decommission its facilities. In the later case, a new landfill would need to be developed for the Great Falls area. These impacts would not directly affect the Industrial Park site, but could have potentially significant impacts to HPSL and other users of that facility.

4.13.4 CONCLUSION

The No Action Alternative would not create any waste management issues at either the Salem or Industrial Park site, as no waste would be generated at the sites. However, by purchasing an equivalent amount of power from generation sources elsewhere, SME would be contributing indirectly to ongoing waste management impacts at existing generating stations in the region or at potentially new generating stations located outside of the region.

Construction-related impacts on waste management at the Salem site and Industrial Park site would be comparable to one another. Impacts would be of minor magnitude, medium-term duration, and small extent, and with a probable likelihood of occurring. The HPSL, which would accept all non-hazardous construction debris, has more than sufficient capacity to accept all the waste without impact to other waste generators within Cascade County. The overall rating for impacts on waste management from the construction phase of the power plant would be adverse and non-significant.

Operation-related impacts on waste management for the Salem site would be of moderate magnitude, long-term duration, and medium extent, and have a probable likelihood of occurring. Ash and water treatment system byproducts would be disposed of in an onsite monofill which

would be managed with appropriate environmental controls, including groundwater monitoring. SME has submitted a No Migration Petition to DEQ, demonstrating that no waste or leachate would migrate off-site or infiltrate to groundwater. Other non-hazardous waste that would be generated during operation of the power plant would be disposed of at the HPSL. Hazardous waste generated at the site would either be recycled by a certified waste handler or transported out of state by a certified contractor to a hazardous waste disposal facility. The overall rating for impacts on waste management from the operational phase of the power plant at the Salem site would be adverse; and while impacts might likely be non-significant, there is some potential for impacts to become significant.

Operation-related impacts on waste management for the Industrial Park site would be of minor to moderate magnitude, long-term duration, and small extent, and have a probable likelihood of occurring. All non-hazardous waste generated during operation of the power plant, including ash, would be disposed of offsite. Hazardous waste generated at the site would either be recycled by a certified waste handler or transported out of state by a certified contractor to a hazardous waste disposal facility. The overall rating for impacts on waste management from the operational phase of the power plant at the Salem site would be adverse; and while impacts might likely be non-significant, there is some potential for impacts to become significant .

Waste management related impacts during the operation phase of the power plant would be slightly less for the alternative Industrial site than for the Salem site, as all waste generated from the Industrial Park site would be disposed of off-site. Overall, however, even given the volume, duration of impacts, and potential of contaminants, waste management impacts would likely be non-significant at both sites due to the Waste Management Plan, facilities and procedures which have been developed to handle wastes.

4.13.5 MITIGATION MEASURES

Mitigation measures would include entering into and establishing a binding voluntary agreement with DEQ for the licensing and regulation of any onsite waste disposal at the Salem site. This agreement would include the installation of a groundwater monitoring system and management of the monofill ash disposal site in accordance with DEQ rules. Issuance of the solid waste license requires certification from the city or county that the site is zoned appropriately. Until that happens, DEQ cannot issue a license even if all other permitting requirements are satisfied.

Additional measures consist of seeking out recycling opportunities for construction debris and the coal combustion products, including ash, generated by the power plant. These beneficial uses of ash have the potential to reduce the operating costs by limiting use of on-site heavy equipment and by reducing the amount of impounded material which could extend the life of the monofill. Any ash disposed of through alternate methods can be collected directly from the plant. If the volume and production rate of ash required is greater than the production capabilities of the plant at the Salem site, ash could be reclaimed from individual storage cells of the monofill.

4.14 HUMAN HEALTH AND SAFETY

4.14.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the sites would continue to be maintained as agricultural land and no notable risks to human health and safety would occur at, or because of, the sites. However, by purchasing power from generation sources elsewhere, SME would be contributing indirectly to ongoing human health and safety impacts at different generating stations in the region or potentially at new generating stations located outside of the region. To the extent that other generation sources may be preexisting and under the purview of older, less stringent safety and emissions regulations, the No Action alternative could potentially be contributing to greater regional impacts on human health and safety.

4.14.2 PROPOSED ACTION – HGS AT THE SALEM SITE

An environmental site assessment of the Salem site determined that there were no recognized environmental conditions or concerns identified within a one mile radius of the site. Additionally, the Salem site is located a considerable distance away from the two National Priorities List (NPL) sites located within Cascade County. However, there are documented impacts from mining waste to soil, surface water and stream sediments in Belt Creek, which flows northeast of the site. Belt Creek, and the Missouri River north of the site, are listed as impaired water bodies which do not support the beneficial uses of aquatic life, coldwater fishery, and drinking water. Because human activities associated with the power plant at the Salem site would not conflict with any of these uses, the site itself is not considered to pose any risk to site workers and visitors.

4.14.2.1 Construction

The construction of a potential coal burning power plant would involve direct health and safety issues for workers. The National Institute for Occupational Safety and Health (NIOSH) considers construction to be a high-risk industrial sector. In 2001, approximately 9.6 million persons were employed in the construction industry. Fatal occupational injury rates in this industry ranged from 75.6 for ironworkers per 100,000 full-time workers to 6.0 for drywall installers, more than a 12-fold difference. Following ironworkers, the highest occupational injury rates for construction workers occurred in roofers, welders and cutters, construction laborers, and truck drivers (BLS, 2004). All construction activities on the power plant and associated facilities would be considered routine.

From Great Falls, plant access would be from southbound U.S. Route 87/89 to eastbound State Route 228 (Highwood Road) to northbound Salem Road. Under this alternative the combined Average Daily Traffic (ADT) of the Salem Road would increase considerably during the construction period, jumping from 36 vehicles in a day to a peak of about 1,340. On the Highwood Road (SR 228), the ADT would go from 549 vehicles in a day to potential maximum of approximately 1850. Unlike the Salem Road, the Highwood Road is paved, so that even

though both are one-lane each direction, it can accommodate greater traffic flow. Because of the increase in traffic, and the operation of heavy construction equipment on the roads, these areas could potentially face a negligible to minor increase in vehicular accidents during the construction phase.

4.14.2.2 Operation

During power plant operations, there would be no public access to the power plant and associated facilities. The entire plant site would be fenced as a part of the overall plant security plan. While specific site security arrangements have not yet been determined, vehicular and pedestrian access to the plant would be limited and controlled by some means.

The primary concern regarding human health and safety risks, as they relate to the operation of power plants, is the effect of air emissions. A detailed description and analysis of the types, effects, and anticipated locations, of air emissions from the proposed plant can be found under air quality, Section 4.5.

Like many naturally occurring materials, coal contains traces of radioactive uranium and thorium: an average of about 1 part per million (ppm) of uranium and 3 ppm of thorium. By comparison, the average brick contains about 8 ppm uranium and 11 ppm of thorium (NCRP, 1988). When coal burns, less than one percent of its radioactive contents are released into the atmosphere. The rest remains in the ash (USGS, 1997). Accordingly, there is relatively little accumulation of uranium and thorium deposited in the soil surrounding a coal fired power plant. Instead, the ash from coal burning retains most of the radioactive material, so it is somewhat more concentrated in the ash than it was in the original volume of coal. The concentration of uranium in fly ash is in the range of 10-20 ppm. By comparison, naturally occurring black shale rocks have uranium concentrations ranging from 11-18 ppm and commonly found phosphate rocks range from 17 to 120 ppm of uranium (USGS, 1997).

