Owl Feather War Bonnet Wind Farm
Rosebud Sioux Tribe
DOE Grant DE-FC36-030GO13122

Final Report

Ken Haukaas

10/22/2007

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The Rosebud Sioux Tribe

Executive Summary

The present day members of the Rosebud Sioux Tribe of approx. 26,000 are the descendants of the Sicangu Oyate (Brule or Burnt Thigh Nation). The Sicangu are a part of the Tetonwan Lakota Oyate (Dwellers of the Plains), more commonly known to history as the Great Sioux Nation. The people of the Sioux Nation, from west to east, refer to themselves as Lakota, Nakota or Dakota, which means friend or ally. The expansive, rolling prairies, the shallow, winding creeks and rivers, and the ever-present winds are all integral parts of the continuing history, culture and remaining economic base upon which the Lakota people who call Rosebud home depend. Many of the Rosebud Sioux Tribe reside on the one million acre reservation, the nation's 6th largest, in South Central South Dakota.

In March 2003, through the vision of the late Alex "Little Soldier" Lunderman (1928-2000) and the efforts of the Rosebud Sioux Tribal Utilities Commission, with assistance from DISGEN Inc. and ICOUP, along with grant funding from Dept. of Energy and a loan from the Rural Utilities Service, United States Department of Agriculture, the Rosebud Sioux Tribe commissioned a single 750 kilowatt NEG Micon wind turbine near the Rosebud Casino. The Little Soldier "Akicita Cikala" Turbine stands as a testament to the vision of a man and a people. This vision has carried on through the application and award of a DOE grant in 2003, in which the Rosebud Sioux Tribe was awarded a $448,551.00 for pre-construction activities in the development of a 30Mw wind farm called the Owl Feather War Bonnet Wind Farm. In this same award DISGEN offered in kind services of $78,750.00, and the Rosebud Sioux Tribe offered in kind services of $27,272.00.

Pre-construction activities in wind development demand knowledge of many requirements in understanding site conditions, interconnection of the wind farm to infrastructure capability. Biological assessment of the site is also necessary to recognize and evaluate the impact of such a wind farm on the environment, flora and fauna, plus the evaluation of the impact on the cultural past and present human activity, along with the potential economic benefits to the tribe and its people.

Development of wind brings forth a myriad of complex issues that need to be understood before one can seriously even think about building a wind farm. The primary understanding is realizing your wind potential, and this data needs to be gathered through the implementation of a Meteorological Tower measuring wind at the proposed wind farm site or relatively near the site for at least a year, and the more years of data, the more financially stable the data is to the investor. In May of 2001, less than 1000 feet from the Western edge of the proposed site, RST Tribal Utilities Commission placed 5 anemometers and 3 wind vanes, at the 30, 40, and 50 meter height on an existing 200' radio tower of radio station KINI.
See wind assessment, Attachment A.

Selection of the site needs to also meet particular requirements and those are the existing presence of available infrastructure on or near the site, such as transmission lines and substation availability.

In order to develop the economic costs to build and to maintain the wind farm as a self-sustainable business in the area, one must evaluate the potential of the wind resource with a price that is compatible enough to make the project feasible for the long range. The Northern Great Plains, although rich in wind, is also rich in coal and as long as coal is nearby and commands a cheaper price than that same power that can be developed through wind, the wind industry at least in this region, shall need subsidies, such as the Production Tax Credit for the foreseeable future. The value of the green tag or renewable energy credits shall also play a key role in the development of wind projects in the future. Relatively speaking the Northern Plains has low cost electrical power overall and getting a good price for electrical power produced in this area is an undertaking that can severely test a developers financial understanding of all the variables.
With major power usage close to 1000 miles away, the wheeling costs become such that the economics demand you build large enough to overcome some of the costs involved or build your own lines or just not sell to the long-range end purchaser. After reviewing costs overall with wheeling costs being the primary inhibitor to selling long range we opted to sell to the nearest buyer which generally means a low price for the power produced.

Nebraska Public Power District was recognized as our first potential buyer; simply because they are the owners of the 115 kv that is in the project site and there would be no wheeling costs. Other potential power purchasers that we looked at were Basin Electric, WAPA, Lincoln Electric System, Xcel Energy and Omaha Public Power District. Once a Draft Power Purchase agreement is in hand, one could realize the potential economics of the project. This price would bring to the table the realization of the feasibility to build the wind farm, provide for a self-sustaining wind farm, pay for the cost of operations and maintenance, and pay royalties or fees and payback the loans and the investors standard rate of return made on a project such as this.

In April of 2003, this wind farm project had an estimated cost of the construction at $37,000,000.00. It is now approaching $54,000,000.00. We continue to be on the track to get this project in place by the end of 2008, even though the weakening dollar in the world market continues to drive the project costs up. All the essential studies have been completed to date, with the exception of an Interconnection Study, although a substantial portion of this was incorporated in the Systems Impact Study, and the project is aware of constraints within the infrastructure. The Interconnection Study needs to know who the end purchaser is.

In the beginning, the intent of DISGEN was to develop a partnership with an investor and the tribe would eventually gain ownership in the 11th, 12th, 13th, or 14th year, after the Production Tax Credit had expired in the 10th year, through the process of accelerated depreciation. At the moment, tribes being tax exempt cannot enjoy the Production Tax Credit, these PTC's drive wind farms in the United States today because of the economics of producing electricity with wind is more costly than other forms of power production such as coal, hence the subsidy. The investor group would relinquish its initial ownership but would remain partial owner through the life of the project, IRS rules. The typical flip structure. The understanding of the economics of building a wind farm and what sort of economic benefit that may result for the tribe remains to be a question for many of our tribal members, even though several meetings at the council level and within the communities about the subject have shown the economics. The fear of another developer coming to the tribe and taking it for a ride has become an ever-present thought in the council. It was this fear that would eventually not allow this project to move under the partnership format.

We ended up having an impasse that appeared to be going nowhere by mid 2006. Throughout this whole process the tribe was not obligated to bring forth any real investment other than the investment of land and the commitment of time of several people within the tribe, it remains so today. After several meetings with the tribal council on the development of the partnership in this wind farm without much success, it was concluded, entirely on my part, that the best approach at this time was for the tribe to be a passive landowner and earn a percentage of gross receipts and possible ownership after the production tax credits have expired. This was simple to understand, and we will have stepped into an industry that is now becoming big business and has great potential for the tribe because of our outstanding wind resource. The scenario eventually agreed upon is a percentage of gross revenues, jobs during the construction phase and jobs in the operations and maintenance of the wind farm, plus the right of first refusal if the LLC wishes to sell. The tribe shall take advantage of this project and engage the possible added value and benefits this project will do for the tribe and its people.

There remains a desire of many tribal members to be the majority owner of the wind farm, but to understand the economics of building a wind farm and the cost to produce a kilowatt of energy this way, without using the Production Tax Credit is liken to throwing ones money down a deep hole, without any of it coming back to you. It is hoped that in the near future legislation in Congress will change this for tribes, so that we can realize ownership of wind facilities at the commissioning of a project.

