Memorandum

To: Commissioners Hanson, Sahr, Johnson

From: Michele Farris MMF

CC: Basin Electric Power Cooperative; Northern Natural Gas Company; Karen Cremer; Pam Bonrud; Greg Rislov; and John Smith

Date: 5/19/2005

Re: El04-041 – In the Matter of the Application of the Basin Electric Power Cooperative for an Energy Conversion Facility Permit for the Construction of a combustion turbine generator near Groton, South Dakota.

Enclosed is a summary of Basin Electric Power Cooperative's application for an energy conversion facility permit. Basin Electric is required, as part of the application, to provide information as specified in ARSD 20:10:22:06 to 20:10:22:33, inclusive, 20:10:22:36, and 20:10:22:39.

Basin Electric Energy Conversion Application Summary

20:10:22:08. Purpose of facility. The applicant shall describe the purpose of the proposed facility.

Basin is proposing to construct a simple-cycle gas electric turbine with a maximum capacity of greater than 100 MW. In addition the company will install approximately, one-half mile of 115 kV overhead transmission line and 11.5 miles of underground natural gas pipeline. Collectively the project is referred to as the East Side Peaking Project.

20:10:22:09. Estimated cost of facility. The applicant shall describe the estimated construction cost of the proposed facility.

Basin states the estimated construction costs for the East Side Peaking Project is $69 million.

20:10:22:10. Demand for facility. The applicant shall provide a description of present and estimated consumer demand and estimated future energy needs of those customers to be directly served by the proposed facility. The applicant shall also provide data, data sources, assumptions, forecast methods or models, or other reasoning upon which the description is based. This statement shall also include information on the relative contribution to any power or energy distribution network or pool that the proposed facility is projected to supply and a statement on the consequences of delay or termination of the construction of the facility.

Construction of the East Side Peaking Project is required to meet the growing needs for power of Basin's membership in its service territory. Basin has established the need to add peaking power to serve projected load growths for its members. A new peak demand delivery to members was reached in 2002.

Basin's forecasted system capacity requirements for the 2004 through 2007 planning horizon are contained in the 2003 Power Supply Analysis Study. The study was conducted to identify the best capacity additions for Basin Electric's service area. The study showed Basin would face a power deficit in the 2004 summer season of 80 to 100 MW. The energy situation showed that peaking is the type of energy resource needed. The East Side Peaking Project offered the lowest total system cost for Basin.

20:10:22:11. General site description. The application shall contain a general site description of the proposed facility including a description of the specific site and its location with respect to state, county, and other political subdivisions; a map showing prominent features such as cities, lakes and rivers; and maps showing cemeteries, places of historical significance, transportation facilities, or other public facilities adjacent to or abutting the plant or transmission site.

The East Side Peaking Project is located in Spink and Brown Counties in predominantly agricultural areas. The combustion turbine is located in Section 18, Township 122 North, Range 60 West on property owned by Basin. The site is located 5 miles south of Groton.
The pipeline is approximately 11.5 miles of 10.75-inch diameter underground natural gas pipeline. The pipeline will originate in Section 13, Township 120 North, Range 61 West at a meter site at the existing 42-inch Northern Border Pipeline. For approximately 2 miles the pipeline will diagonally cross privately-owned agricultural property until it reaches the existing utility and road right-of-

way on the west side of State Highway 37. The remaining pipeline segment will be located in the highway right-of-way until it reaches a point directly west of the combustion turbine site. When the pipeline reaches the site the pipeline will cross beneath the highway and onto the turbine site.

20:10:22:12. Alternative sites. The applicant shall present information related to its selection of the proposed site for the facility, including the following:

(1) The general criteria used to select alternative sites, how these criteria were measured and weighed, and reasons for selecting these criteria;

Four objectives were considered in determining alternatives for the project. They included access to a high voltage transmission system, available gas and water supply, low cost, and minimal environmental and public impact.

(2) An evaluation of alternative sites considered by the applicant for the facility;

Four criteria were developed for the comparative screening of alternatives, including reliability/dependability for energy supply, distance from existing transmission line capacity, cost (capital and operating and maintenance), and environmental considerations.

