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ABSTRACT

This paper examines the environmental impacts of replacing the Bison, South Dakota School District's elementary and high school heating system consisting of oil-fired boilers, and supporting electrical components with a new coal-fired boiler and supporting control system piping. Various alternative systems are also examined, including purchasing a newer, high efficiency oil-fired boiler; and using natural gas, propane, or electric heating. A description of the affected environment is provided followed by a discussion of the environmental effects of the proposed action. Environmental areas examined include air and water quality, waste management, land use, visual and recreational resources, socioeconomic, noise, safety and health, and transportation. An appendix provides various maps, letters from South Dakota environmental agencies, and data on air emissions from the school's present and proposed boilers. (GR)

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PREFACE

This environmental assessment has been prepared in accordance with the provisions of:

- The National Environmental Policy Act (NEPA) of 1969, as amended;
- The Council on Environmental Quality's regulations codified in 40 CFR Parts 1500-1508, "Council on Environmental Quality Regulations for Implementing the Provisions of the National Environmental Policy Act;"
- The Department of Energy's regulation at 10 CFR Part 1021, "National Environmental Policy Act; Implementing Procedures and Guidelines Revocation; Final Rule and Notice."

1.0 PURPOSE AND NEED FOR AGENCY ACTION

This environmental assessment (EA) analyzes the environmental impacts of replacing the Bison, South Dakota School District's elementary school and high school (the School) heating system consisting of oil-fired boilers and supporting electrical components with a new coal-fired boiler and supporting control system and piping. Funds for the proposed action would be through a grant under the Institutional Conservation Program (the Program). The Program, administered by the U.S. Department of Energy, was authorized by the Energy Policy and Conservation Act (Public Law, 42 U.S.C. 6371 et seq. The Program's matching grants program is voluntary and is designed to assist public and private non-profit schools and

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hospitals conduct effective energy conservation programs.

The existing oil-fired system, of boilers, one located in the Bison High School and the other located in the Bison Elementary School building is aging -- the boiler in the high school is over 50 years old, and the boiler in the elementary school is over 20 years old. The two boilers require extensive maintenance, repair, and supervision annually, and replacement parts, particularly for the older boiler, are difficult to obtain. The boilers are inefficient, and the costs of fuel oil are variable. The School is concerned about escalating operations costs associated with these aging and inefficient boilers and desires to replace them with a more efficient and cost-effective system that meets its heating needs and attains greater energy conservation.

2.0 BACKGROUND

The Bison School District is located in Bison, South Dakota. The property on which the proposed action would be sited is comprised of an elementary school (the Bison Elementary School) and a high school (the Bison High School), with supporting gymnasium, playground, and athletic fields, all co-located on the same piece of property. Bison, a small community of approximately 500 people, is located in Perkins County, in the northwestern part of the state, approximately 48 kilometers (30 miles) south of the South Dakota/North Dakota line, 40 kilometers (25 miles) west of Corson County, 48 kilometers (30 miles) east of Harding County, and 64 kilometers (40 miles) north of Meade County (see Appendix A, Figure 1). The property occupies roughly 1.0 hectares (2.5 acres); the total area of the building complex is roughly 3,580 square meters (38,400 square feet) (see Appendix A, Figures 2, 3, and 4). The original building was constructed in 1938, and additions were made in 1961, 1966, and 1970. (See Sections 4.5 and 4.6 for additional description of the site.)

The present heating system consists of two oil-fired boilers. The older boiler, installed in the present high school building in 1939, is a Kawanee rated at 1.8 million British thermal units per hour (Btu/hr) and has a combustion efficiency of approximately 50 percent; there is an 11-meter (35-foot) chimney for this boiler. The second boiler, installed in the present elementary school building in 1973, is a Dunham-Bush rated at 1.3 million Btu/hr and has a combustion efficiency of approximately 75 percent; there is a smoke-stack (no chimney) for this boiler that extends approximately 1 meter (3 feet) over the roofline, for a total height above ground of about 5.5 meters (18 feet). In combination, the two boilers have a combustion efficiency of about 65 percent. (Reference 1)

3.0 PROPOSED ACTION AND ALTERNATIVES

3.1 The Proposed Action

The Department's proposed action is to fund 50 percent (\$77,476) of the amount required (\$154,952) for the purchase and installation of a new coal-fired heating system for the School to replace its existing oil-fired boilers, which would be retained as a back-up system. This environmental assessment has been prepared in connection with the School's grant application for the \$77,476 under the Program.

Submitted on January 6, 1993, the School's application for Departmental grant assistance has been evaluated under applicable program guidelines. The School's buildings were evaluated under the Technical Assistance Program Study and Report requirements pursuant to 10 CFR 455.42. (Reference 1) These reports were prepared by qualified Technical Assistance Program analysts in accordance with 10 CFR 455.90. The proposed new coal-fired boiler would be considerably smaller than those requiring review by the U.S. Environmental Protection Agency.

Through the cost-shared Program grant from the Department of Energy, the School proposes to replace the

existing oil-fired system and install a new coal-fired boiler and control system, with new piping and wiring to connect the new boiler to the existing heating system, as an energy conservation and operating cost reduction measure. The proposed system would be a completely self-contained, closed-loop system.

There are distinct advantages to purchasing and installing a new coal-fired system:

- Coal provides a high Btu value at a low cost: coal costs roughly \$1.51 per million Btu, while fuel oil costs \$5.20 per million Btu. (Reference 2) Further, the cost of coal has been relatively stable, while the cost of fuel oil is subject to variability. Use of coal as a fuel source would be consistent with the National Energy Strategy and would help the School reduce its operating expenditures. The School anticipates reducing its heating costs by over \$16,000 a year and realizing simple pay-back for the proposed action within 4.8 years. (Reference 1)
- Use of coal as a fuel would eliminate dependency on domestic and imported oil.
- Substituting a coal-fired system for the present oil-fired system would help support the market for regional coal.

The proposed action would involve the following activities:

- Purchase and installation of a 3.3 million Btu/hr coal-fired hot water heating plant with a combustion efficiency of approximately 80 percent;
- Purchase and installation of a 27-square meter (288-square foot) (3.5 X 7.5 meters or 12 X 24 feet) prefabricated, movable building in which to house the new coal-fired boiler. This building would be bolted to a concrete pad poured on an existing hard-surface parking area;
- Purchase and installation of a covered bin of between 29.5 and 49.2 metric tons (30 and 50 tons) capacity for coal storage;
- Purchase and installation of a covered, wheeled trailer of approximately 1.9 metric tons (2 tons) capacity for temporary storage of coal ash pending its pick-up for disposal;
- Extension of hot water supply and return lines to tie the new coal-fired hot water heating plant to the remainder of the existing heating system; and
- Installation of heat exchangers to make the new, single coal-fired heating plant compatible with the existing heat transfer system (under the present system, the older oil-fired boiler provides steam heat to the high school and gymnasium buildings, and the newer oil-fired boiler heats the elementary school building).