Even so, the potential to the tribe is unfathomable and we as a tribe must strive to be diligent in wind development as this may very well be our path to economic salvation. At the moment we are well ahead of the curve, but capacity on the transmission lines is fast becoming an issue as more and more firms are attempting to develop wind in the area and this existing line capacity will soon not be able to accommodate any wind projects other than the ones that are actually in queue.

The Rosebud Sioux Tribe
Owl Feather War Bonnet Wind Farm

Project Overview

Background: The Rosebud Sioux Tribe (RST) is located in south central South Dakota near the Nebraska border. The nearest community of size is Valentine, Nebraska. The RST is a recipient of several Department of Energy grants, written by Distributed Generation Systems, Inc. (Disgen), for the purposes of assessing the feasibility of its wind resource and subsequently to fund the development of the project. Disgen, as the contracting entity to the RST for this project, has completed all the pre-construction activities, with the exception of the power purchase agreement and interconnection agreement, to commence financing and construction of the project. The focus of this financing is to maximize the economic benefits to the RST while achieving commercially reasonable rates of return and fees for the other parties involved. Each of the development activities required and its status is discussed below.

Land Resource: The Owl Feather War Bonnet 30 MW Wind Project is located on RST Tribal Trust Land of approximately 680 acres adjacent to the community of St. Francis, South Dakota. The RST Tribal Council has voted on several occasions for the development of this land for wind energy purposes, as has the District of St. Francis. Actual footprint of wind farm will be approx. 50 acres.

Wind Resource Assessment: The wind data has been collected from the site since May 1, 2001 and continues to be collected and analyzed. The latest projections indicate a net capacity factor of 42% at a hub height of 80 meters. The data has been collected utilizing an NRG 9300 Data logger System with instrumentation installed at 30, 40 and 65 meters on an existing KINI radio tower. The long-term annual average wind speed at 65-meters above ground level is 18.2 mph (8.1 mps) and 18.7 mph (8.4 mps) at 80-meters agl.
The wind resource is excellent and supports project financing.

Transmission Interconnection: A Nebraska Public Power District (NPPD) 115kV transmission line is located within the project boundary. A Cherry-Todd Rural Electric Cooperative substation is located adjacent to the project area and interconnects to the 115kV line. However, the substation capacity is not sufficient to accept a 30 MW wind project, so the economic model assumes a new substation will be required or at the least a substantial upgrade to the existing.
NPPD has conducted a Feasibility Study and a System Impact Study and will soon complete a Facilities Upgrade Study. None of these studies has identified any significant barriers to interconnecting the wind facility.

Environmental Studies: As Tribal Trust Land, permitting must be completed under the National Environmental Policy Act (NEPA). Bureau of Indian Affairs (BIA) -- an agency of the Department of Interior -- is the permitting authority. BIA consults closely with the US Fish and Wildlife Service (FWS) in establishing the study protocols, specifically as they relate to avian assessments. Disgen's Manager of Environmental Affairs and the RST Resource Development Office worked closely with the FWS and BIA to establish the protocols and manage the required studies. The RST Resource Department conducted an "ethnographic study" by interviewing tribal elders concerning their cultural experiences in the project area. Disgen is currently completing a draft Environmental Assessment (EA) document for review by all the parties. There have been no insurmountable issues identified. Disgen believes the EA will be completed by end of November 30, 2007 with the FONSI to be issued no later than February 2008 by Bureau of Indian Affairs. Construction is expected to be completed by December 31, 2008.

Power Purchase Agreement: The obvious choice as a potential power purchaser is NPPD as it owns the transmission line in the project area.

Interconnection Agreement (IA): The IA will be completed with NPPD upon the successful negotiation with NPPD on power price. The IA is specific to the location of the power purchaser.

Financing Structure: The project pro-forma models a highly leveraged non-recourse project finance transaction of seventy percent (70%) debt and thirty percent (30%) equity. The debt will be provided, or guaranteed, by the federal government under strict rules. The equity will be provided by a taxable investor that can fully utilize the federal Production Tax Credits available under Section 45 of the Internal Revenue Code (PTC) and the benefits of the accelerated depreciation accorded to wind energy projects. The RST may have the option, but not the obligation, to assume majority ownership of the project at some future date determined by the parties. This "flip structure" has been utilized in other wind energy transactions and will apply to the tribal projects as well. The Project financing is structured to provide high equity rates of return and net present value of the economic benefits to the investor are very high, over a period of eleven or twelve years.

The Rosebud Sioux Tribe
Owl Feather War Bonnet Wind Farm

Objectives

The objectives of the project are to develop a self-sustainable business on the reservation to foster jobs primarily and to create maximum economic development benefits to the RST and its members without the tribe assuming any economic risk. Building capacity was also an important ingredient in this whole project, as it has provided a greater understanding of the potential of wind resource here on the reservation. The learning curve of all involved, including the education of our administrative personnel along with our elected officials has brought us all within the tribe a more enlightened view of the economic potential of wind for our people.

Within these objectives were action items that required a complete assessment before construction could begin.

1. Identify a specific wind project site on Tribal Trust Land and complete a preliminary site layout.
2. Collect and analyze additional years of wind data and confirm the expected capacity factor of the facility.
3. Complete photo-simulations of the facility for use in public scoping meetings.
4. Complete the cultural review, including ethnographic studies, and conclude there are no sensitive cultural sites that prevent construction
5. Complete the flora and fauna studies required for inclusion in the Environmental Assessment (EA) required for a Tribal Trust Land Use Permit from the BIA. BIA and US Fish and Wildlife Service personnel reviewed and approved the study protocol prior to fieldwork.
6. Complete the Feasibility and System Impact Studies for interconnecting the facility to a 115Kv transmission line owned by the Nebraska Public Power District (NPPD) at the Cherry-Todd Substation located next to the project area.
7. Complete Geo-Technical Reports on Soil Profile.
8. Identify potential purchaser/s of power and green tags.
9. Engage Rural Utilities Services (RUS), which has indicated a willingness to provide low cost long-term project debt for this project, if NPPD is the power purchaser.
10. Identify several investors willing to consider the project such that the Federal Production Tax Credit can be utilized.

Owl Feather War Bonnet Wind Farm
Rosebud Sioux Tribe

Description of Activities Performed

Late Fall/Winter of 2003

Initially the activities primarily were to insure the land that was being proposed is the land on the legal description, and in tribal trust wholly. Once this was assured, the preliminary site layout was developed and site visit by both DISGEN and Ed McCarthy, contracted Meteorologist was conducted on the site in midwinter of 2003/04 to insure there were no problems with the turbine locates and the site layout.