Because the concentrations of radioactive elements in coal and coal ash are roughly comparable to those in common materials such as bricks, exposure to coal ash would be roughly comparable to the radiation exposure from living or working in a brick building. That exposure provides a very small fraction of the average annual background radiation exposure experienced by a typical American (i.e. about 7 millirem/yr from brick as compared to about 360 millirem/yr on an overall average from all sources) (NCRP, 1988).

In regard to the small proportion of radioactive material that is released into the atmosphere, there are very little available data on the resulting exposure risk. EPA, however, cites a figure of 0.03 millrem/yr radiation exposure within 50 miles of a coal plant (EPA, 2006f). Given the overall average background exposure of 360 millirem/yr for the average person, this EPA figure would suggest that living near a coal plant is not likely to increase a person's radiation exposure by more than a very small amount.

In addition to air emissions, the large quantities of solid wastes that are generated from coal combustion activities can pose a risk to human health and safety if improperly analyzed and disposed of. In 1999, EPA conducted a risk assessment that found a lack of potential human

health risk for virtually all coal combustion waste constituents. Arsenic was the one constituent for which EPA identified potential human health risks (EPA, 1999a). Arsenic was found to pose a potential human health risk via two pathways: 1) via the groundwater pathway where these wastes are managed in unlined landfills and surface impoundments, and 2) via non-groundwater pathways where these wastes are used as soil amendments for agricultural purposes. The identified risks in both these pathways are based on high-risk scenarios in EPA's risk modeling analysis for either the ingestion of wastewater influenced by releases from the waste management unit or from direct human ingestion exposure routes.

Transmission Line Corridor(s)

In the recent past, concerns have been raised about the health effects of powerful Electro-Magnetic Fields (EMF) emanating from high-voltage power lines that pass through populated residential areas. However, scientific studies appear inconclusive, with no consistent, significant link detected between EMF and cancer (Hafemeister, 1996). The generally low population density of Montana suggests that fewer people may be exposed to EMF from a new power line than in more populous areas of the country.

4.14.3 ALTERNATIVE SITE – INDUSTRIAL PARK SITE

The alternative site is located in a historically and actively developed industrial siting area. During an environmental site assessment of the Industrial Park site, two Resource Conservation Recovery Information System (RCRIS) small quantity hazardous waste generators and a Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) – No Further Remedial Action site, were identified within a ¾ mile radius of the site. Additionally, the ESA identified one State hazardous waste (CECRA) site and one State Leaking Underground Storage Tank (LUST) within one mile of the Industrial Park site. None of these locations, however, were determined to pose an environmental threat to the proposed Industrial Park site, and no recognized environmental conditions or concerns were identified within a one-mile radius of the site.

The Industrial Park site is also located a substantial distance away from the two NPL sites located within Cascade County, and there are no impacts from mining in the water bodies adjacent to the site. The Missouri River flows south and east of the site and is listed as an impaired water body which does not support the beneficial uses of aquatic life, coldwater fishery, warm water fishery, and drinking water. Because human activities associated with the power plant at the Industrial Park site would not conflict with any of these uses, the site itself is not considered to pose any risk to site workers and visitors.

4.14.3.1 Construction

The construction of a potential coal burning power plant would involve similar direct health and safety issues for workers as described above under construction of the Salem site. All construction activities on the power plant and associated facilities would be considered routine.

From Great Falls, plant access would be from northbound U.S. Route 87. Under this alternative the combined ADT of the U.S. 87 would increase notably, going from 7,718 vehicles in a day to a peak of just over 9,000. Most of the project-related traffic would occur during both the morning and afternoon commutes, when a peak of approximately 650 vehicles per hour could be entering and exiting the construction site. This amount of traffic is believed to more than double the amount of vehicles accessing Route 87 between the hours of 6 and 7 a.m. and 3 and 5 p.m. Because of the increase in traffic, and the operation of heavy construction equipment, this area of U.S. Route 87 could potentially face a negligible to minor increase in vehicular accidents during the construction phase.

4.14.3.2 Operation

Impacts of the operation of the power plant to human health and safety at the Industrial Park site would be similar to those discussed under the Salem site. During power plant operations, there will be no public access to the power plant and associated facilities, and the entire plant site would be fenced as a part of the overall plant security plan.

The quantity and quality of air emissions would be the same as under the Proposed Action. A detailed write-up on the types, effects, and anticipated locations, of air emissions from the plant at the Industrial Park site can be found under air quality, Section 4.5. Because the area surrounding the Industrial Park site has a greater concentration of residential areas than the Salem site, there could be some amount of additional exposure of local residents to air emissions.

4.14.4 CONCLUSION

The No Action Alternative would not create any notable risks to human health and safety at, or because of, the sites. However, by purchasing power from generation sources elsewhere, SME would be contributing indirectly to ongoing human health and safety impacts at different generating stations in the region or at potentially new generating stations located outside of the region. To the extent that other generation sources may be preexisting and under the purview of older, less stringent safety and emissions regulations, the No Action alternative could potentially be contributing to greater regional impacts on human health and safety.

Construction-related impacts on human health and safety at the Salem site and Industrial Park site would be relatively comparable to one another. Impacts would be of minor magnitude, medium-term duration, and small extent, and with a probable likelihood of occurring. Construction of heavy industrial facilities would expose construction workers to short-term health and safety risks typically faced in the construction industry, considered high-risk by the National Institute for Occupational Safety and Health (NIOSH). Additionally, traffic volumes and the presence of heavy construction equipment on site access roads could potentially cause a negligible to minor increase in vehicular accidents. The overall rating for impacts on human health and safety from the construction phase of the power plant would be adverse and non-significant.

Operation-related impacts on human health and safety for the Salem site and the Industrial Park site would be of minor magnitude, long-term duration, and medium extent, and have a probable

likelihood of occurring. A coal-fired power plant would emit an additional minor increment of mercury to the environment, thereby contributing incrementally to this cumulative problem; however, as discussed in more detail under Air Quality, these emissions are not likely to cause any health problems locally. The overall rating for impacts on human health and safety from the construction phase of the power plant would be adverse; and while impacts would likely be non-significant, there would be some potential for impacts to become significant.

Impacts to human health and safety at the Industrial Park site are potentially a little greater than at the Salem site, due to its proximity to a greater number of residential areas. This distinction, however, is not large enough to classify the impacts from the power plant sited at the Industrial Park as being major or even moderate. Direct and indirect impacts to human health and safety in the local Great Falls area itself would probably be minor. Overall, the operation of a new, well-controlled CFB power plant at either the Industrial Park site or the Salem site represents negligible to minor human health and safety concerns, by contributing a tangible but small increment to several widespread, chronic, cumulative environmental problems. The contribution of the power plant's operation to widespread, regional, national, and global concerns is minor and incremental, but the problems to which it would contribute are serious ones. Impacts of the plant at either site would be adverse and most likely non-significant.

4.14.5 MITIGATION

Mitigation measures during operation of the power plant include installing and operating all BACT methods of reducing air pollutants, including non-criteria pollutants such as mercury. In addition, cleaning coal before it is combusted would reduce the contaminants released into air emissions following the combustion process. Finally, implementation of proper waste management procedures and water pollution control would further reduce any impacts from the plant at either location.