(3) An evaluation of the proposed plant or transmission site and its advantages over the other alternative sites considered by the applicant, including a discussion of the extent to which reliance upon eminent domain powers could be reduced by use of an alternative site, alternative generation method, or alternative waste handling method.

A comparison of the alternatives was conducted and the results are presented in Appendix A of the application.

20:10:22:13. Environmental information. The applicant shall provide a description of the existing environment at the time of the submission of the application, estimates of changes in the existing environment which are anticipated to result from construction and operation of the proposed facility, and identification of irreversible changes which are anticipated to remain beyond the operating lifetime of the facility. The environmental effects shall be calculated to reveal and assess demonstrated or suspected hazards to the health and welfare of human, plant and animal communities which may be cumulative or synergistic consequences of siting the proposed facility in combination with any operating energy conversion facilities, existing or under construction. The applicant shall provide a list of other major industrial facilities under regulation that may have an adverse affect of the environment as a result of their construction or operation in the transmission site or siting area.

Basin included an Environmental Assessment as Appendix A of the application. The Environmental Assessment describes the environment prior to construction of the East Side Peaking Project and the environmental consequences from the construction, as well as an environmental assessment for the alternative that was rejected.

20:10:22:14. Effect on physical environment. The applicant shall provide information describing the effect of the proposed facility on the physical environment. The information shall include:

(1) A written description of the regional land forms surrounding the proposed plant site or through which the transmission facility will pass;

The proposed project will use the existing level to nearly level terrain for the gas turbine and associated facilities. The grading and earthmoving required is not significant because the sites are nearly level and are not located in areas susceptible to flooding.

(2) A topographic map of the transmission site or siting area;

A topographic map was included in Exhibit 7. Modifications to approximately 15 acres of cultivated farm fields will be associated with grading an area for the generator pad and establishing drainage of storm water across and around the site. A retention pond for site surface runoff water and non-contact cooling water would also be constructed.

(3) A written summary of the geological features of the siting area or transmission site using the topographic map as a base showing the bedrock geology and surficial geology with sufficient cross-sections to depict the major subsurface variations in the siting area;

The underlying geologic material for the Project area is Precambrian basement rocks to the Cretaceous Pierre Shale.

(4) A description and location of economic deposits such as lignite, sand and gravel, scoria, and industrial and ceramic quality clay existent within the plan or transmission site;

There are no economic mineral deposits that occur in the project area as stated in the Soil Survey of Brown and Spink Counties (US Dept of Ag, SCS 1974, 1977.)

(5) A description of the soil type at the plant site;

The soil types at the turbine site are described as Aberdeen (silty clay loam), Nahon (silty clay loam), and Exline (silt loam) series. The soil types are described in more detail in Section 4.0 of the environmental report located in Appendix A.

(6) An analysis of potential erosion or sedimentation which may result from site clearing, construction, or operating activities and measures which will be taken for their control;

Impacts to soils from the proposed project would be insignificant.

(7) Information on areas of seismic risks, subsidence potential and slope instability for the siting area or transmission site; and

Seismic hazards in the project area are rated as very low.

(8) An analysis of any constraints that may be imposed by geological characteristics on the design, construction, or operation of the proposed facility and a description of plans to offset such constraints.

The geological characteristics within the project area impose no unusual constraints on the design, construction or operation of the proposed generation facility or pipeline.

20:10:22:15. Hydrology. The applicant shall provide information concerning the hydrology in the area of the proposed plant or transmission site and the effect of the proposed site on surface and groundwater. The information shall include:
(1) A map drawn to scale of the plant or transmission site showing surface water drainage patterns before and anticipated patterns after construction of the facility;
(2) Using plans filed with any local, state, or federal agencies, indication on a map drawn to scale of the current planned water uses by communities, agriculture, recreation, fish, and wildlife which may be affected by the location of the proposed facility and a summary of those effects;
(3) A map drawn to scale locating any known surface or groundwater supplies within the siting area to be used as a water source or a direct water discharge site for the proposed facility and all offsite pipelines or channels required for water transmission;
(4) If aquifers are to be used as a source of potable water supply or process water, specifications of the aquifers to be used and definition of their characteristics, including the capacity of the aquifer to yield water, the estimated recharge rate, and the quality of ground water;
(5) A description of designs for storage, reprocessing, and cooling prior to discharge of heated water entering natural drainage systems;
(6) If deep well injection is to be used for effluent disposal, a description of the reservoir storage capacity, rate of injection, and confinement characteristics and potential negative effects on any aquifers and groundwater users which may be affected.