Although not required by NEPA, we felt that it was also necessary to conduct an Ethnological Review as part of the Cultural Review within the Environmental Assessment, to bring forth the oral history of the proposed site. During the winter of 2003 and 2004 this study was conducted, through the offices of RST Resource Development. The tribe hired 2 Lakota speaking enrolled tribal members, Ms. Ione Quigley and Mr. Randy Emery, who had degrees in Cultural Resource Management, to locate as many elders in the area and conduct interviews on the history of the site. They brought forth recommendations that will be stated in the Environmental Assessment and implemented in the construction phase. The complete findings are not for the public domain and will not be released to the general public. Their findings indicate that human activity was present in the area prior to the acquisition of the land by the Catholic Church. Preliminary recommendations are:

1. To conduct a full reconnaissance ground survey on all 680 acres.
2. Classify and record all plants that are to be disturbed for medicinal qualities and to replant as much as possible those native grasses and plants that are to be disturbed.
3. To have a qualified person on the job site during excavation to identify any possible artifact uncovering and to ensure that the stop work order will be implemented in case of such an occurrence and proper authorities are notified.

We will incorporate the last 2 items in the contract for construction. The first recommendation was completed in the Class III of the archeological review.
See Ethnographic Study Format Attachment B.

2004-2005

In March of 2004, the 1st Scoping meeting was held in Rosebud, South Dakota and an additional one in St. Francis, South Dakota in May of 2004, to detail project intent to those people interested in the project and to fulfill the requirements of the National Environmental Policy Act. All preliminary studies were brought forth at this meeting along with the protocol to be used in the Ecological Baseline Study, the Biological Assessment.
See Ecological Baseline Study (Draft), Attachment C.

From March 2004 to March 2005 Western Ecosystems conducted the Ecological Baseline Study within and around the boundaries of the proposed area with the majority of site work during the summer of 2004. In mid winter of 04/05, an eagle or a pair were visiting the site for Prairie Dog buffet, mostly on the West side, which precluded the placement of turbines in this particular area, based on consultation with the U.S. Fish and Wildlife and BIA officials in Aberdeen. This essentially restricted the number of available turbine sites. The plan to use 1.5Mw turbines was discarded and a 2.0Mw or larger turbine is now considered.

In August 2004, NPPD brings forth the Systems Impact Study, which indicates the constraints and shortcomings of the local system and the requirements to upgrade. NPPD was contracted to conduct this study. *See Systems Impact Study, Attachment D.*

During the summer of 2005, Dale informally approached NPPD and discussed the project with then President and CEO Bill Fuhrman about the possibility of NPPD purchasing the power. It was implied that the existing board would probably not go any higher than 2.0 cents per kilowatt and we could keep the green tags. The economics would not work out as desired.

At this point, we felt that NPPD was completely out of the picture and so we approached Xcel
Energy and the response was very favorable but wheeling costs to jump on the NPPD line and then on to WAPA line in order to get the power into Minnesota, would be in essence, giving the power away. Our next potential purchaser was Basin Electric who also responded well to our proposal. We would still have to deal with the wheeling costs to move the power over the NPPD lines to jump on to a WAPA line. In understanding the potential cost of the wheeling costs DISGEN discussed this scenario with NPPD and it was concluded that the OFWB would pay about $11,000 monthly to move this power over NPPD lines. This was viewed as a no choice option. We surmised that we needed to do this and the project would have to swallow the wheeling costs for a period of 2-3 years while we build our own transmission line to the WAPA line from the project site, about 15 miles. During the fall of 2005, we discussed this scenario with Rushmore Electric engineers, and Cherry-Todd Electric, the local cooperative. It was estimated that the 115 kv line would cost about $175,000.00 per mile plus a new substation where we would tie into the WAPA line. $2,625,000 for the line and approx. 3 million for a new

substation and we would just add this to project costs. This option was not a very good option but it was one where we were very seriously considering as this project needed to move forward.

In the fall 2005, grant funding expires and I am transferred to Resource Development Office as planner grant writer with the responsibility to maintain my role in this project.

2006 to Date

We have a very good wind resource that is very valuable, but we could not get anyone to buy it for a decent price. We were at the mercy of our isolated location, wheeling costs and NPPD. It seemed insurmountable until there was a change of command at NPPD. We went back to NPPD in the spring of 2006 with an offer of 2.633 cents per Kwhr and this was accepted in draft form. The Owl Feather War Bonnet Wind Farm would give up 20 Mw of Green Tags as part of the price indicated, 10 Mw of Green Tags would be retained by the LLC. Native Energy has proposed an upfront payment of $3.2 million dollars for lifetime purchase of 10Mw of Green Tags of the project

With grant funding exhausted and no cash flow moving to support DISGEN's involvement, Dale Osborn (DISGEN) in March 2006, develops an MOU to have assurances from the tribe to continue on this project and have the right to recoup his investment in the project. It is discussed and sent to our in house lawyers, very good lawyers but not necessarily versed in renewable energy issues. The council wants an expert opinion and requests that I try and find someone to assist. I found people were willing to help but they needed money for this work, which the council did not authorize monies for. I stated to the council that I would look on the Internet and see if we could get some help for free. I appealed to the world in effect and I ended up talking with Mr. Roger Freeman of Citizens Energy Corporation. I requested his assistance and he agreed to assist Pro Bono and to look at the Draft MOU, along other project data that DISGEN has brought forth. He committed a letter in response to the council on what DISGEN was doing for the tribe and what this MOU was about.
Roger Freemans Letter, See Attachment E.

In May of 2006, at a duly convened council meeting, Roger Freeman's letters is presented and expresses a favorable response on DISGEN and their efforts, but also encourages the tribe to be sure to retain lawyers versed in this field. The council then wants DISGEN to pay for this expertise and charge the money against the project costs.

Via telephone, Dale refuses. I basically relay this back to the council.

No action was taken on signing the MOU.

An impasse ensues; 3 months go by with nothing happening on the project. In order for this project to get off dead center, I suggested to Dale to offer the tribe a percentage of the gross revenue stream, close to the economic benefits the tribe would get anyway as a partner. In essence the world would view this wind farm as the Rosebud Sioux Tribes.

DISGEN forms the Owl Feather War Bonnet LLC and issues a Grant of Easement based on the concept of the tribe being a passive landowner and receiving on an annual basis of 6.75% of gross revenues upon a price not below $26.33 per Mwhr or 2.633 cents per Kwhr, escalating between 1.5 and 2.5% annually as terms may be negotiated in the Power Purchase Agreement. The tribe also reaps 88% of the state excise tax that the project will be charged, essentially within a year of project commissioning from the state of South Dakota. DISGEN brings forth on annual basis a $50,000.00 trust for educational needs for any tribal member of school age, during the life of this project.

In house lawyers review Grant of Easement and negotiations ensue via email and telephone and on Nov 30, 2006, council approves Grant of Easement.
See Grant of Easement Report to Council Nov. 30, 2006, Attachment F.
See RST Corporate Resolution 2006-06, Attachment G.
Tribal Chairman Rodney M. Bordeaux instructs me to send the Grant of Easement along with my report to Stephan Many Deeds for comments, in December of 06; response takes more than 6 months and goes to Aberdeen first. Although Aberdeen receives a copy of the report, we had to request one. I suspect we would've had to wait for Aberdeen before we got a proper response. To date, we have yet to get that response from Aberdeen. The response from BIA DEMD was favorable.
See response letter from BIA DEMD to Aberdeen Area Office, Appendix H.