4.15 SOCIOECONOMIC ENVIRONMENT

4.15.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, no CFB coal-fired power plant would be constructed at either the Salem or Industrial Park sites. The direct and indirect economic benefits from a nearly half-billion dollar investment in the local economy and short-term (construction) and long-term (operation) job creation would be forgone under this alternative. However, this is not an adverse impact, but rather a lost opportunity to realize economic benefits to the local community from the Proposed Action.

Under the No Action scenario, by about 2012, SME would meet approximately 80 percent of its future base load electricity needs by means of a power purchase agreement(s) with one or more wholesale electricity provider in the WSCC and approximately 20 percent through its ongoing contract with WAPA.

Under this alternative, SME's member cooperatives and consumers would be unprotected from future increases in the price of electricity on the open market. Given the volatility of this market, and particularly that of natural gas prices – natural gas being one of the major fuels used to generate electricity in the northern Rocky Mountain West and Pacific Northwest, geographic areas covered by the WSCC – consumers could be paying substantially higher electric rates, although it is not possible to quantify precisely how much higher. It is not unreasonable to suppose that rates could be 20 percent to 100 percent higher. The higher electric rates for residential, commercial, and industrial consumers of electricity in the SME service area could potentially induce several direct and indirect effects.

Assuming a residential consumer decides to maintain pre-price-increase electricity consumption levels and pay more for the same electric service, potential direct effects for residential consumers of higher electricity bills would include less disposable income for other household expenditures. Thus, spending on goods and services in the local economy and therefore contributions to local economic activity would be reduced. The magnitude of this reduction would not be expected to be large (more than a few percent), in that a typical household's expenditures on electricity would constitute only a small percentage of its annual expenses. Nevertheless, in aggregate, reduced spending would ripple through the local economy, inducing effects such as modest job and income losses in the retail trade, arts, entertainment, recreation, accommodation and food services industries.

If the residential consumer decides to conserve electricity and/or use it more efficiently in response to higher rates, this could take the form of "doing without" or deprivation (e.g. reducing lighting levels, lowering the thermostat in winter and raising it in the summer) and/or installing more energy-efficient appliances such as refrigerators, compact fluorescent light bulbs, systems such as geothermal heat pumps and insulation, and more effective home insulation. Residential consumers could potentially feel less comfortable in their homes and possibly could be exposed to conditions that pose risks to their health and safety. This adverse effect would fall harder on lower-income residents, especially the 10 percent or more of households below the poverty line in the counties within SME's service area. Furthermore, this population would be least able to afford additional insulation, newer, more energy-efficient refrigerators, washers, dryers, and so forth, much less the more technically sophisticated energy conservation/efficiency devices.

With regard to SME members' commercial and industrial customers, higher electricity prices, by raising production costs (industry) and the cost of doing business (commercial businesses) could also have a variety of potential effects. For any given firm or institution, the magnitude of these effects would depend on how large the relative cost of electricity is compared to other factors of production. Higher electricity rates could influence decisions on whether to locate or expand activities within SME's service area; some firms that are power intensive may choose to locate in other regions where electricity costs less. Higher rates could spur increased investment in energy efficiency and conservation technologies among commercial and industrial customers. They could also lead to structural changes in the economy within SME's service area; less energy intensive industries would be favored while more energy intensive industries would be disadvantaged.

4.15.2 PROPOSED ACTION – HGS AT THE SALEM SITE

4.15.2.1 Construction

SME and Stanley Consultants estimate that construction of the HGS at the Salem site would take approximately 3 ½ years (51 months) from the start of preliminary engineering to commercial operation of the plant. Construction would begin with site preparation, foundations, and underground utilities, while design of the above-ground mechanical, piping, buildings, structures, and electrical systems is being developed. Construction would take approximately 2 years and 7 months in all and would employ an average of 300 to 400 workers at any one time with an estimated peak construction workforce approaching 550.

During different phases of construction different categories of workers would rotate in and out of the site, with a small percentage of supervisors, engineers, and operations staff remaining onsite throughout the entire construction period. The first part of the construction process would involve civil and structural engineering work, and site preparation, including grading, and laying building foundations. The next phase would include steel work and rigging that would require the use of heavy machinery. After the setting of large structural components, welders, pipe fitters, machinists, and electricians would be on site to finish the project.

Wage rates for construction workers would vary from approximately $20/hr to close to approximately $40/hr. Most of the construction and engineering jobs would be highly-skilled, specialized, well-paying positions. The total cost of the 51-month project is estimated at approximately $515 million, of which approximately $100 million is construction labor (Chaffee, 2005).

Because of the specialized expertise required, the construction workforce is expected to be primarily drawn from outside the region. Based on a rough estimate that 75 percent of the power plant construction workers required would come from outside the region (Chaffee, 2005; Warren, 2004), the Great Falls area would see an increased demand on rental housing. These construction workers may rent apartments for the duration of their work, share hotel rooms with other workers, or drive a recreational vehicle (RV) to the area and stay at available sites during the week. Because many workers would live in their own RVs, the impact on the regional housing market would be minimized.

In the 2000 Census, Cascade County had 11,252 renter-occupied units (USCB, 2000b); given the county's overall vacancy rate of 8%, there would be roughly 900 vacant rental units in Cascade County. These vacant units, along with the more than 1,300 hotel rooms in Great Falls, could in all likelihood meet the housing demand for a majority of the temporary workers. With a large number of workers living in RVs during peak times or commuting from out of the region, the current housing stock could meet the demands of temporary workers. However, during special events in Great Falls, hotel rooms might not be available. Those workers who do not find housing in the Great Falls area could commute from other parts of the county and other nearby counties.

Most of the workers would be living in the area temporarily and would therefore not bring their families. However, a relatively small fraction of the workers associated with the construction of the plant would stay for the duration of the project and could potentially relocate their families, becoming permanent residents of the Great Falls area. In an area with a population of over 55,000, this increase would be expected to have a small economic impact and little impact on public services such as public schools.

The construction of a $515-million power plant would also create a number of jobs indirectly from project-related spending and the spending decisions of workers. This effect, known as the employment multiplier effect, takes the impacts from project-related spending into account to determine the number of indirect or induced jobs created in the local economy by an action. With an estimated employment multiplier of 1.5 (GOEO, 2006), the 400 jobs created during construction of the plant could potentially result in the creation of as many as 200 additional indirect or induced jobs, for a total of 600 jobs created by the project. However, these jobs would be temporary and would last only for the duration of the construction phase of the project.

The construction and operation of a power plant has the potential to create both temporary and permanent jobs, generating additional wages and benefits to be spent in the local economy. Local commercial entities in the community might expect to see some short-term, increase in activity related to expenditures by the project workforce.

Businesses in the project area might see some beneficial economic effects from per diem expenditures (meals, incidentals, etc.) by workers during the time they are in the local area. Current per diem levels for the region are about $60 for lodging and $39 for meals and incidental expenses, for a total of nearly $100/day.