The proposed action would take approximately 90 days to accomplish from start to finish; however, most of this time would involve final design, ordering the new boiler and support components, and off-site construction of the boiler's housing building, which would be designed as a portable/removable unit. Actual on-site "construction" would be limited to installation activities, including laying a concrete pad on the existing paved surface on which to mount the housing building, off-loading the building and the boiler, emplacing the building by bolting it to the concrete pad, installing the new boiler in the housing building by bolting it to the building floor, and installing/connecting the required support components to hook the new boiler up to the existing water and electrical lines. This on-site installation phase would last only approximately 35 days.

Once operational, the new coal-fired boiler would be run 24 hours a day, 7 days a week during the five-month period of November through March. It would be run on an as-needed basis from September through October and from April through May and would be shut off completely during the summer months.

Appendix A, Figure 3, a simplification of part of Figure 2, illustrates approximately the location of the proposed action relative to the School property and the residential and non-residential properties

immediately surrounding it. Appendix A, Figure 4, illustrates approximately the proposed action's siting relative to the School's buildings and the rest of the complex. Specific details of the action (e.g., size and exact placement of the coal and ash bins, exact routing and placement of supply and return lines, etc.) will not be known until completion of the project's design phase, which will not occur until the project is approved and a designer is selected and contracted.

The current heating system consists of two No. 2 fuel oil-fired boilers. The heating plant consists of one Kawenee boiler and one Dunham-Bush boiler. As previously noted, these boilers have output ratings of 1.8 and 1.3 million Btu/hr, respectively, and a combined combustion efficiency of about 65 percent. (Reference 1) Fuel oil consumption is roughly 112,426 liters/year (29,700 gallons/year) at a cost of roughly \$21,402. (Reference 1) Fuel oil is delivered by truck from different distributors, depending on refinery source, from as far away as Livingston, Montana, (724 kilometers or 450 miles) to as close as Bismarck, North Dakota, (280 kilometers or 175 miles). Historically, the School has used an average of four annual loads of between 18,925 to 22,710 liters (5,000 to 6,000 gallons) each and eight smaller annual shipments of 1,893 to 3,028 liters (500 to 800 gallons) each.

The School would obtain sub-bituminous coal, with a sulphur content of approximately one-half of one percent, from Sheridan, Wyoming, located roughly 483 kilometers (300 miles) from Bison. The coal would be delivered to the School by truck, and the new system would require approximately 197 metric tons (200 tons) of coal per year. Depending on the size of truck used by the local supply company (this would depend upon road restrictions, weather conditions, and truck availability), between 5 to 20 shipments per year would be required. The coal would be stored in metal receiving bins located inside the boiler housing building for auger-feeding to the boiler. The spent ash would be manually auger-fed to and stored in a covered metal wagon for transportation to the local landfill. The boiler would be designed to require only intermittent evacuation of ash, and auger feeding of ash from the boiler to the ash wagon would be performed at most twice a day.

While coal might have to be delivered from up to twice the distance of the presently used fuel oil, the choice of coal as fuel for the School's system offers the advantage of providing a high Btu value at low cost, as identified above. Further, coal can be stored in greater quantities than oil, thereby reducing the risk of contingencies such as unpredictable weather, which often can hamper timely tanker truck delivery of fuel oil. The main disadvantage of using a coal-fired system would be an increase in air emissions and the generation of bottom ash waste requiring disposal. The air emissions that would be released by the proposed system, as compared with the present system, are shown in Appendix C, Table 1 and are discussed in Section 5.1.

As noted above, the new boiler system would be installed in a prefabricated building to be placed adjacent to the present high school building in an open (parking) area owned by the School. The all metal (steel) boiler room building, designed to be portable, would be bolted to a concrete pad that would be laid over the existing paved area. The building would be approximately 27 square meters (288 square feet), with a height of about 5 meters (15 feet) at its eave; it would include a new 15.3-meter (50-foot) (total height from the ground) steel-insulated chimney. No asbestos management would be required within the new system. Upon completion of the building and installation of the proposed system, the area north of the boiler building would remain open (parking) space.

3.2 Alternative Actions

3.2.1 Purchase of a New, Higher Efficiency Oil-Fired Boiler

This option was dismissed from further consideration because it would not adequately resolve the School's need to reduce its escalating heating costs and achieve greater energy conservation. The School has

identified that greater cost savings and energy efficiency could be realized through conversion to a coal-fired boiler.

3.2.2 Natural Gas as an Alternative Fuel

This option was dismissed from further consideration because there are no public utilities or private firms that currently supply natural gas to Bison, South Dakota.

3.2.3 Propane as an Alternative Fuel

Propane is a natural gas substitute with lower heating values. This alternative was dismissed from further consideration for this and other reasons. While propane would create lesser air emissions impacts, its use would not provide the safe, reliable fuel source the School seeks; there is a greater hazard of fire or explosion, which would place staff and students in greater jeopardy. Creating additional storage capacity at the School for propane would cause other concerns, including insurance issues involved with storage tank location and increased liability. Since propane would be delivered by truck from a greater distance than the available coal for the proposed action, inclement weather could delay fuel delivery, raising questions about the reliability of this fuel source. Finally, propane is less cost-effective than coal, as indicated by a spot market price of \$6.39 per million Btu as compared with \$1.51 per million Btu (Reference 2) for coal.

3.2.4 Conversion to Electric Heat

Conversion to electric heat was dismissed from further consideration as an alternative because it is more efficient to generate heat on-site than from existing external power sources due to transmission line losses and additional efficiency losses of electrical resistance heating. To heat the School with electric resistance heating, more coal would be burned by off-site power plants than by the proposed action (in order to compensate for transmission line losses), resulting in greater air emissions. This option also would increase heating costs prohibitively: \$1.51 per million Btu for coal versus \$16.99 per million Btu (Reference 2) for electricity.