During this time period, NPPD changes approach, the draft PPA expires and NPPD puts out a Request for Proposals in May '07 for a 30, 60, 90 and 110Mw of renewable electrical energy with response due in July of '07. Owl Feather War Bonnet Wind Farm LLC responds to the proposal on each size.

This is where the Wind Farm is at the moment.

The Rosebud Sioux Tribe and DISGEN stands committed to build this wind farm. The obstacles are not insurmountable, only time consuming, and at the moment, time is of the essence. The BIA needs to come to the table and make this work, push and pull this project to fruition, as the approvals are subject to their timely responses. DISGEN will be bringing the dollar to the table and the tribe will bring the studies and the land to the table. The offices of BIA and Department of Interior at the Washington DC level can make an impact in this project by insuring DISGEN's efforts to secure a Rural Utilities Service Loan through USDA to develop this project, as it will affect one of the poorest locations in the nation.

At the end of November, DISGEN will submit the EA to BIA Aberdeen. We expect a Findings of No Significant Impact (FONSI) within 90 days of this submittal. If we receive the findings sooner, engagements with the investors are assured sooner. The Bureau of Indian Affairs can be of great assistance to this effort, but time frames in response to requests must become priority.

The issue of capacity of the existing infrastructure such as the transmission lines through this area is the pressing issue in wind development. The Rosebud Sioux Tribe views this project as our first step towards a self-sustainable tribal economy based on wind development, but without the close immediate assistance of the BIA and the Department of Interior, we may lose the momentum on this project and future ones.

Owl Feather War Bonnet Wind Farm
Rosebud Sioux Tribe
Conclusions and Recommendations

In reviewing the project, the biggest concern of others and mine is; understanding the economics of the wind project for the landowner, developer and the investor. It would be nice if there were an advocacy group that could assist tribes to understand the economics of wind development. Even though the developer is supposed to have the best interests of the tribe in mind, the tribe in our case has suspicions concerning whether or not we are getting the best deal or getting the short end of the deal in this project, and this is in simply the twice bitten, twice shy syndrome, hog farm issue. In my view, I feel that DISGEN Inc. is bringing forth a good deal for the tribe, but my expertise is considered questionable, and so the council requires an outside independent view of the project to insure that in fact this is a good deal from experts versed in this field. I suspect there are other tribes in this same situation. With this in mind, it would be my recommendation that the Bureau of Indian Affairs and/or the Department of Interior develop a wind advisory group that can comment on the value of the economics that developers bring forth for the tribes.

After the RST Council voted unanimously in late November, 2006, on the Grant of Easement, the RST President, Honorable Rodney M. Bordeaux requested the Office of BIA DEMD, Lakewood, Colorado for advice on the Grant of Easement brought forth by DISGEN, Inc. After being at BIA DEMD for close to 7 months, their review was sent to the Aberdeen Area Office in July, 2007 and as of this report date; no recommendation has come down from Aberdeen to Rosebud on this easement. Even so, this office requested a copy of the recommendation from BIA DEMD, and did receive a copy from Roger Knight's, BIA DEMD office. Although the response was favorable for the tribe, it took 7 months from when we first presented this Grant of Easement before it was sent to Aberdeen. This is entirely too lengthy a period for a response and it still has not come down from Aberdeen Area Office. This time frame needs to be reduced to no longer than a 90 day turn around.

At the end of November, the Environmental Assessment for this project will be submitted to the Lead Agency, which is the BIA Aberdeen Office of Ms. Dianne Mann-Klager, Lead Wildlife Biologist. It is imperative that the BIA Aberdeen Office responds to this EA in a timely manner.

Another matter of concern is the wheeling costs and how they have significantly affected this project. The wind resource in this region is extremely high, but the isolation from major markets has reduced the potential economic picture for the tribe because of the wheeling costs to move this power to these major markets. We cannot change a private corporation on its stance on wheeling costs such as Nebraska Public Power District, but I think that we need to discuss the implications of WAPA owned transmission lines and the Federal Trust Responsibility towards Indian Tribes in wind development.

The Hydroelectric Power Dams that were installed for flood control and for building an emerging nation that needed more land and the power to subdue these lands along with the installation of WAPA lines that cross the Upper Great Plains caused the displacement of an estimated 100,000 Indians from ancient homelands along the Missouri River to accommodate this venture on the part of the U.S. Government. The WAPA lines that were built to move this power across the Northern Plains were once fully charged by hydropower, clean power, now these lines have more than 80% coal produced dirty power moving on them. Wind development, especially by tribes need to be recognized by the Federal Government as a true opportunity to put United States obligation to trust responsibility in action.

The Western Area Power Administration is essentially part of the Federal Government and the Federal Government has a Trust Responsibility to tribes. The Trust Responsibility is recognized as an integral part of our tribal relationship with the Federal Government to improve the economic picture of tribes. We stand now to request from the Federal Government to review this relationship concerning wheeling costs on these existing WAPA lines with possible access priorities and reduced or no cost to tribes for the use these lines for the purposes of improving our lifestyle and our economic picture.

Owl Feather War Bonnet Wind Farm
The Rosebud Sioux Tribe
Social and Economic Impact

The project area is located in Todd County, South Dakota, which lies wholly within the exterior boundaries of the Rosebud Sioux Tribal Reservation. In 2003, the county had an estimated population of 9,468 residing in 2,462 residences. Native Americans comprise 85.6% of the population and **the county is the fifth poorest in the USA** with a per capita income of $7,714.00, resulting in a poverty level of 48.3%. As a comparison to the State of South Dakota, that has a per capita income in 2003 of $29,234.00.

The community of St. Francis, which is located near the project area, is an economically disadvantaged community comprised of 96% Native Americans. There are no industrial or manufacturing facilities in the community. The unemployment rate fluctuates around 55% in summer to 85% in midwinter, and any job creation is a significant benefit to the community.

The RST Council has been briefed on numerous occasions relative to the benefits the RST will receive. The land royalty payments will be at a minimum, approximately $240,000 per year escalating at 2.5% for 20 years. The total amount for royalties is approximately $5 million for the use of the 50 acres. In addition, the RST will receive the sales and use taxes collected by the State of South Dakota and paid to the RST in amounts approximately equal to $1 million. In addition, employment includes a tribal preference and it is estimated the payroll for tribal employees will be approximately $100,000 per year. There is expected to be 3-4 permanent full time quality maintenance jobs created by this project. The total value over the project's life is approximately $8.0 million dollars with little or no dollars being expended by the tribe.

There is also an expected 20-40 temporary jobs during the construction of the wind farm with a local impact of $3-4 million dollars during construction. In addition, RST construction and reclamation services will be used where possible during the construction of this project. Benefits included will be the sale and delivery of gravel of approx. 14,000 cubic yards, for the project access road development, by tribal construction personnel, along with the excavation for underground lines, the excavation of foundations for the turbines themselves and the possibility of the tribe developing a concrete batch plant that will provide approx. 450 cubic yards per each turbine of 2.0 Mw. or larger. It has been suggested to the tribe and to the community to anticipate the potential to the community by looking at the added benefits and initiate efforts to capture the moment and the added economic value.