The Employment Multiplier

A "multiplier" is a number used by economists to determine the impact of a project on the economy. It is the ratio of total change in output or employment to the initial change (or direct change). For example, if an industry were to create 100 new jobs it would require materials and services from its supplying industries. If this increase in demand created 30 new jobs in the supplying industries, the employment multiplier would be 1.3 [i.e., 100 (direct) + 30 (indirect and induced)].

Overall, the construction of the HGS at the Salem site would have a primarily positive or moderately beneficial effect on the socioeconomic environment of the local and regional area, including increases in employment opportunities, total purchases of goods and services, and an increase in the tax base. The creation of up to 400 construction jobs on average and the payment of approximately $100 million in wages to construction workers would be expected to result in a total, temporary economic stimulus for the Great Falls area from direct, indirect and induced effects of 600 jobs and $150 million in spending.

4.15.2.2 Operation

The operation of the HGS would require approximately 65 permanent employees with average salaries of $60,000 a year. The total annual payroll would be almost $4 million. These positions include plant operations, maintenance personnel, and engineering staff. Although the operations phase would not officially start until after the completion of construction, most of the staff would

start working at the halfway point of the construction process in order to become familiar with the plant. The plant would be fully staffed 6 months prior the end of construction.

The addition of 65 well-paying, technical and professional jobs to the Great Falls region would create a minor, beneficial economic impact for the region. With a labor force of 35,000 in Cascade County as a whole, the addition of 65 new, permanent jobs plus the potential creation of approximately 105 additional jobs through indirect or induced employment from the employment multiplier effect of 2.6 for the "power generation and supply" sector in Cascade County. This would result in the addition of about 170 jobs in total, or 0.5 percent of total employment in the area. This would represent a modest beneficial effect on the local economy, but would not be significantly beneficial. The long-term, total economic stimulus to the Great Falls/Cascade County area would be about $10.4 million (2.6 x $4 million) annually.

Many of the workers holding the approximately 170 new jobs created directly, indirectly, or induced by the HGS would have families associated with them. Using the relationship between 2000 Census figures for total Cascade County population and total employment, each new worker would be associated with an additional 1.3 persons in each household. Thus, the 170 new jobs would result in total population growth of almost 400 residents. Using the same assumption used in estimating the impact of construction – that 75 percent of the new jobs would go to new residents (former non-residents who would settle in the area) and 25 percent to existing residents of the Great Falls/Cascade County area, then the total net, permanent population gain from proceeding with the HGS would be approximately 300, in comparison with 2004 populations for Great Falls of approximately 56,000 and for Cascade County of approximately 80,000. These are minor demographic changes.

An additional economic benefit of the project is the property taxes that SME would pay to the state, county, city, and school district. Assuming the taxable value runs close to the estimated

The Employment Multiplier II

The Montana Governor's Office of Economic Opportunity ran an IMPLAN model for the "Power Generation and Supply" sector for Cascade County. They got a "Type 1" multiplier of 1.6 and a "Type 2" multiplier of 2.6. The "Type 1" multiplier includes the jobs at the plant and the jobs created as a result of the plant doing business with other businesses in the county. The "Type 2" multiplier adds jobs created as a result of individual plant employees spending in the local community. The 2.6 multiplier is rather high compared to most industries, which is expected given that the utility industry pays very well compared to most Montana industries (GOEO, 2005).

Direct, indirect and induced spending/labor is the "total economic stimulus." What this represents is the total effect of multiple rounds of spending once an initial capital infusion is made. A dollar enters the local economy, in this case in the form of wages or purchases made by the plant. In each successive round of spending some portion of the original dollar "leaks" out of the local economy for payments like taxes, or purchases from outside the local economy - cars, major appliances, or contracts with outside firms, etc.

The remainder stays in the local economy and gets re-spent again and again until all of the original dollar eventually leaks out of the economy. When all of the original dollar has leaked out, the total stimulus associated with that dollar is complete.

The difference between "Type 1" and "Type 2" is the question of how far analysts want to track the original spending. Both types capture the entire stimulus, but the Type II is more comprehensive. The distinction is more based on where one stops the calculation. For the sake of simplicity this analysis uses the 2.6 multiplier. It includes the total direct, indirect and induced stimulus to the local economy.

construction value, and assuming a factor of 3% on all portions of the project (cooperative and city), the estimated 2005 property taxes would be as follows: to the state, $2,282,067; county, $1,664,338; city, $2,131,606; and school district, $3,075,079. The total annual property tax levy would be $9,153,090 (Chaffee, 2005).

Although no social surveys have been conducted for this EIS, based on widespread experience with similar large industrial projects elsewhere in the state and country, it is possible that some neighbors or nearby residents of the HGS would generally oppose the project on certain grounds, or find some aspects of such a large, new industrial facility in an area that has always been rural to be objectionable, even while supporting the project generally. However, the Proposed Action, at least for the plant site itself, would not bring about any residential relocation, and would not require the use of eminent domain or condemnation. The sellers of the property on which the HGS would be sited are willing sellers. It is unlikely to affect property values, assessments, and property taxes of surrounding rural, agricultural properties, which could continue to be used as farmland and rural residences.

Easement: The right of a person, government agency, or public utility company to use or restrict public or private land owned by another for a specific purpose.

SME would negotiate the purchase of easements with other property owners in the vicinity whose land may be required for transmission line and/or pipeline rights-of-way. When an easement is obtained, it is added to the title of the property, and it travels with the title through ownership transfers, forever restricting its use. Easements can be bought, donated, or negotiated on a specific piece of property. They are usually valid for an indefinite period of time; however, certain easements protecting natural environmental features have been valid for a specific timeframe, such as 30 years. It is most common for easements to be valid *in perpetuity*, and the entity holding it determines the period of time most suitable to its needs and goals. In the event that neither party could agree on mutually acceptable price for an easement or sale in fee simple, SME, working with the state or county, would have the option of resorting to eminent domain.

Eminent Domain: A power reserved by a government agency, usually at the state or local level, to use its legislatively-granted police power to condemn a piece of property for the public use.

Eminent domain is a power reserved by a government agency, usually at the state or local level, to use their legislatively-granted police power to condemn a piece of property for the "public use". "Public use" can include anything furthering the health, safety, and welfare of the general public. In condemning the property, the entity must provide "just compensation" for the property, or pay the market value of the land or structure at the time of condemnation. It is required that the exercise of the eminent domain power be rationally related to a conceivable public purpose (Callies et al., 1994), although a closely watched, very controversial 2005 U.S. Supreme Court decision based on a case in New London, Connecticut gave local governments the right to condemn private property on behalf of private developers whose actions are purportedly fostering broad economic development aims in an area (Anon., 2005). If eminent domain were to be used by local or state government on behalf of an entity like SME, the land would then be fully owned by that entity.

4.15.3 ALTERNATIVE SITE – INDUSTRIAL PARK SITE

4.15.3.1 Construction

With one possible exception, the construction-related socioeconomic impacts of the Industrial Park site would be virtually identical to those of the Salem site or Proposed Action. Overall, the construction of SME's proposed generating station at the Industrial Park site would have a primarily positive or moderately beneficial effect on the socioeconomic environment of the local and regional area, including increases in employment opportunities, total purchases of goods and services, and an increase in the tax base.