The proposed site is relatively flat with only one foot of relief across the approximately 15 acre area. As such, the area will need to be built up and graded to drain storm water off the site to a shallow retention pond. The retention pond will be designed to accommodate a 25-year/24-hour rainfall event in addition to any non-contact water generated by operation of the unit. Included in the application as Exhibits 9 and 9A are the present surface water drainage patterns near the site.

The proposed project would contribute no significant impacts to surface water, ground water or floodplains.

The WEB Water Development Associate in Aberdeen will provide all of the water for the facility from an existing 12-inch rural water distribution pipeline that is adjacent to the site.

20:10:22:16. Effect on terrestrial ecosystems. The applicant shall provide information on the effect of the proposed facility on the terrestrial ecosystems, including existing information resulting from biological surveys conducted to identify and quantify the terrestrial fauna and flora potentially affected within the transmission site or siting area; an analysis of the impact of construction and operation of the proposed facility on the terrestrial biotic environment, including breeding times and places and pathways of migration; important species; and planned measures to ameliorate negative biological impacts as a result of construction and operation of the proposed facility.

There were no threatened, endangered or candidate animal or plant species observed in or around the proposed project site.

Impacts to vegetation from the proposed project are expected to be insignificant since the majority of the acreage for the turbine and the pipeline is agricultural land or existing substation, existing constructed drainage pond or existing right-of-way. Cultivated cropland and farming are the principal land use in the project areas.

0:10:22:17. Effect of aquatic ecosystems. The applicant shall provide information of the effect of the proposed facility on aquatic ecosystems, and including existing information resulting from biological surveys conducted to identify and quantify the aquatic fauna and flora, potentially affected within the transmission site or siting area, an analysis of the impact of the construction and operation of the proposed facility on the total aquatic biotic environment and planned measures to ameliorate negative biological impacts as a result of construction and operation of the proposed facility.

The proposed project site is not expected to cause significant, direct, indirect, or cumulative impacts on wetlands. Less than 10 acres of isolated herbaceous wetland are located within the total quarter-section surrounding the site, and the 11.5 mile-long pipeline crosses only one small non-jurisdictional wetland.

20:10:22:18. Land use. The applicant shall provide the following information concerning present and anticipated use or condition of the land:
(1) A map or maps drawn to scale of the siting area and transmission site identifying existing land use according to the following classification system:
(a) Land used primarily for row and nonrow crops in rotation;
(b) Irrigated lands;
(c) Pasturelands and rangelands;
(d) Haylands;
(e) Undisturbed native grasslands;
(f) Existing and potential extractive nonrenewable resources;
(g) Other major industries;
(h) Rural residences and farmsteads, family farms, and ranches;
(i) Residential;
(j) Public, commercial, and institutional use;
(k) Municipal water supply and water sources for organized rural water districts; and
(l) Noise sensitive land uses;

A land use map was included in the application on page 32.

(3) Identification of the number of persons and homes which will be displaced by the location of the proposed facility;

No homes or individuals will be removed or displaced as a result of construction, operation or maintenance of the proposed East Side Peaking Project.

(4) An analysis of the compatibility of the proposed facility with present land use of the surrounding area, with special attention paid to the effects on rural life and the business of farming; and

The proposed project is compatible with the existing, as well as the projected future, land use.

(5) A general analysis of the effects of the proposed facility and associated facilities on land uses and the planned measures to ameliorate adverse impacts.

The East Side Peaking Project will not adversely impact existing land uses. Crop planting and cultivation will continue in the project area.