3.2.5 Conversion to Heating from Solar, Wind, Geothermal Energy

Solar, wind, and geothermal heating alternatives were also dismissed from further consideration. The School's technical review determined that these alternate energy generating technologies were not practical for the building's heating requirements -- the limited solar, wind, and geothermal resources, coupled with their high capital costs, preclude them from being a suitable alternative.

3.3 The No Action Alternative

Under the No-Action alternative, the new coal-fired system would not be installed in the School, and the School would continue operation of the existing oil-fired system. The No Action alternative would not resolve the School's concerns of escalating maintenance and heating costs nor achieve its energy conservation goals. In addition, the potential benefits derived from installation of the proposed system, including improved combustion efficiency, reduced heating costs, reduced consumption of oil, and expansion of the regional coal market, would not be realized.

4.0 DESCRIPTION OF AFFECTED ENVIRONMENT

4.1 Air Quality

Bison and the surrounding area are within attainment for all criteria pollutants, as indicated in 40 CFR 81.342: for total suspended particulates (TSPs), Bison is included in the "Rest of State" designation as "Better than national standards"; for sulphur dioxides (SO₂), the entire state is designated as "Better than national standards"; for both carbon monoxide (CO) and ozone, Perkins County is designated as "Unclassifiable/Attainment"; and for nitrous oxides (NO₂), the entire state is designated as "Cannot be classified or better than national standards." As reported by the South Dakota Department of Environment and Natural Resources, monitoring data in the Bison area indicates that current pollutant levels are well below both Federal and state ambient air quality standards. (Reference 1) The air is generally clear with excellent visibility since much of it arrives by way of the Rocky Mountains and Canada. During the summer, the wind is most frequently from the south and southeast; during the winter, it is most frequently from the north and northwest, according to information provided by the National Oceanic and Atmospheric Administration based on information for Rapid City, South Dakota, about 170 kilometers (105 miles) southwest of Bison and the closest weather reporting station to Bison. Wind speeds are often moderate at mid-day and almost calm at night, averaging about 18 or 19 kilometers (11 or 12 miles) per hour on a year-round basis. NOAA information also indicates the area of the proposed action has only about 23 days a year with no wind.

4.2 Ecological Resources

The School has been in operation for more than 75 years, and the site has been disturbed extensively. There are no known Federally or state-listed threatened or endangered animal or plant species or critical habitats present on or near the site of the proposed action. (See the letters to/from the South Dakota Department of Game, Fish, and Parks and the U.S. Fish and Wildlife Service in Appendix B.)

4.3 Water Quality

No surface waters cross the site of the proposed action. The nearest surface water to the site is an unnamed wetland (a slough), located roughly .8 kilometers (.5 miles) northeast of the School District, on the opposite side of a main north-south road. There is no interaction with either the waterway or groundwater sources. Nothing is drawn from either source, and nothing is introduced into them. (See the letters to/from the South Dakota Department of Game, Fish, and Parks and the U.S. Fish and Wildlife Service in Appendix B.)

4.4 Floodplains and Wetlands

The School is not located in a floodplain and thus the proposed action would not take place in a floodplain. No wetlands are located within the School's site boundary. The nearest wetland to the site is the previously mentioned slough located approximated .8 kilometers (.5 miles) northeast of the School District.

4.5 Land Use

The School occupies roughly 1.0 hectares (2.5 acres), or roughly five city blocks, within the city limits of Bison (see Appendix A, Figure 2), in a region of South Dakota characterized by rolling hills. The area immediately surrounding the School property (see Appendix A, Figure 3) has no residential homes within one city block, 91.5 to 106.8 meters (300-350 feet), to the west and south/southwest. Homes within Bison average five to six houses per city block. Immediately to the east and southeast of the School are nine homes, six of which presently are occupied. These homes, all of wood frame construction and from 4.6 to 15.3 meters (15 to 50 feet) apart, are 91.5 to 183 meters (300 to 600 feet) from the location of the proposed boiler and its housing building. Except for these homes, all property east and northeast of the School is non-residential. Immediately across the street to the south of these homes, about 91.5 to 213.5 meters (300

to 700 feet) from the site of the proposed action, is another series of similar homes. About 183 meters (600 feet) to the north of the proposed boiler's site (just across the street at the School's northern boundary) is another residential area. The properties immediately to the northwest, west, and south/southwest of the site of the proposed action all are non-residential. Construction and operation of the proposed action would occur within the confines of the existing site. No additional lands are required for the proposed action. No prime, unique, or important farmlands are present at the site.

4.6 Visual and Recreational Resources

The site of the proposed action is surrounded by parking areas, School buildings, schoolyard/playground, commercial/non-residential property, and residential housing. As noted above, the area surrounding the School property has no residential homes within one city block to the west and south/southwest, and, except for the six occupied homes immediately to the east/southeast of the proposed action, to the east and northeast. The nearest public or private recreational areas are the School playground adjacent to the site, used primarily in the warmer months. The closest components of the School playground are three swing sets and a free-play area approximately 46 meters (150 feet) east of the proposed boiler's location; the School basketball court is approximately 122 meters (400 feet) to the northeast of the proposed boiler's location.

4.7 Historic and Archaeological Resources

The South Dakota State Historic Preservation Officer, in a letter dated October 31, 1994 (see [Appendix B](#)), confirmed that no known resources having historic, architectural, or archaeological significance, including Native American burial grounds or sacred use areas, are in the vicinity of the proposed action.

4.8 Socioeconomics

The boiler and its housing building would be built at another site (not by the local work force) and moved to Bison. Local site work for installation of the boiler and its prefabricated housing building would be performed by a local work force of between two to 10 individuals. There are no Native American Tribes or low income or minority communities in proximity to the Bison School District. A socioeconomic profile of the Bison region is not included in this EA because the work force for the proposed action's installation and operation would be small and, as discussed in Section 5.9, the proposed action would have negligible socioeconomic effects.

5.0 ENVIRONMENTAL EFFECTS OF PROPOSED ACTION

5.1 Air Quality

Impacts from fugitive dust or smoke from installation of the proposed system would be limited in duration to the approximately 35-day installation period and would be mitigated through such appropriate control measures as spraying water for dust control.