The exception relates to the greater proximity of residential development to the site. Approximately seven groups of residences are located within one mile of the Industrial Park site, primarily along Black Eagle Road, Rainbow Dam Road, and Bootlegger Trail. The combination of increased worker and heavy equipment traffic, noise, and fugitive dust associated with a large construction project could prove a distinct inconvenience or annoyance for those individuals with less tolerance for these short-term environmental stresses.

4.15.3.2 Operation

As with construction, during its operational phase, the Industrial Park Alternative would have virtually identical socioeconomic impacts to those of the Proposed Action (HGS at the Salem site). Operation of the CFB coal-fired power plant would require approximately 65 permanent employees with average salaries of $60,000 a year. The total annual payroll would be almost $4 million. Approximately 105 additional indirect and induced jobs would be created via the employment multiplier effect for a grand total of approximately 170 new permanent jobs. The 170 new jobs would result in total population growth in the Great Falls and Cascade County of approximately 400 of which approximately 300 would be new residents in a county with a population of about 80,000.

Figure 4-16. New homes within 1 mile of Industrial Park site

The greater proximity of certain residents to the Industrial Park site could potentially expose them to various environmental stressors, including noise, air emissions and occasional fugitive dust, traffic, and views of industrial facilities rather than open space. While none of these impacts, which are covered in other sections, are significantly adverse in and of themselves, in combination they may degrade the quality of life for more sensitive nearby residents. However, residents close to a designated industrial park may not have expectations that it would resemble a natural park or even remain as empty lots and unused open space. For this reason, while the property values of the nearest residents could possibly decline, the magnitude of this decline is unlikely to

be significant. As with the Salem site, there would be no residential relocations associated with the Industrial Park site, as the City of Great Falls owns the land.

4.15.4 CONCLUSION

Due to the higher electric rates it would likely lead to for SME's members and consumers, the socioeconomic impacts from the No Action Alternative would be somewhat significant and adverse. Other aspects of the socioeconomic environment, such as changes in employment, changes in the tax base and residential relocation, would not be affected by the No Action Alternative. Since no construction and operation of a coal-burning power plant would take place at either the Salem or Industrial Park sites, the No Action Alternative would not result in any adverse impacts at either of these sites.

Summarizing socioeconomic impacts (in particular, on income) of the No Action Alternative using the impact significance definitions described at the beginning of Chapter 4 and presented for Socioeconomic Impacts ("Changes in Income") in Appendix J, the magnitude would be "minor", the duration would be "long-term", the extent would be "medium", and the likelihood is "probable". Overall then, the rating for socioeconomic impacts (income) from the No Action Alternative would be somewhat significant and adverse. Other aspects of the socioeconomic environment, such as direct or indirect changes in employment, changes in the tax base and residential relocation, would be minimal under the No Action Alternative.

Overall, the construction of the HGS at the Salem site would have a moderately beneficial effect on the socioeconomic environment of the local and regional area, including increases in employment opportunities, total purchases of goods and services, and an increase in the tax base. Over the long term, during the operation of the HGS for 30 or more years, it would yield beneficial and potentially significant socioeconomic impacts on aggregate income, employment, and population in the City of Great Falls and Cascade County. It would also provide reliable electricity at reduce rates for SME's customer base.

Using the impact significance definitions described at the beginning of Chapter 4 and presented for Socioeconomic Impacts ("Changes in Income") in Appendix J, socioeconomic impacts on income, employment, and population of the Proposed Action would be of minor magnitude, long-term duration, medium extent, and the likelihood is probable. Overall then, the rating for socioeconomic impacts on income, employment, and population from the Proposed Action would be potentially significant and beneficial.

The rating for socioeconomic impacts on income, employment, and population from the Industrial Park Alternative would be same as for the Proposed Action, potentially significant and beneficial. The caveat is that the Industrial Park Alternative could have greater adverse impacts, though not likely significant ones, on the quality of life of nearby residents.

4.15.5 MITIGATION MEASURES

Since most of the socioeconomic effects from both action alternatives are beneficial, and the adverse effects are not significantly adverse, no mitigation measures are planned or proposed.

4.16 ENVIRONMENTAL JUSTICE/PROTECTION OF CHILDREN

4.16.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no construction or operation of a power plant at either the Salem or Industrial Park sites. As a result there would be no direct impact or effect from a plant on disproportionate numbers of minorities, persons living in poverty, or children at the sites.

However, insofar as SME would need to meet energy supply needs in the service area by purchasing power from existing generation wholesale suppliers located elsewhere, SME's member cooperatives and consumers would be unprotected from future increases in the price of electricity on the open market. Given the volatility of this market, consumers could be paying substantially higher electric rates in the future under the No Action Alternative. Although it is not possible to quantify precisely how much higher, it is not unreasonable to suppose that rates could be 20 percent to 100 percent higher.

The No Action Alternative then, would preclude building a new power plant which would provide a consistent and reliable energy source for the service area. This could lead to indirect economic effects on commercial and residential populations within SME's service area.

Low-income residential consumers would be the most affected population group from increased electrical rates and higher electricity bills. This population group would be least able to afford to upgrade their homes with energy-saving measures, such as installing additional insulation or more energy-efficient appliances and heating systems, in order to lower their energy bills. As a result, low-income residents would potentially have to reduce their electrical usage and could be susceptible to insufficient energy and heating conditions in their homes. This could expose this population group to conditions that would pose risks to their health and safety.

4.16.2 PROPOSED ACTION – HGS AT THE SALEM SITE

4.16.2.1 Construction

The construction of the power plant at the Salem site, and the installation of its infrastructure, would have a negligible effect on disproportionate numbers of minorities, persons living in poverty, or children, as these population groups are not generally present at or near the Salem site.

There are only eight scattered rural residences located within three miles of the site. The closest residence is located approximately 0.5 mile northwest of the site and is owned by the current property owner of the Salem site. Though there would be nuisances such as noise, dust, and traffic associated with construction activities, these impacts would not cause an environmental justice or protection of children concern due to the lack of these affected population groups in disproportionate numbers in the areas impacted by construction activities.

4.16.2.2 Operation

The operation of the plant at the Salem site would create emission of air pollutants, noise, increased rail and road traffic, and visual impacts on adjacent lands. Additionally, the site would be an industrial facility situated amidst agricultural lands. The siting of the plant, and the reliable infrastructure and possible cogeneration energy that would be available in this area once the plant is operational, could potentially influence land uses in the greater vicinity of the site to become more industrialized. These impacts would have a negligible effect on disproportionate numbers of minorities, persons living in poverty, and children, for the same reasons as discussed above under construction impacts. Simply, these population groups are not generally present in disproportionate numbers at the Salem site or the areas affected by the Salem plant's emissions and other operational impacts.

4.16.3 ALTERNATIVE SITE – INDUSTRIAL PARK SITE

4.16.3.1 Construction

The construction of the power plant at the Industrial Park site, and the installation of its infrastructure, would have a negligible to minor effect on disproportionate numbers of minorities, persons living in poverty, or children, as the impacts associated with construction would generally be limited to the construction areas which are agricultural or industrial zoned areas. However, there would be nuisances such as increased noise, dust, and traffic associated with construction activities, and these impacts could have the potential to cause an environmental justice or protection of children concern due if these affected population groups are located in the areas impacted by construction activities.