20:10:22:19. Local land use controls. The applicant shall provide a general description of local land use controls and the manner in which the proposed facility will comply with the local land use zoning or building rules, regulations or ordinances. If the proposed facility violates local land use controls, the applicant shall provide the commission with a detailed explanation of the reasons why the proposed facility should preempt the local controls. The explanation shall include a detailed description of the restrictiveness of the local controls in view of existing technology, factors of cost, economics, needs of parties, or any additional information to aid the commission in determining whether a permit may supersede or preempt a local control pursuant to SDCL 49-41B-28.

The proposed project complies with local land use zoning and building rules, regulations, and ordinances. Basin applied for a variance from the Brown County Zoning Ordinance to allow construction of the turbine. The application for variance was approved and is included in the application as Appendix C.

20:10:22:20. Water quality. The applicant shall provide evidence that the proposed facility will comply with all water quality standards and regulations of any federal or state agency having jurisdiction and any variances permitted.

The construction, operation or maintenance of the proposed project will result in no significant direct, indirect, or cumulative impacts to surface or groundwater quality. Construction will be conducted to minimize and control sediment and erosion.

20:10:22:21. Air quality. The applicant shall provide evidence that the proposed facility will comply with all air quality standards and regulations of any federal or state agency having jurisdiction and any variances permitted.

Dispersion modeling was used to estimate the air quality impact of potential emissions from the turbine. The predicted maximum impacts demonstrate that operation of the generator will not cause or contribute to violations of applicable air quality standards. Basin has applied for a Title V operating permit from the state Department of Environment and Natural Resources. No significant or long-term impacts to air quality will occur as a result of this project. Some fugitive dust may be generated during construction from construction traffic on unpaved roads and removal of soil at the site.

20:10:22:22. Time schedule. The applicant shall provide estimated time schedules for accomplishment of major events in the commencement and duration of construction of the proposed facility.

Construction of the combustion turbine generator is planned to begin in the summer of 2005, with the gas pipeline and transmission interconnection planned later that fall with an estimated duration of two months. Commercial operation is planned for June 2006.

20:10:22:23. Community impact. The applicant shall include an identification and analysis of the effects the construction, operation, and maintenance of the proposed facility will have on the anticipated affected area including the following:

(1) A forecast of the impact on commercial and industrial sectors, housing, land values, labor market, health facilities, energy, sewage and water, solid waste management facilities, fire protection, law

enforcement, recreational facilities, schools, transportation facilities, and other community and government facilities or services;

At the start of the process a local review committee was assembled to determine what, if any, impacts would be due to the proposed project. The committee was comprised of the Mayor of Groton, Chairmen of Brown and Spink County Commissions, and the Presidents of the Groton and Conde school districts, as well as a representative of Basin Electric. The final report submitted to the Commission states, "The conclusion of the committee was that the proposed energy conversion facility would have little or no impact on the area and should be approved."

(2) A forecast of the immediate and long-range impact of property and other taxes of the affected taxing jurisdictions;

There is no significant immediate or long-term impact on the property and other taxes of the affected taxing jurisdictions as a result of construction and maintenance of the proposed project.

(3) A forecast of the impact on agricultural production and uses;

The small conversion of agricultural land to the gas turbine site area is expected to have minimal impact on overall crop production within the proposed project area.

(4) A forecast of the impact on population, income, occupational distribution, and integration and cohesion of communities;

There will be no significant socioeconomic impacts resulting from the project.

(5) A forecast of the impact on transportation facilities;

There will be a minor increase in traffic during the delivery and staging of equipment and as a result of daily traffic to and from the construction sites.

(6) A forecast of the impact on landmarks and cultural resources of historic, religious, archaeological, scenic, natural, or other cultural significance. The information shall include the applicant's plans to coordinate with the local and state office of disaster services in the event of accidental release of contaminants from the proposed facility; and

The proposed transmission site area was surveyed for cultural resources. Based on the results of the survey and a review of relevant databases, Basin's proposed project is not expected to impact cultural resources.

(7) An indication of means of ameliorating negative social impact of the facility development.