The community or the tribe could also develop a small trailer park to accommodate those personnel that require such a place to stay during construction along with a small restaurant or a vendor for delivery of food to site during construction. This could be an economic potential for the tribe or an individual, to start up a business, which can be further sustained by a focal point for tourists, hunters and visitors to the reservation in the tourism sector.

The implications of the economic potential through wind development for our tribe cannot be understated or even fully realized and as the tribe moves forward in wind development we build on a foundation of education and experience, allowing our people an opportunity at building a better life for our children and grandchildren, by continuing this vision.

Owl Feather War Bonnet Wind Farm
Rosebud Sioux Tribe
DOE Grant DE-FC36-030GO13122

Attachment A

Wind Assessment Report, May 2007

Preliminary Wind Resource and Theoretical Energy Estimates

For the

Owl Feather War Bonnet Wind Project

At The

Rosebud Sioux Nation
Rosebud, South Dakota

Prepared For:

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May 2007

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1.0 Introduction and Summary

A wind resource assessment is prepared for the Owl Feather War Bonnet Project in south central South Dakota near the Town of St. Francis on the Rosebud Sioux Nation. Five (5) years of wind speed data (5/15/2001 – 5/14/2006) are collected at the site and are used to prepare the assessment.

The average wind speed measured at 65 meters above ground level is 18.2 mph. Using the wind shear information collected on the tower, the projected long-term annual average wind speed at 80 meters above ground level is 18.8 mph (8.4 mps). Theoretical energy estimates are prepared for six different turbines: GE 1.5MW with a 70m rotor; GE 1.5MW with a 77-meter rotor; Vestas V-80; Vestas V-90; Gamesa G87, and the Suzlon S88. The theoretical energy estimates for each of the six turbines at two different hub heights, 65 meters and 80 meters, are presented in Table 1. In addition, a theoretical energy estimate is prepared for the Gamesa G80 turbine on an 80-meter tower.

Table 1 –Turbine and Project Theoretical Energy Estimates

Turbine	Rotor Diameter (m)	Rating (kW)	Hub Height (meters)	Net Annual Energy Output for a 15 Turbine Project (kWh)	Turbine Net Capacity Factor
GE	70	1500	65	70,242,277	35.6%
GE	77	1500	65	76,224,080	38.7%
Vestas	80	1800	65	84,874,777	35.9%
Vestas	90	3000	65	117,707,265	29.9%
Gamesa	87	2000	65	99,472,213	37.9%
Suzlon	88	2100	65	101,700,183	36.9%
GE	70	1500	80	74,351,058	37.7%
GE	77	1500	80	80,129,911	40.7%
Vestas	80	1800	80	89,709,661	37.9%
Vestas	90	3000	80	125,134,636	31.7%
Gamesa	87	2000	80	104,743,558	39.9%
Gamesa	80	2000	80	97,147,140	37.0%
Suzlon	88	2100	80	107,403,472	38.9%

2.0 Site Description

The Owl Feather War Bonnet Project is proposed for a nearly 1.5 square mile area southeast of the town of St. Francis on the Rosebud Sioux Reservation. The project location is shown in Figure 1. The local topography is typical of the central plains with generally flat terrain with minor hills and ridges and deep gullies. Land use is dry land farming and cattle ranching. The general wind resource in the region is shown in Figure 2. The bulk of the reservation is considered Wind Power Class 5 (Excellent).