There is a greater proximity of residential development to the Industrial Park Site compared to the Salem site, though it is by no means a highly populated area. Approximately seven groups of residences are located within one mile of the Industrial Park site, primarily along Black Eagle Road, Rainbow Dam Road, and Bootlegger Trail. These areas are primarily low-density single family home areas and have no known disproportionate number of minorities. Additionally, these residential areas have no known disproportionate number of persons living below the poverty level. In fact, several of the homes located nearest to the Industrial Park Site are newly constructed, relatively large and high-cost single family homes.

Although there would be no environmental justice issues associated with construction activities at the Salem site, children may be presumed to live in several of the residencies near the site. Mitigation measures taken to minimize construction impacts (e.g. employing the use of noise reduction equipment, dust suppression, limitation in the timing of construction), would decrease these impacts below the threshold of significance and should provide adequate protection to children living in the area.

4.16.3.2 Operation

The operation of a power plant at the Industrial Park Site would have the same air pollutant, noise, increased rail and road traffic, visual, and land use impacts as would operating the plant at

the Salem site. The Industrial Park Site, however, has the potential to cause a slightly increased risk of impacting children and persons living in poverty, due to the fact that the site is located in closer proximity to higher population areas and additional industrial sites. No impacts are anticipated to a disproportionate number of minorities, as Cascade County does not have disproportionate numbers of minority groups.

The current burden from existing facilities emitting criteria air pollutants to residents and children living below the poverty line in Cascade County is approximately twice that of the burden to families and children above the poverty line (Scorecard, 2005). Though there are no known concentrated areas of poverty within the areas of impact from the proposed plant's air emissions, consideration was given to not exacerbating the emissions of existing facilities located within the area of impact with additional emissions from the plant. In other words, hypothetically the emissions from the proposed plant could be compounded by other industrial emissions in the vicinity which could potentially place an undue burden of air pollutants on residents downwind of the facilities, particularly children, and if present, low-income residents. The air quality permit analysis looked at the potential of HGS emissions to add to other industrial facility emissions. No additive impacts were found in this modeling of cumulative impacts.

4.16.4 CONCLUSION

There is not a disproportionate number of minorities in Cascade County, and none of the alternatives are expected to have an impact on a minority population group. Further, there is no evidence that siting of the proposed SME facility has targeted areas with disproportionately high levels of racial minorities or impoverished populations. Moreover, there has been no regulatory discrimination of enforcement standards where projects may affect those groups. Finally, there is no inequitable distribution of benefits, primarily economic, with project impacts such as increased pollution to those groups.

The No Action Alternative would involve no direct impact or effect from a power plant on persons living in poverty or children at either the Salem or Industrial Park sites. However, insofar as SME would need to meet energy supply needs in the service area by purchasing power from existing generation wholesale suppliers located elsewhere, SME's member cooperatives and consumers would be unprotected from future increases in the price of electricity on the open market. This could lead to indirect economic effects on commercial and residential populations within SME's service area, which could disproportionately affect low-income residential consumers. Low-income residential energy consumers would potentially have to reduce their electrical usage and could be susceptible to insufficient energy and heating conditions in their homes. These impacts would be moderate magnitude, intermittent-term duration, small extent, and possible likelihood.

The Proposed Action, construction and operation of a power plant at the Salem site, would have a negligible effect on children or persons living in poverty, as these population groups are not generally present at or near the Salem site. The Salem site and its adjacent land is low-density agricultural land, and though nuisances associated with construction and impacts from plant operations would affect areas within this land, there are no particularly susceptible population

groups present in significant numbers within the area to cause concerns regarding environmental justice or protection of children.

Construction and operation of the power plant at the Industrial Park site would involve the same impacts as at the Salem site, however, there is some potential of a slightly increased risk of impacting children and persons living in poverty from this site, due to the fact that it is located in closer proximity to higher population areas and additional industrial sites. The emissions from the proposed plant hypothetically could be compounded by other industrial emissions in the vicinity which could potentially place an undue burden of air pollutants on residents downwind of the facilities, particularly children, and if present, low-income residents. However, during modeling of cumulative air quality impacts conducted as part of the air permitting process, this hypothesis was largely discounted. It is currently considered an impact of minor magnitude, long-term duration, medium extent, and having an improbable likelihood of occurring. Overall impacts would be adverse but non-significant.

4.16.5 MITIGATION MEASURES

Since there are no significant, adverse impacts from the action alternatives anticipated on disproportionate numbers of minorities, persons living in poverty, or children, no mitigation measures specific to Environmental Justice issues are planned or proposed for either of the action alternatives. However, mitigation measures taken to minimize construction and operation impacts to other resource areas (e.g. reduction in noise, visibility, and air quality impacts) would also directly lessen the impacts to any sensitive or susceptible receptors in the impact areas, including children, minorities, or persons living below the poverty level.

4.17 UNAVOIDABLE ADVERSE IMPACTS

The Proposed Action analyzed in this EIS is the construction and operation of the proposed HGS and wind turbines at the Salem site and the associated connected actions. The connected actions of the Proposed Action include the construction and operation of power transmission lines, a rail spur, and potable, raw water and wastewater lines. The construction and operation of the proposed HGS and the connected actions would result in some unavoidable adverse environmental impacts in the Montana and the United States. This section describes these impacts.

Soils, Topography, and Geology

Under the Proposed Action, the total area of disturbance for construction and operation activities would include the total footprint of the power plant, approximately 545 acres, and additional roadway, rail spur, and utility corridor zones. The wind turbines would require approximately 4.5 acres. The construction and operation of a power plant and its associated infrastructure would involve extensive site grading and excavation activities that would compact and displace a considerable amount of soil and alter the topographic contours of the Salem site and its vicinity. Removal of vegetation and compaction would occur in the work areas, with potential impacts on erosion. Soil displacement and compaction would occur during site grading and use of access

roads. Though the impacts associated with topography are considered negligible, because the site is generally evenly contoured already, the impacts to soil resources would be adverse and moderate in magnitude.

Water Resources

Construction and operation of the power plant at the Salem site would have adverse impacts on water resources from the increase in the amount of storm water runoff carrying sediment and contamination loads into surface water from the site, from the risk of contamination to ground water and surface waters in the vicinity of the site, and from the water withdrawals from the Missouri River and subsequent municipal water discharges. The water withdrawals from the Missouri River could reduce the river flows by 0.31 percent, representing an adverse but less than significant impact to the Missouri River flows downstream of the site. The subsequent discharge of wastewater into the City of Great Falls for treatment at its existing wastewater treatment facility would result in adverse and moderate in magnitude impacts.

Direct loss of wetlands and floodplains adjacent to the Missouri River would result from the construction and operation of the water intake structure in the Morony Reservoir and the installation of transmission line and pipeline within the River corridor. These impacts would be adverse and somewhat significant.

Air Quality

Impacts from the Proposed Action would result in adverse but not significant impacts on air quality. Impacts specifically related to construction activities would include exhaust and fugitive dust emissions generated by the operation of construction vehicles, which would cause adverse and moderate impacts to degradation of local air quality in the short term.