Operation of the proposed system would result in additional air emissions. A review comparing the proposed action to the existing system was conducted by the South Dakota Department of Environment and Natural Resources. The results of this review are presented in [Appendix C](#), including a table comparing emissions of the present and proposed systems. The table is reproduced below for ease of reference:

Bison School District Air Contaminant Emissions

Emissions	Actual Tons Per Year					
	TSP	SO2	NO2	CO	VOCnm	VOCm
Existing Equipment	0.04	1.06	0.4	0.08	<0.01	<0.01
Proposed Equipment	1.6	1.9	0.8	0.6	<0.01	<0.01

As the table indicates, there would be a large increase in total suspended particulates (TSPs). Increases in sulphur and nitrous dioxides (SO₂ and NO₂) and carbon monoxide (CO), however, would be slight. There effectively would be no change in volatile organic compounds (VOCs). Further, the anticipated combustion efficiency of the proposed coal-fired boiler is higher than either of the older oil-fired boilers separately or in combination, as illustrated in the table below: (Reference 1)

Boiler Combustion Efficiency Comparison

Boiler	Combustion Efficiency
Existing Kawanee Oil-Fired Boiler	50%
Existing Dunham-Bush Oil-Fired Boiler	75%
Existing Oil-Fired Boilers Combined	65%
Proposed New Coal-Fired Boiler	80%

The South Dakota Department of Environment and Natural Resources determined that the total emissions would have no impact on the ambient air in the Bison area and that, based on its compliance with state regulations, the School is exempt from having to obtain an air quality operating permit for either the existing boilers or the proposed new boiler, even taking into account the projected increase in TSPs. Given the primary north/northwest

winter wind direction and average 18- or 19-kilometer (11- or 12-mile) per hour winds, the relative east/northeast direction of the School's playground and athletic areas from the site of the proposed boiler, and the primary rural nature of the city of Bison, the proposed action is expected to have negligible, if any, air emissions impacts upon School students or area residents. (NOTE: In the absence of a dispersion model, which would require approximately one year's accumulation of baseline data, more detailed study of air impacts [concentrations and exposures] cannot be made. Because of the size of the proposed system, the small amount of projected emissions, and the expectation that a dispersion model likely would allow no greater quantification of impacts or their significance, such a model is not planned to be developed.)

5.2 Ecological Resources

Implementing the proposed action would not affect any natural areas or any wildlife habitats. No vegetation would be cleared during the proposed action's installation phase. No endangered or threatened animal or plant species or habitats would be affected during the proposed action's installation or operational phases. Disturbance to wildlife resulting from noise would be localized and limited to the installation period. Installation activities would not affect wildlife life cycles adversely. (See the letters to/from to the South Dakota Department of Game, Fish, and Parks and the U.S. Fish and Wildlife Service in Appendix B.)

5.3 Water Quality

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No surface waters cross the site of the proposed action, and the nearest surface water to the site is roughly 6.4 kilometers (4 miles) away. The site for emplacing the proposed boiler and its housing building is located beside the existing High School building on an already paved area. The proposed boiler would make use of a closed-loop system, the boiler's coal bin would be placed inside the housing building, and the ash bin, while outside, would be metal-covered; therefore, no changes in stormwater runoff quantity or quality are expected (see the letters to/from the South Dakota Department of Game, Fish, and Parks and the U.S. Fish and Wildlife Service in Appendix B).

Coal and ash storage in closed containers on a concrete pad above the present parking surface, would virtually eliminate the danger of leachate entering local groundwater. Any accidental spillage of coal or ash during loading/unloading operations, although not specifically quantifiable, would be expected to be small and inconsequential. Because the proposed boiler and its housing building would be placed on concrete above an existing paved area, clean-up of accidental coal or ash spillage could be accomplished readily.

Because the proposed coal-fired facility would be a closed-loop system, it would be filled once, using approximately 1,137 liters (300 gallons) of city water. On a daily basis, no additional water would be needed. Also because it would be a closed-loop system, there would be no effluent discharge.

5.4 Floodplains and Wetlands

Neither floodplains nor wetlands would be affected by the proposed action.

5.5 Waste Management

Construction debris generated by the proposed action would be disposed of in accordance with local, state, and Federal requirements.

The proposed action would generate no hazardous wastes. The South Dakota Department of Environment and Natural Resources has estimated the heating system would generate roughly 14.7 metric tons/year (15 tons/year) of bottom ash. (Reference 1) This ash would be transported by truck in approximately eight shipments per year and disposed of at the Bison City Landfill, located about 2.4 kilometers (1.5 miles) north/northwest of the City. The Bison City Landfill is a controlled site approved by the South Dakota Department of Natural Resources. With approximately 30 years' remaining life for this landfill, there is adequate capacity to accommodate the bottom ash from the School's proposed coal-fired boiler. Additionally, if ever needed, there exists space tentatively designated for a new, regional landfill, with about 50 years' projected life, about 24 kilometers (15 miles) southwest of the City of Bison to which the School could send its ash.

5.6 Land Use

Land use impacts of the proposed action would be limited to the localized area of disturbance and consistent with the present use of the site (see Appendix A, Figure 4). The proposed action would comply with local requirements as an allowed use as a city facility and would not conflict or interfere with present usage of the existing School site. The paved area that would be utilized for the boiler and its housing building is not used currently except for parking. Following installation, the paved area around the installed boiler and its housing building would revert to its original use. Because the boiler and its housing building would be constructed to be portable, they would be relatively easy to remove should this be necessary in the future.

5.7 Visual and Recreational Resources

Upon completion of the proposed action's construction phase, the final appearance of the small building housing the new boiler would be consistent with the existing School complex and the character of the surrounding area. The 15.3-meter (50-foot) chimney stack would not have an adverse impact even though it would be taller than the existing 11-meter (35-foot) existing chimney on the high school and the 1-meter (3-foot) existing smokestack (total of 5.5 meters [18 feet] above ground height) on the elementary school; it would be shorter than a 23-meter (75-foot) communications tower about 4 blocks northwest of the site and a 20-meter (65-foot) water tower about two blocks southwest of the site. Existing recreational areas would not be affected. Other than the School playground and its facilities, located approximately 46 meters (150 feet) east of the proposed boiler and housing building, there are no public recreation sites or trails on the site.

5.8 Historic and Archaeological Resources

No historic or archaeological sites have been identified by the South Dakota Historic Preservation Officer (see letter in [Appendix B](#)).

5.9 Socioeconomics

Installation of the proposed boiler and its housing building would require an estimated work force of 2 to 10 local workers to be employed for roughly 35 days. Given the size of the community, these jobs would have a small short-term benefit to the area, but no significant changes in area economic, housing, or infrastructure conditions are expected.

No disproportionately high and adverse human health or environmental effects on Native American, low-income, or minority communities would be expected because such communities are not located in proximity to the site of the proposed action.