Figure 1 – General Location of the Owl Feather War Bonnet Project

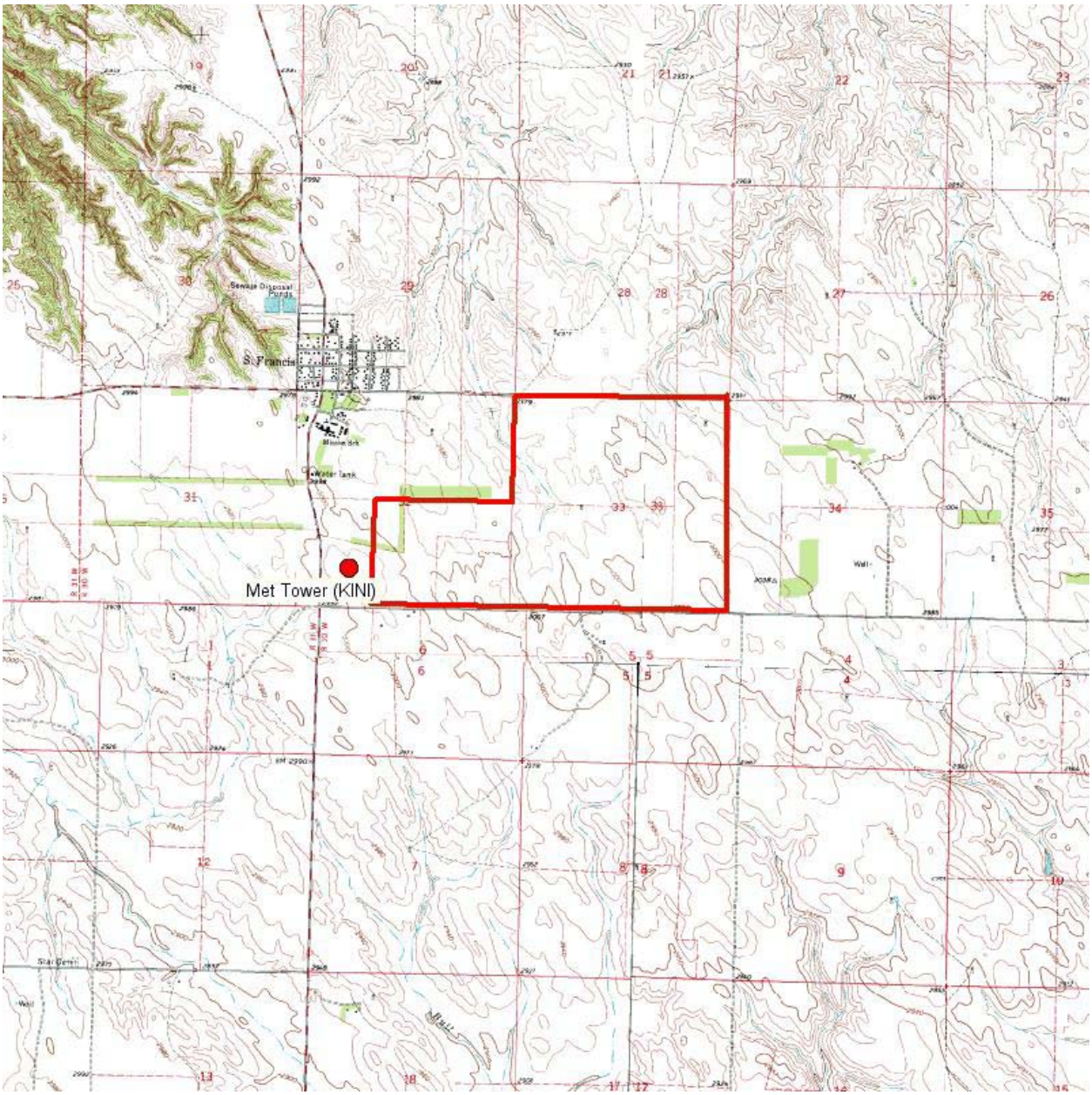
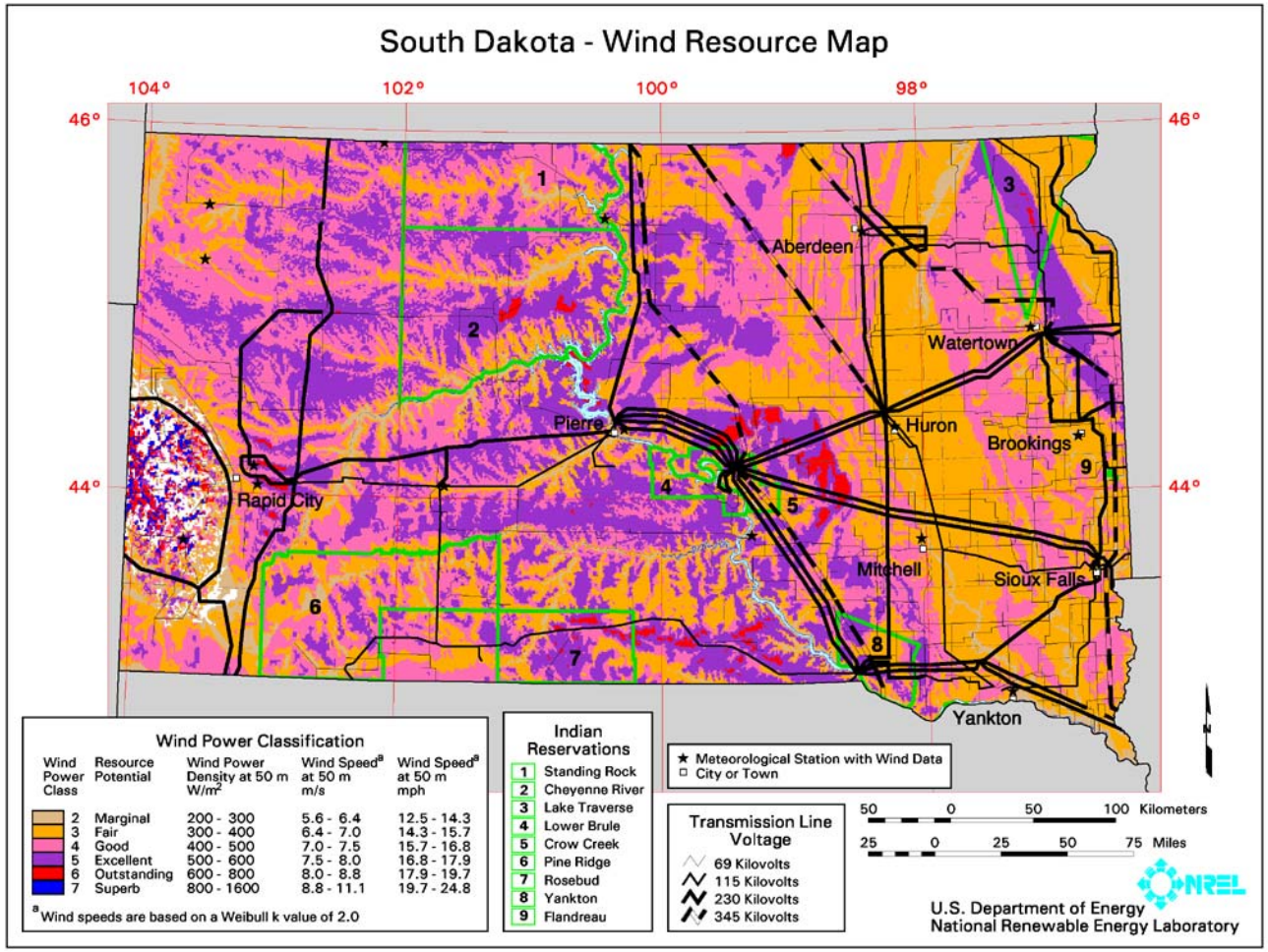


Figure 2 – Wind Resource Map For South Dakota



3.0 Meteorological Monitoring Program

3.1 On-Site Meteorological Monitoring Program

3.1.1 Tower Location

The tower is located at 43.13045 Deg North and 100.90024 West at an elevation of 3,025 feet. (Figure 3).

3.1.2 Tower Description

The tower is an existing 200 foot communications tower.

3.1.3 Period of Record

The equipment was installed in May 2001 and remains operational. Data are current through the middle of June 2006.