The Proposed Action would also cause a number of on-site and off-site impacts on air quality from operation activities. The emission of criteria pollutants and/or trace element deposition would cause adverse and moderate impacts to degradation of local air quality in the long term. Additionally, operation of SME's generating station would cause off-site impacts on PSD Class I increments and several AQRVs (visual plume, regional haze, and acid deposition), that would be adverse and of minor to moderate magnitude. None of these impacts would be significant in and of themselves, though they would contribute small but measurable increments to identified environmental resources in the Class I areas that are significantly affected by air quality impacts. Releases of greenhouse gases and mercury would be adverse and represent a minor incremental contribution to other air quality impacts.

Biological Resources

The Proposed Action would result in several adverse and moderate in magnitude impacts from construction and operation activities related to the plant and its associated facilities. Specifically, adverse impacts would result from the short-term harm to aquatic biota from degraded water quality; the long-term increase in mortality of terrestrial mammals by rail strikes and increased traffic on the plant access roads; the increase in mortality to birds and bats from blade strikes on wind turbines; and the disturbance of wetland habitats during installation and operation of the

water intake structure. These impacts combined would result in adverse though non-significant impacts on biological resources.

Acoustic Environment

Impacts of the Proposed Action would result adverse and less than significant impacts on the acoustic environment. Noise levels associated with the daily operation of a typical 250-MW coal-fired power plant would be caused primarily by the Induced Draft fans, Primary Air fans, Secondary Air fans, transformers, cooling tower, turbine, boiler, coal crusher and trains for coal delivery. Intermittent noise sources associated with the power plant that would not significantly affect the daily operation L_{dn} but could be audible for several miles from the site, including steam line cleaning, start-up steam vents, tonal noise produced by the ID fans, and locomotives used to deliver coal.

The noise levels of typical daily plant operations are not predicted to exceed the EPA guideline of L_{dn} 55 dBA beyond 0.6 mile from the Salem site and are predicted to be approximately equal to the existing ambient noise levels during quiet periods at approximately 3.1 miles from the Salem site. The HGS power plant noise levels are predicted to be less than the 50 dBA nighttime noise limit of the Great Falls Municipal Code for residences, and less than or equal to the EPA L_{dn} 55 dBA guideline, at all of the receptor locations in the study area. Employee vehicle traffic and delivery truck noise is predicted to be less than MDT's L_{eq}(h) 66 dBA impact criteria at 50 feet from the plant access road.

Recreation

Construction and operation of the HGS and wind turbines at the preferred Salem site would result in adverse and minor impacts on recreation in the immediate project vicinity and wider Great Falls area. Though the Proposed Action would not restrict access to either of the two recreational sites in the immediate vicinity of the project site, the Lewis and Clark staging area historic site and the Morony Reservoir, the presence of the power plant 0.8 mile (1.3 km) to the south of the Lewis and Clark historic site would degrade the recreational experience there to some extent for the few visitors the site receives.

Cultural Resources

The Proposed Action would result in adverse and significant impacts on cultural resources from site preparation, staging, construction, maintenance, operations, and connected actions associate with the power plant, wind turbines water lines, transmission lines, rail supply lines. Specifically, the adverse and significant impacts on cultural resources would be a result of the effect that the visual presence of the power plant and its associated facilities would have on the historic scene and the visual landscape qualities of the Great Falls Portage National Historic Landmark. While these impacts could be mitigated, they could not entirely be eliminated by proceeding with the Proposed Action at the Salem site.

Visual Resources

The Proposed Action, including the construction and operation of wind turbines and the proposed transmission line interconnections, would result in adverse and potentially significant impacts on visual resources. The primary reason for these adverse impacts is the large visual change the power plant, wind turbines, and the transmission lines would have on the scenic setting in the project area, and the effect the power plant power plant and its associated facilities would have on the scenic quality of the Great Falls Portage National Historic Landmark.

Transportation

The Proposed Action would result in minor, adverse impacts on traffic congestion from activities related to construction of the power plant and its associated facilities. Specifically, the combined average daily trips (ADT) of vehicles using Salem Road would increase considerably during the construction phase of the project.

Farmland and Land Use

Impacts from the Proposed Action would result in adverse, non-significant impacts on farmland and land use in the vicinity of Salem site. In the context of the amount of quality farmland in other areas of Cascade County, the actual conversion, or development, of the land required for the plant would be adverse and only a minor in magnitude impact. However, the influence and impacts of the power plant and its associated support facilities could indirectly influence land uses on adjoining or nearby properties in the vicinity of the site. The impacts associated with operating the plant could potentially cumulatively affect one particular area and be perceived as adverse enough to residents that they would choose to relocate. Over time this cycle could continue and the predominant land use in the area could change from being primarily farmland to being primarily industrial land. Additionally, the development of the Salem site in of itself may reduce market values of nearby rural, agricultural land. If property values were affected, there would be repercussions on land assessments and property taxes.

Waste Management

Construction and operation of the power plant at the Salem site would result in adverse and moderate in magnitude impacts on waste management. The impacts would primarily be a result of the large amount of debris generated from construction of the plant and its associated facilities, from the risk of leaching associated with the onsite disposal of ash and water treatment system, and from the risk of runoff from any waste piles temporarily stored on site.

Human Health and Safety

The Proposed Action would result in adverse and minor in magnitude impacts on human health and safety. Construction of the power plant and associated facilities would expose construction workers to short-term health and safety risks typically faced in the construction industry. Traffic volumes and the presence of heavy construction equipment on site access roads could potentially cause a negligible to minor increase in vehicular accidents. The emission of an additional minor

increment of mercury to the environment during plant operations would contribute incrementally to the problem of mercury accumulation in the biosphere, wildlife, and humans.

4.18 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

NEPA and MEPA require that environmental analysis include identification of "…any irreversible and irretrievable commitments of resources which would be involved in the Proposed Action should it be implemented." This section thus describes irreversible and irretrievable commitments of resources associated with the implementation of the Proposed Action, as described in Chapter 2 of this EIS.

Irreversible resource commitments are related to the use of nonrenewable resources, such as soils, wetlands and visual resources, and the effects that the uses of these resources would have on future generations. Such actions are considered irreversible because their implementation would affect a resource that has deteriorated to the point that renewal can occur only over a long period of time or at great expense, or because they would cause the resource to be destroyed or removed.

Irretrievable resource commitment of natural resources means loss of production or use of resources as a result of a decision. It represents opportunities forgone for the period of time that a resource cannot be used. Irretrievable refers to the permanent loss of a resource including extinction of a threatened or endangered species, disturbance of a cultural site, loss of land production, or use of natural resources (including minerals and coal). For example, production or loss of agricultural lands can be irretrievable, while the action itself may not be irreversible.

Topography, Soils, and Land Use

The construction and operation of the proposed power plant, and its associated facilities and infrastructure, plus the wind turbines would require the commitment of approximately 550 acres of land for the plant footprint and additional land for roadway, rail spur, and utility corridor zones; and the excavation and/or grading of extensive amount of soil within this land. This commitment would be irreversible for the life of the power plant and the wind turbines. While it is possible that these structures, roads, rail spurs, and utility corridor zones could be removed and the natural landscape renewed, this is unlikely in the foreseeable future.