The most significant benefits would be reduced energy costs to the School and increased demand for regional coal.

5.10 Noise

Increased sound levels would be generated during installation activities associated with the proposed action. The nearest residence is roughly 91.5 meters (300 feet) southeast of the site. Because of the limited installation activities, the nature of the site, and the distance to residences, the net increase in noise attributable to installation activities would be imperceptible. Further, any installation activities would be limited to standard working hours. Because they are expected to be very minor, the precise levels of these increased temporary noise levels were not estimated.

Once operational, noise associated with the proposed action would be at levels imperceptible to surrounding residences. Work place noise exposure from the proposed action would be maintained within established state and Federal standards.

5.11 Safety and Health

No safety or health impacts to the School's faculty, students, or nearby residents are expected to result from the proposed action. Any potential exposure of these individuals would be minimized by a combination of engineering controls and implementation of appropriate safe work practices and procedures. Training

programs would be provided to ensure that operators are aware of potential hazards associated with the proposed system.

5.12 Transportation

It is expected that the proposed action would generate an insignificant number of vehicles during either its installation or operational phases. Further, because of low traffic projections, motor vehicle emissions would be insignificant.

On-site construction activities would be of short duration and limited to delivery and installation of the boiler and the portable housing building and daily commuting of trades people for connection of the boiler with the School's electrical and water systems. Installation activities could result in an estimated increase of no more than ten vehicles daily for approximately 35 days. This small increase in traffic volume could be accommodated easily by the existing transportation network.

Because operating the proposed coal-fired boiler would create less than one new permanent job, the only permanent traffic impacts would be those associated with shipments of coal from the mine to the School and transportation of ash from the School to the Bison City Landfill. As noted in Section 3.1, the number of coal shipments per year to satisfy the anticipated 197 metric tons (200 tons) required by the new boiler could range from as few as 5 to as many as 20, depending on the size of truck used by the local supply company, as determined by road restrictions, weather conditions, and truck availability. Generally, however, it is anticipated that 10-ton trucks would be used, meaning that the upper estimate of 20 shipments could be expected. Based on information in Section 5.5 of this EA, approximately eight shipments of ash per year are projected. These small increases in traffic volume could be accommodated easily by the existing transportation network, particularly taking into account that the present average of four annual loads of between 18,925 to 22,710 liters (5,000 to 6,000 gallons) each and eight smaller annual shipments of 1,893 to 3,028 liters (500 to 800 gallons) each of fuel oil would be eliminated with implementation of the proposed action.

Risks associated with commercial truck transportation can be expressed as an estimate of injury or fatality to the public and the driver(s) as a result of physical trauma from vehicle collisions. Data collected by the Department of Commerce (Reference 3) indicates that the death and injury rates are 9.56×10^{-9} fatalities/kilometer (1.53×10^{-8} fatalities/mile) traveled and 6.25×10^{-8} injuries/kilometer (1.0×10^{-7} injuries/mile) traveled for commercial trucks on mainly rural highways.

Based on an average of 12 fuel oil shipments annually from either Bismarck, North Dakota, (280 kilometers or 175 miles) or Livingston, Montana, (724 kilometers or 450 miles), the annual probability of a fatality resulting from a truck accident is between 3×10^{-5} and 8×10^{-5} . The annual probability of an injury resulting from an accident is between 2×10^{-4} and 5×10^{-4} . Conversion to coal would result in a slight increase in these annual probabilities to 1×10^{-4} for fatalities and 6×10^{-4} for injuries, assuming 20 coal shipments per year at 483 kilometers (300 miles) per shipment and 8 ash shipments per year at 24 kilometers (15 miles) per shipment.

5.13 Cumulative Impacts

Because of the limited nature of the proposed action, it is not expected that there would be any cumulative, or overlapping, impacts resulting from it. There have been identified no commercial coal-fired plants within a 40-mile radius of Bison although there is a coal-fired school plant about 45 miles northwest of Bison in Hettinger, North Dakota. Most of Bison's residences have electrical resistance heating systems; few if any (exact number not available) utilize coal-fired furnaces. Only two commercial coal-fired furnaces have been identified in Bison, one in a bowling alley (approximately 250 thousand Btu/hr) and a

hand-fed furnace in a lumber yard (about 31 thousand Btu/hr). As a result, no significant cumulative environmental impacts are expected. Cumulative impacts on energy utilization and cost savings may be significant from the perspective of the Bison School District, but it is not expected to have statistical significance in terms of a measurable decrease in total energy consumption in the community of Bison or the general geographic region.

6.0 LIST OF PERSONS/AGENCIES CONSULTED

- Bison School District
- South Dakota Governor's Office of Economic Development
- South Dakota Department of Environment and Natural Resources
- South Dakota Historical Society
- South Dakota Department of Health
- South Dakota Department of Game Fish and Parks
- U.S. Fish and Wildlife Service
- National Oceanic and Atmospheric Administration
- U.S. Department of Commerce

7.0 REFERENCES

1. "Technical Assistance Report," West Plains Engineering (January 1993).
2. South Dakota Governor's Office of Economic Development Fuel Surveys.
3. U.S. Department of Commerce, Bureau of the Census, 1987, Truck Inventory and Use Survey, Washington, D.C.

Appendix A

Figure 1: South Dakota State Map

Figure 2: Bison City Map

Figure 3: Relative Location of Residential and Non-Residential Properties Surrounding Bison School District and Proposed Action

Figure 4: Location of Proposed Action Relative to Existing School District Site Layout

Appendix B



Letter from South Dakota State Historical Society



Letter from South Dakota Department of Game, Fish, and Parks



Letter from U.S. Department of the Interior, Fish and Wildlife Service

Appendix C

South Dakota Department of Environment and Natural Resources Synopsis of Air Emissions Information

Based on potential emissions the South Dakota Department of Environment and Natural Resources has determined that the Bison School District is exempt from obtaining an air quality operating permit for its existing oil-fired boilers and the proposed coal-fired boiler. The total emissions would have no impact on the ambient air in the Bison area.

The existing oil-fired boilers are exempt in accordance with ARSD 74:36:04:03 (revised through February 9, 1994), which states that a device or apparatus that has a heat input capability of not more than 3,500,000 Btu per hour is exempt from obtaining an air quality permit.