20:10:22:24. Employment estimates. The application shall contain the estimated number of jobs and a description of job classifications, together with the estimated annual employment expenditures of the applicants, the contractors, and the subcontractors during the construction phase of the proposed facility. In a separate tabulation, the application shall contain the same data with respect to the operating life of the proposed facility, to be made for the first ten years of commercial operation in one-year intervals.

The application shall include plans of the applicant for utilization and training of the available labor force in South Dakota by categories of special skills required. There shall also be an assessment of the adequacy of local manpower to meet temporary and permanent labor requirements during construction and operation of the proposed facility and the estimated percentage that will remain within the county and the township in which the facility is located after construction is completed.

During construction of the pipeline it is estimated there will be 75 employees, 60 that are residents of the area and 15 that aren't. Construction of the remainder of the project will require approximately 18 employees for one month construction work and 10 employees for two months for electrical work.

20:10:22:25. Future additions and modifications. The applicant shall describe any plans for future modification or expansion of the proposed facility or construction of additional facilities, which the applicant may wish to be approved in the permit.

Basin is not requesting approval of any future additions or modifications under this permit application.

20:10:22:26. Nature of proposed energy conversion facility. The application shall contain a description of the operating nature of the proposed facility, the expected source and quantity of its raw materials, and energy requirements. The preceding shall be illustrated by means of an annotated map. The description shall include the following:

(1) The proposed on-line life of the facility and its projected operating capacity during its on-line life;

The life of the facility is estimated at 33 or more years. It is intended as a peaking facility operating between 5 and 15 percent.

(2) A general description of the major components of the proposed facility such as boilers, steam generators, turbine generators, cooling facilities, production equipment, pollution control equipment, and other associated facilities;

The combustion turbine generator is a GE Aero LMS 100 dual fuel-capable gas turbine designed for outdoor installation. It is a simple cycle turbine capable of generating a nominal 95 MW with a heat rate of approximately 9,300 Btu per Kwh. The gas turbine site equipment includes the turbine, generator, generator breaker, site station service transformer, motor control centers equipment, battery systems, and other gas turbine site equipment and systems.

(3) An identification of materials flowing into the facility, including all materials such as air, water, coal, and chemical compounds that will be utilized by the proposed facility, recorded in accordance with accepted scientific practices regarding their estimated consumption rate;

The materials flowing into the facility are natural gas, water and air. The natural gas delivery capacity at the combustion turbine will be 26 million standard cubic feet per day. The facility will consume a maximum of 100 gallons per minute of water.

(4) An inventory of all materials flowing out of the proposed facility, including the method of control, treatment, destination, and disposal monitoring programs of each of the materials; and

Water treatment will be by semi-trailer mounted demineralizing vessels that will be regenerated off site. Non-contact wastewater from the evaporative cooler will be handled in on-site ponds. Storm water will be routed to an on-site pond. All waste generated at the facility during construction will be disposed of at an approved landfill on a daily basis.

(5) The procedures proposed to avoid or ameliorate the possibility that the discharges, emissions, or solid wastes would do any of the following:

(a) Constitute a public nuisance;

(b) Endanger the public health and safety;

(c) Endanger human, animal, or plant life; or

(d) Endanger recreational facilities.

Air emissions from the facility will be governed under the Title V operating permit issued by DENR. Solid waste will be disposed of by using a licensed disposal firm. Contaminated wastewater will be collected and removed from the site.

Basin will operate the facility to comply with the noise standards agreed to in the stipulation. These standards were determined based on rules implemented in Minnesota. The stipulation requires that the noise level will not exceed 60 dbA (decibels, A-weighted) more than 10 percent in a one hour period during the daytime at the nearest occupied, existing residence. During the nighttime the noise level will not exceed 55 dbA more than 10 percent in a one hour period.

The point of measurement will be within 100 feet of the residence in the direction of the generation facility. It is Basin's intention to measure as close to the residence as possible, however, 100 feet was selected due to the proximity of the property line in relation to the house. If for some reason the landowner will not provide access to their property for testing, the testing can be done at the property line of Basin and still comply with the permit requirements. A post construction operational noise assessment will be completed to show compliance with the noise level. The assessment will be performed by an independent third-party consultant approved by the PUC. The assessment will be performed in accordance with American National Standards Institute (ANSI) B133.8 – Gas Turbine Installation Sound Emissions.