Water Resources

The consumptive use of 80 to 85 percent of the water diverted from the Missouri River during operation of the plant (which would range from 3,000 to 3,500 gallons of water per minute) would represent an irretrievable commitment of water resources. The diversion of surface water would result in a reduction of the Missouri River flow downstream of the Morony dam by 0.31 percent. Additionally, there would be a direct loss of a negligible to minor amount of floodplains and wetlands as a result of the construction and operation of the water intake structure in the Morony Reservoir and the installation of transmission line and pipeline within floodplain and

wetland areas of the Missouri River. The loss and/or degradation of floodplain and wetland areas would represent an irreversible commitment of water resources.

Biological Resources

The construction and operation of the power plant, wind turbines, and their associated facilities and infrastructure would result in limited irreversible and irretrievable commitments of natural and cultural resources. Vegetation would be irretrievably removed from the footprint of the plant and the additional land dedicated for roadway, rail spur, and utility corridor zone development. The areas occupied by structures as well as the access roads and maintained grounds, would be irreversibly removed from natural habitat for the duration of the existence of the plant. Although some sensitive species might be affected by construction, it is unlikely that threatened or endangered species or their habitat would be harmed.

Cultural and Visual Resources

The presence of the power plant, wind turbines, and their associated facilities would impact the visual and cultural resources of the Great Falls Portage NHL. This commitment of the Great Falls Portage NHL viewshed would be irreversible for the duration of the presence of the power plant and its facilities. While it is possible that the plant, turbines and associated facilities could be removed and the natural landscape of the area renewed, this is unlikely in the foreseeable future.

Construction Materials

Construction of the HGS and its secondary actions would result in both the irreversible and irretrievable use of construction materials. Many of the materials used for constructing the plant, transmission poles, and wind turbines, in particular the steel and other metals that would have to be committed, are ultimately recyclable but would remain an irreversible commitment of resources for the life of the project. Other construction materials, such as insulation materials, plastics, concrete, siding, piping, and so forth, would in large part likely represent an irretrievable use of materials, as upon any demolition of structures at the end of the project life, these materials would be ultimately disposed of at a landfill.

Moderate quantities of fossils fuels would be irretrievably consumed during the construction of the power plant, wind turbines, and their associated facilities. Diesel fuel and gasoline would be consumed by construction equipment such as bulldozers, backhoes, earth scrapers, motor graders, heavy haul trucks, large tractors, concrete trucks, asphalt pavers, concrete pavers, rollers, and compactors, and cranes, during the two years and seven months estimated for completion of construction activities. Aviation fuel would be consumed by helicopters assisting in construction related activities. The consumption use of fuel during construction activities would not constitute a long-term drain on local resources.

Operation Materials

Operation of the power plant at the Salem site would result in the irretrievable commitment of several resources, including coal, limestone, ammonia, fuels, and processing chemicals. Coal consumption is estimated to be 259,300 lb/hr, or 1,135,800 tons/yr. Limestone and ammonia would be purchased and used to reduce air pollutants. Limestone would be consumed at a rate of approximately 5,780 lb/hr or 25,300 tons/yr. Ammonia would be consumed at 50 lb/hr (220 tons/yr).

Processing chemicals and maintenance chemicals such as oils, paint and paint thinner, and solvents and degreasers, would also be consumed during plant operations. In addition, all of the energy, fuels, and other materials, such as processing chemicals and maintenance chemicals, including oils, paint, paint thinner, solvents and degreasers, would also be consumed during plant operations and would represent irretrievable commitments of resources to the Proposed Action.

4.19 RELATIONSHIP BETWEEN SHORT-TERM USE OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

NEPA and MEPA require consideration of the relationship between short-term uses of the environment and long-term productivity associated with a Proposed Action. This involves the consideration of whether a Proposed Action is sacrificing a resource value that might benefit the environment in the long term, for some short-term value to the sponsor or the public.

In the context of the short-term uses of the environment associated with the operation of the HGS and the long-term impairment of environmental resources as they have been analyzed in this EIS, short-term refers to the that period of time encompassing the life span of the power plant and its associated facilities to the period of time encompassing the disassembly of the plant and subsequent restoration and rehabilitation activities. Long-term refers to that period of time following restoration and rehabilitation activities, during which consequent impacts from the Proposed Action still affect the environment.

The proposed short-term uses of the environment associated with the Proposed Action are the development of 545 acres of land for the footprint of the power plant and additional land for roadway, rail spur, and utility corridor zones; the consumptive use of 2,400 to 3,000 gallons of water per minute of Missouri River water; the direct loss of farmland, vegetation, wildlife habitat corridors, and floodplains and wetlands; and the consumptive use of coal, limestone, ammonia, and other nonrenewable resources.

Upon retirement and disassembly of the power plant and its associated facilities, the developed land would be returned to uses similar to the currently existing use of predominantly low to moderate valued farmland. The projected period before natural conditions return to an approximate pre-project status within the project area is expected to exceed several decades following completion of restoration activities. Organic content, biological activity, and horizon

development in the replaced soil surface layers of the project area would be expected to take an especially long time to approach background conditions. On the other hand, the long-term loss of productivity in the soils may eventually be greater than pre-project conditions, due to the continued loss of topsoil and organic constituents from current agricultural practices.

Water withdrawals from the Missouri River would cease immediately and concurrently with retirement of the power plant. As a result, flows in the Missouri River would recover the amount of water withdrawn for plant operations immediately following plant retirement. This may result in a temporary increase in erosion of the river banks as the velocity and volume of water flowing downstream of Morony dam could experience a negligible to extremely minor increase. River flow conditions would adapt and recover after several years at the most. Floodplains and wetlands restored following equipment removal and rehabilitation efforts would take several decades to recover pre-development characteristics. However, if restoration were to implement efforts to enhance riparian zones along the Missouri River, long-term productivity could eventually increase as compared to current conditions, which are characterized by limited productivity of area floodplains and wetlands.

Immediately following the disassembly of the power plant and its associated facilities, and regrading and revegetation of the project site, the viewshed associated with the Great Falls Portage National Historic Landmark could be restored, and the associated visual and cultural resource impacts could be mitigated.

To the extent that operation of the power plant contributes incrementally to the long-term forcing of climate change and global warming due to its air emissions including greenhouse gases, or contributes to the long-term increase in pollutant and trace metal deposition, this project could contribute in a minute but non-trivial way to potentially significant potential impacts on long-term productivity of terrestrial and aquatic ecosystems dependent on the climate system. The relative emissions from this facility, compared to national and global emissions, are discussed in this EIS.

The short-term social gains associated with the Proposed Action would result in beneficial long-term socioeconomic productivity in the vicinity of the project site. The Proposed Action would generate net socioeconomic benefits for the local and regional economy over the anticipated time of the project life and for several decades thereafter. Between 300 and 400 temporary construction jobs at any given time, and approximately 65 full-time jobs, would be created by the Proposed Action. Total payroll for the construction workers is anticipated to be approximately $100 million, and the total annual payroll for full-time employees is anticipated to be approximately $4 million.

The total economic stimulus to the Great Falls/Cascade County area during the life of the project would be about $10.4 million (2.6 x $4 million) annually. An additional economic benefit of the project is the property taxes that SME would pay to the state, county, city, and school district. Assuming the taxable value runs close to the estimated construction value, and assuming a factor of 3% an all portions of the project (cooperative and city), the estimated 2005 property taxes would be as follows: to the state, $2,282,067; county, $1,664,338; city, $2,131,606; and school district, $3,075,079. The total annual property tax levy would be $9,153,090.