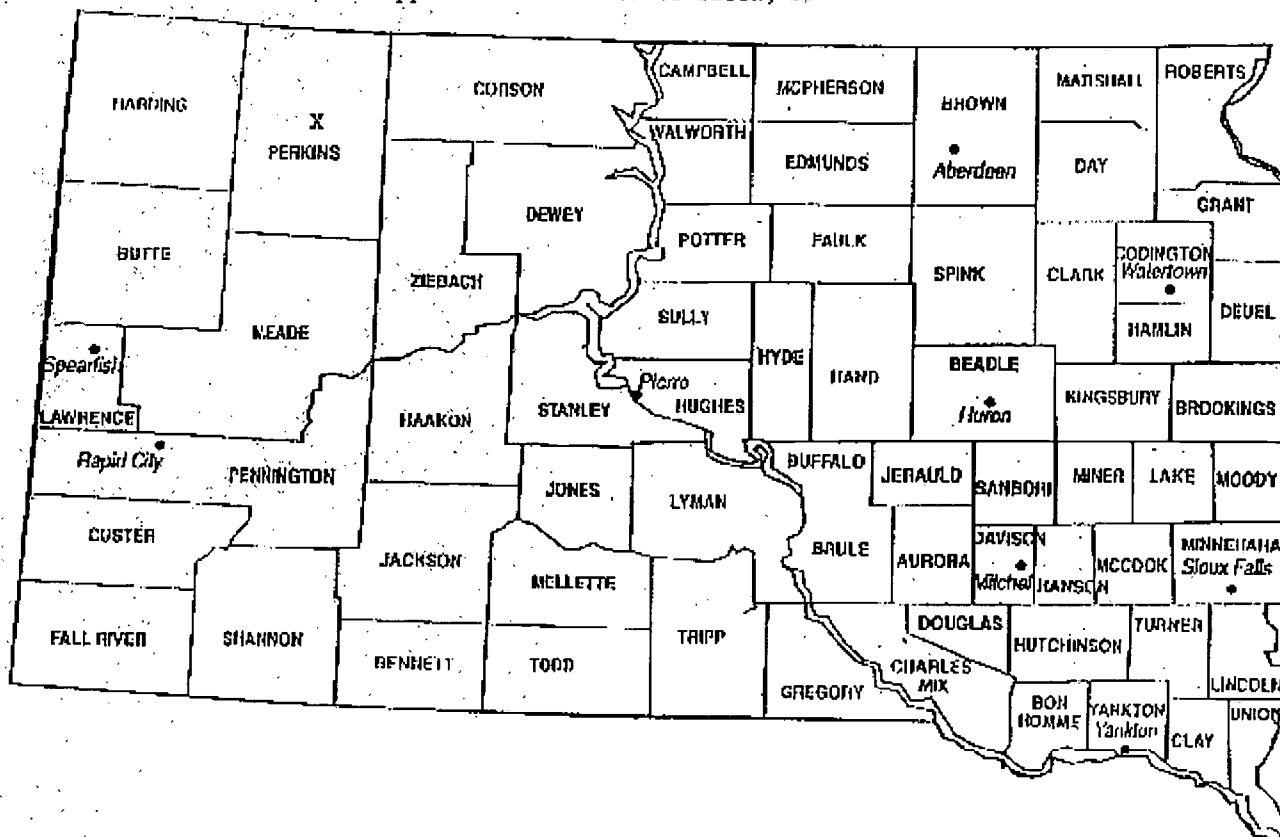
The proposed coal-fired boiler would also be exempt from permitting in accordance with ARSD 74:36:04:03 (revised through January 5, 1995), which states that a facility that has the potential to emit 25 tons or less per year of any criteria pollutant, except lead, before the application of control equipment is exempt from obtaining an air quality permit.

The Department provided the following table of Bison School District emissions from the present and the proposed boilers:

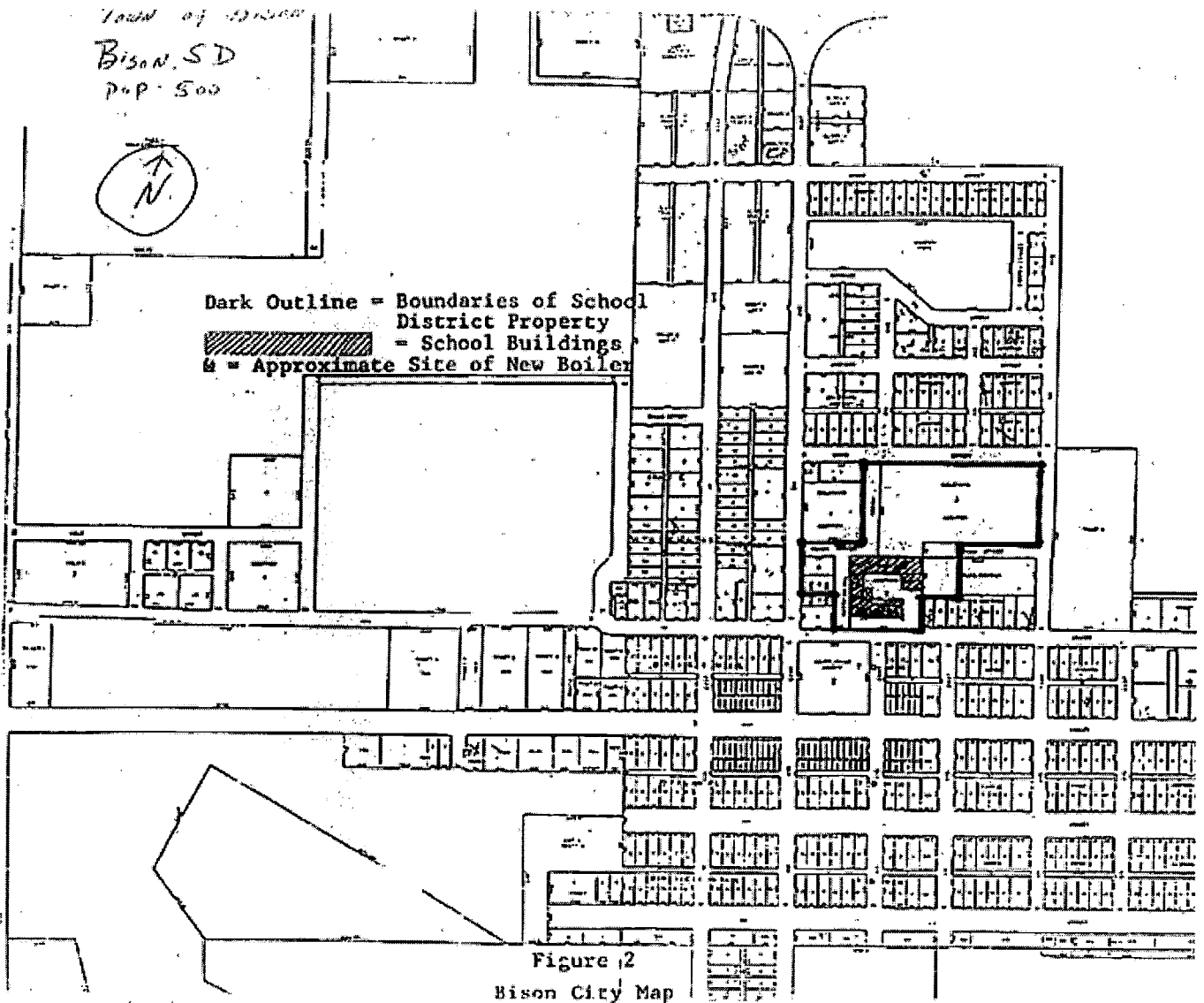
Table 1. Bison School District Air Contaminant Emissions