The local review committee addressed the noise level at the nearest residence. Item 9 in their report states, "A shelter belt of trees was discussed as a possible buffer if the noise levels remained high during the peaking operations."

There are no recreational facilities located near the turbine site. The facility will be lighted, fenced and locked to prevent any harm to human or animal life.

20:10:22:27. Products to be produced. The applicant shall describe both in general terms and by technical description the products and by-products to be produced by the proposed facility and their destinations.

The combustion turbine will consume natural gas as a fuel to generate electricity. The electricity will be provided to the Western 115 kV transmission system for transmission and distribution.

20:10:22:28. Fuel type used. The applicant shall provide a description of the type of fuel used, including:

(1) Primary proposed fuel types;

(2) Anticipated yield and range (BTU or appropriate unit); and

(3) Approximate chemical analysis of the proposed design fuel.

The combustion turbine will use natural gas, however it could be modified at a later date to also use fuel oil. The natural gas contracted has a heat content of 1,000 Btu per cubic foot. The chemical analysis of the fuel is included with the application as Exhibit 15, located on page 50.

20:10:22:29. Proposed primary and secondary fuel sources and transportation. On a map drawn to scale, the applicant shall provide the location of proposed primary and secondary sources of fuel and method of its transportation. When possible, the map shall show the location of the proposed facility; where distances are too great to show the facility and proposed primary and alternate supply sources, smaller scale inserts showing relative location shall be presented. The applicant shall also describe any additional transportation facilities needed to deliver raw materials and to remove wastes.

The proposed pipeline route is shown on Exhibit 7 on page 10 in the application.

20:10:22:30. Alternate energy resources. The applicant shall provide information concerning the alternate energy resources considered in the construction of the energy conversion facility. The applicant shall also discuss the reasons for selecting the proposed energy resource rather than an alternative resource.

Solar, wind, geothermal, and small hydroelectric alternatives were identified and studied. Solar and wind alternatives were eliminated because of the nature of the generation, the alternatives do not reliably meet the peaking power supply needs of the members. Peaking power is needed quickly with little start-up delay. Natural gas fired turbines can be operational in a short period of time on demand.

Geothermal and hydro alternatives were eliminated due to the limited resources in the service area.

20:10:22:31. Solid or radioactive waste. The applicant shall provide information concerning the generation, treatment, storage, transport, and disposal of solid or radioactive waste generated by the proposed facility and evidence that all disposal of the waste will comply with the standards and regulations of any federal or state agency having jurisdiction. Any variations from these standards shall be indicated.

Industrial waste will consist of waste fluids and detergents from turbine maintenance and miscellaneous other materials. All industrial wastes will be removed from the site and held for disposal in a licensed and permitted commercial waste disposal facility. No hazardous waste will be generated by the process operations.

20:10:22:32. Estimate of expected efficiency. The applicant shall provide an estimate of the expected efficiency of the proposed energy conversion process and discuss the assumptions on which the estimate is based.

The vendor guarantees a percent heat recovery (power output/ heat input) of 42.18%. The efficiency is higher than that for similar power generating facilities of current design.

20:10:22:33. Decommissioning. The applicant shall provide a plan or policy statement on action to be taken at the end of the energy conversion facility's on-line life. Estimates of monetary costs, site condition after decommissioning, and the amount of land irretrievably committed shall be included in this statement.

Upon abandonment of the property, all equipment and buildings will be removed from the site and disposed of appropriately. The facility will not produce any hazardous material that will be stored or disposed of on site.

20:10:22:36. Additional information in application. The applicant shall also submit as part of the application any additional information necessary for the local review committees to assess the effects of the proposed facility pursuant to SDCL 49-41B-7. The applicant shall also submit as part of its application any additional information necessary to meet the burden of proof specified in SDCL 49-41B-22.

The application contained all the information as required of Basin to meet the burden of proof as specified at SDCL 49-41B-22. Basin has submitted written responses to staff's data requests.