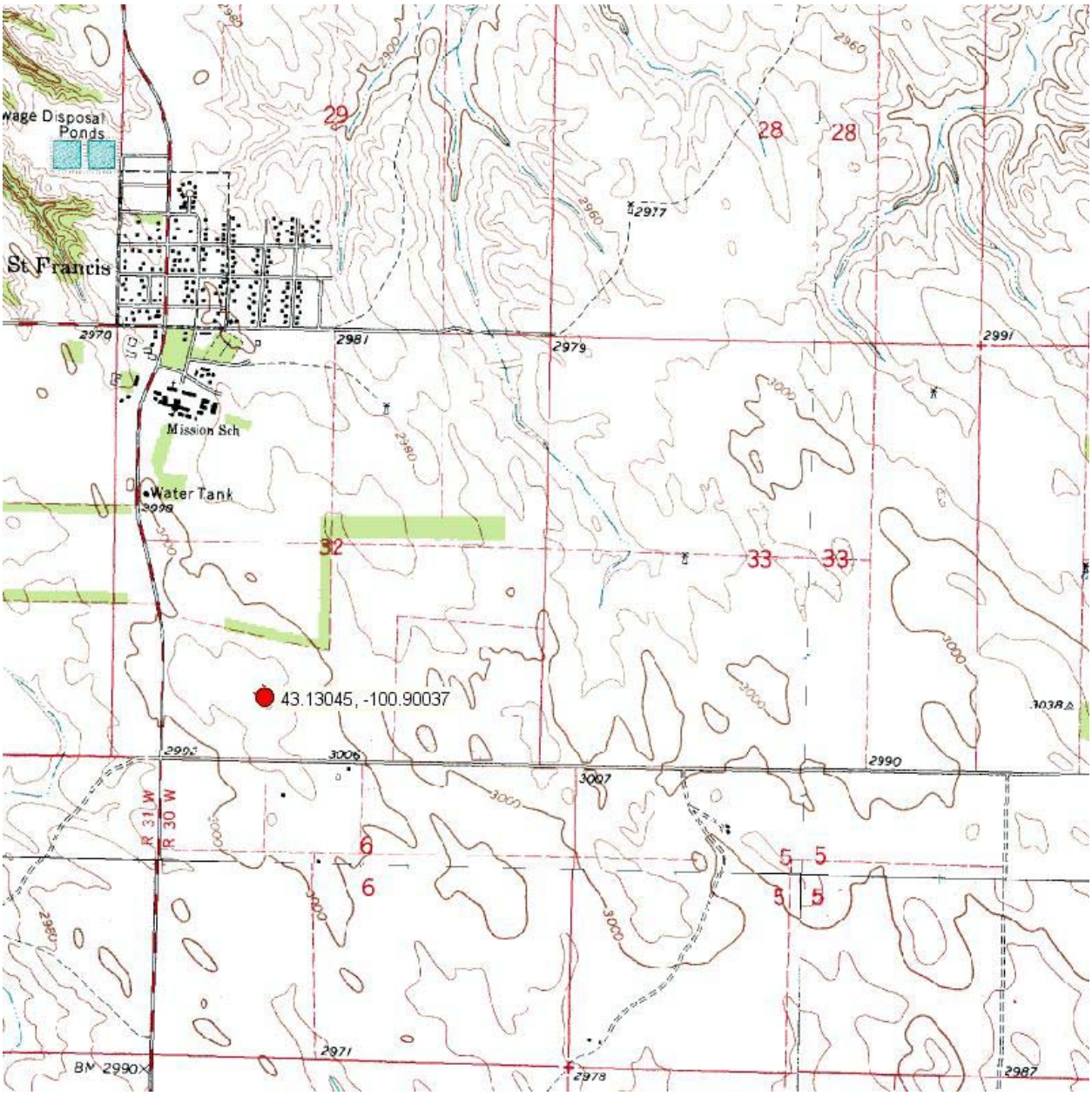
3.1.4 Sensor Description

Three levels of wind speed sensors consisting of six sensors overall and two levels of wind direction sensors are mounted on the tower. A description of the sensors is presented in Table 2 and Table 3.

Maximum #40 wind speed sensors are installed at three levels: 30-meters, 40-meters, and 65-meters. Two wind speed sensors are mounted at the 50-meter level; two wind speed sensors are mounted at the 40-meter level; and two wind speed sensor are mounted at 10-meters. The booms mounting the wind speed sensors extend along an east – west axis relative to the tower. Wind direction sensors, NRG #200P, are mounted at 40 meters and 65 meters above ground level.

All sensors are mounted on 43 inch booms including the wind speed sensors at the 65-meter level on the tower.

Figure 3 – Location of Meteorological Monitoring Site at the Owl Feather War Bonnet Project Site



3.1.5 Datalogger

The data are collected using an NRG Systems 9300SA logger. Flashcards are pulled on a routine basis for processing and download to an electronic file. The data values are recorded and stored as hourly values.

3.1.6 Maintenance

No scheduled maintenance is performed. Equipment is replaced and repaired as necessary to maintain a high rate of data recovery.

3.1.7 Data Recovery

Data recovery statistics for each of the wind speed and wind direction sensors are presented in Table 4.

Table 2 – Wind Speed Sensor Description for Owl Feather War Bonnet Property Tower.

Sensor	Wind Speed	Wind Speed	Wind Speed	Wind Speed	Wind Speed	Wind Speed
Channel	1	2	3	4	5	6
Type	Max #40	Max #40	Max #40	Max #40	Max #40	Max #40
Monitoring Height	65-Meters	65-Meters	40-Meters	40-Meters	30-Meters	30-Meters
Mounting Boom Orientation	West	East	West	East	West	East
Boom Length	43 inches	43 inches	43 inches	43 inches	43 inches	43 inches
Height Abv Mounting Hardware	6 inches	6 inches	6 inches	6 inches	6 inches	6 inches
Slope	1.711	1.711	1.711	1.711	1.711	1.711
Offset	0.8	0.8	0.8	0.8	0.8	0.8

Table 3 – Wind Direction Sensor Description for Owl Feather War Bonnet Property Tower.

Sensor	Wind Direction	Wind Direction
Channel	7	8
Type	200P	200P
Monitoring Height	50-Meters	40-Meters
Mounting Boom Orientation[1]	3	3
Boom Length	43 inches	43 inches
Height Abv Mounting Hardware	6 inches	6 inches
Deadband Orientation	North	North

Table 4– Meteorological Monitoring Program – Data Recovery

Parameter	**Sensor**	**Level**	**Data Recovery**[1]
Wind Speed	Max #40	65-meter (1)	97.8%
Wind Speed	Max #40	65-meter (2)	97.4%
Wind Speed	Max #40)	40-meter (3)	94.2%
Wind Speed	Max #40	40-meter (4)	97.6%
Wind Speed	Max #40	30-meter (5)	97.6%
Wind Speed	Max #40	30-meter (6)	81.2%
Wind Direction	200 P	50-meter	96.7%
Wind Direction	200 P	40-meter	97.0%

3.2 Average Wind Speed

The average wind speeds are presented for each sensor and each level in Tables 5 through 12. The annual average wind speed at the 65-meter level is 18.2 mph. The diurnal wind speed pattern indicates a daytime minimum and a nighttime maximum for each level, which is most pronounced at the 65-meter level. This diurnal pattern is very typical of a Great Plains site.

Table 5- Mean Hourly Wind Speeds at 30 Meters

MEAN HOURLY WIND SPEEDS

ROSEBUD SIOUX TRIBE
30M WIND SPEED (CHAN 5) (MPH)