Emissions	Actual Tons Per Year					
	TSP	SO ₂	NO ₂	CO	VOC _{nm}	VOC _m
Existing Equipment	0.04	1.06	0.4	0.08	<0.01	<0.01
Proposed Equipment	1.6	1.9	0.8	0.6	<0.01	<0.01

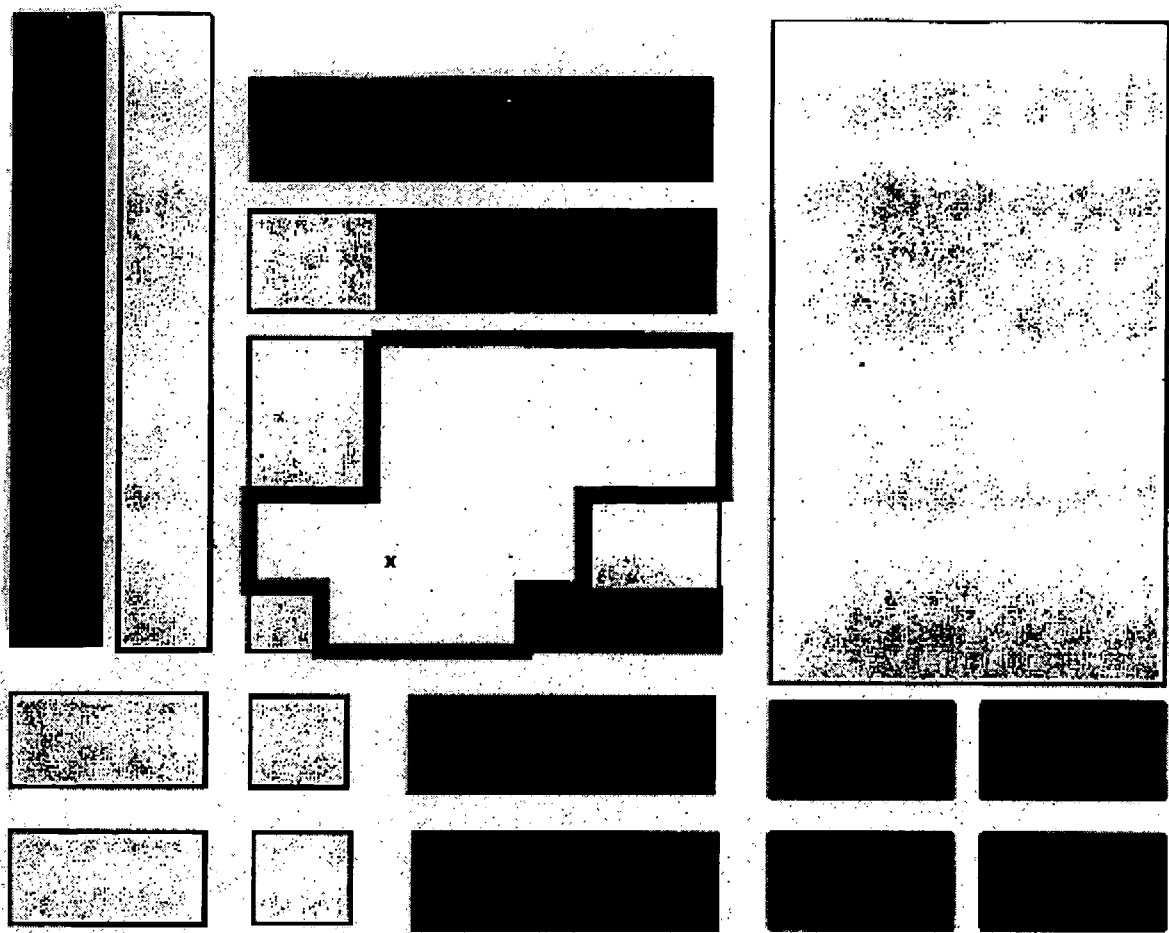
X - Approximate Location of Bison, SD



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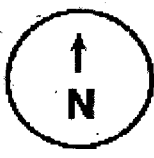


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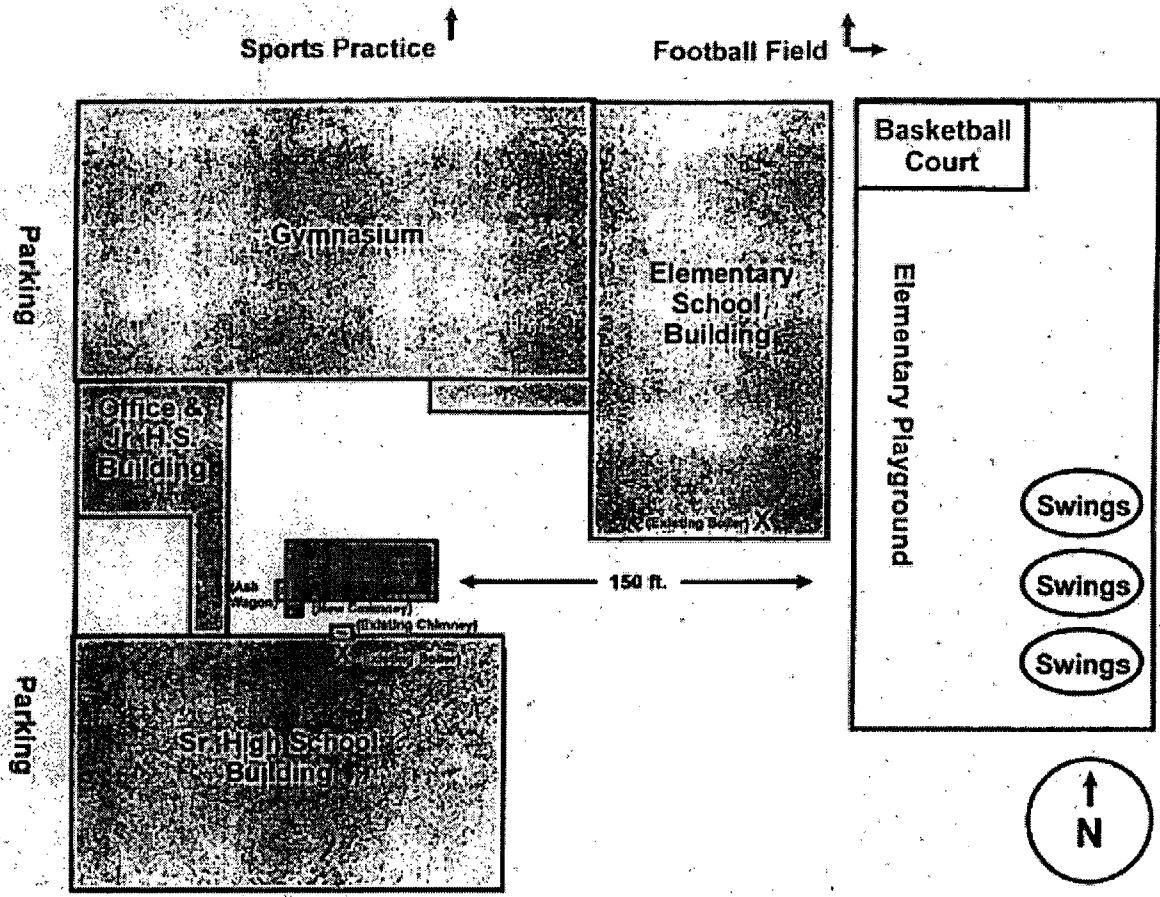
x = Approximate Location of Proposed Action

Unshaded Area = Bison School District Property
 Lightly Shaded Area = Non-Residential Property
 Darkly Shaded Area = Residential Property




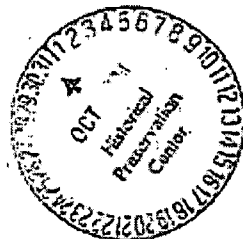
**Relative Location of Residential and Non-Residential Properties
 Surrounding Bison School District and Proposed Action**

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South Dakota

GOVERNOR'S OFFICE OF ECONOMIC DEVELOPMENT
 711 E. Wells Avenue
 Pierre, South Dakota 57501-3969
 603-773-5032 Fax: 603-773-3256



Memorandum

To: South Dakota Historical Preservation Officer

CC: Roger Slotsve, Bison School District

From: Merrill Van Gerpen, Governor's Office of Economic Development
Merrill Van Gerpen

Date: October 25, 1994

Subject: Bison Institutional Conservation Program (ICP) Project

The Bison School District has been awarded an energy conservation grant through the Institutional Conservation Program for the installation of a coal fired boiler.

Before final funding approval can be issued, the institution must prepare an environmental assessment (EA) for submission to the U.S. Department of Energy. One aspect the EA must address is the effect the proposed energy conservation measure will have on any historically or archaeologically significant buildings or lands.

The new coal fired boiler will be housed in a 500-1000 square foot structure to be built adjacent to the existing school in the city of Bison, SD. The proposed location has been previously disturbed and landscaped.

To the best of my knowledge the proposed action will not disturb any historically significant lands or buildings, and the site is not part of any historic district.

SECTION 106 DETERMINATION

This project will have no effect on historic and archeological sites in South Dakota.

For the *Melan*
 State Historic Preservation Officer

Date: 10/31/94

P.O. Box 417

Vermillion, S.D. 57069 605/231-0465

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Memorandum

To: South Dakota Department of Game, Fish and Parks

CC: Roger Slotsve, Bison School District

From: Merrill Van Gerpen, Governor's Office of Economic Development *Merrill Van Gerpen*

Date: October 25, 1994

Subject: Bison Institutional Conservation Program (ICP) Project

The Bison-School District has been awarded an energy conservation grant through the Institutional Conservation Program for the installation of a coal fired boiler.

Before final funding approval can be issued, the institution must prepare an environmental assessment (EA) for submission to the U.S. Department of Energy. One aspect the EA must address is whether the site provides habitat for any federal or state listed, threatened, endangered, or rare plants or animal, or if critical habitat is present on the site.

The new coal fired boiler will be housed in a 500-1000 square foot structure to be built adjacent to the existing school in the city of Bison, South Dakota. The proposed location has been previously disturbed and landscaped.

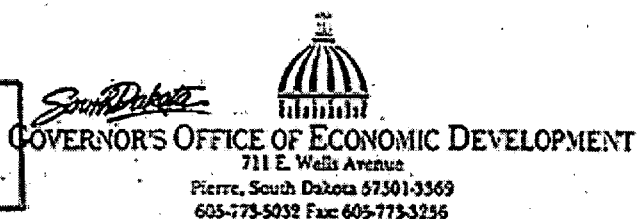
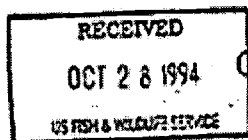
To the best of my knowledge the proposed action will not impact on protected species due to the site's previously disturbed nature. It will not create any apparent hazard to wildlife, since presently paved access will be used. It would be unlikely to create a habitat for any species, and will not affect runoff.

S.D. DEPARTMENT OF
GAME, FISH AND PARKS

Project as described will have no significant impact on fish and wildlife resources. If project design changes, please submit plans for review.

[Signature]
Date Approval

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Memorandum

To: U.S. Dept of the Interior
U.S. Fish and Wildlife Service

CC: Roger Slotsve, Bison School District

From: Merrill Van Gerpen, Governor's Office of Economic
Development *Merrill Van Gerpen*

Date: October 25, 1994

Subject: Bison Institutional Conservation Program (ICP) Project

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Before final funding approval can be issued, the institution must prepare an environmental assessment (EA) for submission to the U.S. Department of Energy. One aspect the EA must address is whether the site provides habitat for any federal or state listed, threatened, endangered, or rare plants or animal, or if critical habitat is present on the site

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