06/01/01 - 05/31/06

Hour	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
01	16.1	15.7	17.2	18.0	16.7	16.6	15.9	16.7	16.6	16.3	16.8	16.6	16.6
02	16.3	15.6	17.4	18.0	17.1	16.5	15.7	16.3	16.9	16.4	17.1	16.5	16.7
03	16.5	15.9	17.1	17.9	16.8	16.0	15.4	15.9	16.6	16.3	17.0	16.5	16.5
04	15.9	15.8	16.8	17.6	16.8	15.5	15.1	15.2	16.3	16.0	16.8	16.5	16.2
05	15.4	15.7	16.7	17.5	16.5	15.4	14.9	14.8	16.4	16.1	16.3	16.3	16.0
06	15.2	15.2	16.3	17.2	16.2	14.8	15.2	14.6	16.5	15.7	15.9	16.1	15.7
07	15.5	15.0	15.9	16.9	15.8	14.6	14.7	14.6	16.5	15.8	15.9	16.3	15.6
08	15.2	14.9	15.6	16.3	15.5	14.0	14.1	14.3	16.3	15.7	16.2	16.5	15.4
09	15.4	14.6	15.5	15.9	16.0	14.8	13.9	14.7	16.2	15.4	16.4	16.3	15.4
10	15.4	14.5	15.5	16.2	16.7	15.6	14.3	15.2	16.9	15.5	16.2	16.2	15.7
11	15.2	14.8	16.0	16.3	16.5	15.5	14.8	15.9	17.4	16.1	16.2	16.2	15.9
12	15.2	15.6	16.5	16.9	16.6	15.0	14.9	16.0	17.8	16.1	16.6	16.6	16.2
13	15.6	15.7	16.7	16.9	16.4	14.9	14.8	15.7	17.7	16.5	17.0	16.7	16.2
14	15.6	15.8	17.1	17.1	16.3	15.0	14.7	15.3	17.7	16.4	17.6	16.9	16.3
15	15.6	16.2	17.3	17.4	16.2	15.5	14.9	15.7	17.7	16.6	17.5	17.0	16.5
16	15.6	16.5	17.4	17.5	16.1	15.3	14.8	15.6	17.3	16.3	17.1	16.5	16.3
17	15.3	16.6	17.2	18.0	16.1	15.0	14.7	15.8	17.0	15.5	16.6	16.1	16.1
18	14.5	16.1	17.0	17.9	16.0	15.1	14.9	15.5	16.8	14.5	15.7	15.5	15.8
19	14.6	15.4	16.6	17.4	15.8	15.2	15.4	15.3	16.0	14.1	16.0	15.6	15.6
20	15.0	15.2	16.3	17.1	15.1	15.0	15.0	15.0	15.6	14.6	16.5	15.9	15.5
21	15.4	15.4	16.3	16.9	15.5	16.0	15.2	15.4	16.3	15.2	16.5	16.0	15.8
22	15.4	15.7	16.2	17.6	16.5	16.3	15.9	15.9	16.9	15.2	16.1	16.3	16.2
23	15.2	15.9	16.7	18.1	16.9	16.4	16.2	16.6	16.8	15.6	16.4	16.1	16.4
24	15.8	16.1	17.2	18.2	16.6	16.6	16.3	16.6	16.4	16.0	16.6	16.5	16.6
Mean	15.4	15.6	16.6	17.3	16.3	15.4	15.1	15.5	16.8	15.7	16.5	16.3	16.1
Good Hours	3556	3143	3598	3600	3585	3365	3720	3720	3600	3651	3564	3687	
Missing Hours	164	241	122	0	135	235	0	0	0	69	36	33	

42,789 Hours of Good Data 1,035 Hours Missing 97.6% Data Recovery

Table 6 - Mean Hourly Wind Speeds at 30 Meters

MEAN HOURLY WIND SPEEDS

ROSEBUD SIOUX TRIBE
30M WIND SPEED (CHAN 6) (MPH)

06/01/01 - 05/31/06

Hour	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
01	15.7	15.8	16.7	17.8	17.0	16.9	15.8	17.3	16.7	16.3	16.3	16.4	16.6
02	15.8	15.7	17.0	18.0	17.4	16.7	16.0	16.9	16.8	16.6	16.5	16.4	16.7
03	15.9	16.0	16.8	17.9	17.1	16.0	15.7	16.5	16.5	16.4	16.8	16.6	16.5
04	15.3	15.7	16.5	17.7	17.2	15.5	15.3	15.8	16.3	16.1	16.9	16.5	16.2
05	15.1	15.6	16.5	17.4	17.1	15.5	15.2	15.2	16.5	16.3	16.5	16.7	16.1
06	15.2	15.6	16.1	17.2	16.6	14.9	15.3	15.0	16.6	16.0	16.2	16.6	15.9
07	15.5	15.3	15.7	16.9	16.2	14.6	14.7	14.8	16.9	16.2	16.0	16.9	15.8
08	15.2	14.8	15.2	16.3	15.8	13.9	14.0	14.4	16.7	15.8	16.1	17.0	15.4
09	15.3	14.5	15.2	15.5	16.4	14.7	13.7	14.6	16.4	15.4	16.1	16.6	15.4
10	15.5	14.2	15.4	15.8	17.0	15.5	14.2	15.0	17.0	15.5	15.8	16.5	15.6
11	15.4	14.3	15.8	16.2	16.9	15.4	14.6	15.6	17.6	16.2	15.8	16.5	15.9
12	15.2	15.2	16.5	16.9	16.9	15.0	14.6	15.8	18.0	16.4	16.4	17.0	16.1
13	15.7	15.5	16.9	16.9	16.6	15.0	14.5	15.6	17.8	16.8	16.8	17.1	16.2
14	15.6	15.9	17.2	17.1	16.5	15.2	14.4	15.4	17.9	16.9	17.5	17.4	16.4
15	15.7	16.4	17.4	17.5	16.4	15.6	14.7	15.9	18.0	16.9	17.2	17.5	16.5
16	15.6	16.6	17.3	17.8	16.5	15.2	14.6	15.8	17.7	16.7	16.6	16.7	16.4
17	15.1	16.7	17.1	18.3	16.7	15.0	14.4	15.9	17.5	15.7	15.8	16.0	16.1
18	14.2	15.9	16.7	18.3	16.8	15.2	14.7	15.8	17.1	14.4	14.8	15.0	15.7
19	14.5	15.3	16.2	17.6	16.5	15.2	15.3	15.8	16.0	13.9	15.2	15.2	15.6
20	15.1	15.2	15.9	17.0	15.8	15.0	14.9	15.1	15.6	14.4	15.8	15.7	15.5
21	15.5	15.4	16.0	16.9	15.9	15.8	15.3	15.6	16.3	15.2	16.1	15.9	15.8
22	15.4	15.6	15.9	17.6	16.9	16.0	15.9	16.1	17.0	15.4	16.0	16.1	16.2
23	15.1	16.0	16.2	18.1	17.1	16.2	16.1	17.2	17.0	15.7	16.4	16.0	16.4
24	15.4	16.1	16.9	18.0	16.8	16.9	16.1	17.3	16.6	16.0	16.4	16.4	16.6
Mean	15.3	15.6	16.4	17.3	16.7	15.5	15.0	15.8	16.9	15.9	16.3	16.4	16.1
Good Hours	2824	2478	2852	2972	3161	3365	3439	2976	2880	2906	2807	2940	
Missing Hours	896	906	868	628	559	235	281	744	720	814	793	780	

35,600 Hours of Good Data 8,224 Hours Missing 81.2% Data Recovery

Table 7 – Mean Hourly Wind Speeds at 40 Meters

MEAN HOURLY WIND SPEEDS

ROSEBUD SIOUX TRIBE
40M WIND SPEED (CHAN 3) (MPH)

06/01/01 - 05/31/06

Hour	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
01	16.7	15.9	17.6	18.7	17.7	17.5	16.8	17.7	17.6	17.1	17.6	17.4	17.3
02	16.9	15.9	17.7	18.6	18.1	17.4	16.6	17.3	17.8	17.3	17.8	17.3	17.4
03	17.0	16.2	17.4	18.6	17.9	16.8	16.2	16.8	17.5	17.1	17.5	17.3	17.2
04	16.4	16.0	17.1	18.4	17.7	16.3	15.9	16.0	17.1	16.9	17.5	17.3	16.8
05	15.9	15.9	17.1	18.1	17.6	16.3	15.7	15.6	17.2	17.0	17.1	17.1	16.7
06	15.7	15.6	16.8	17.7	17.3	15.6	16.0	15.4	17.2	16.6	16.7	17.0	16.4
07	16.0	15.3	16.5	17.6	16.9	15.4	15.5	15.5	17.3	16.8	16.7	17.2	16.4
08	16.0	15.2	16.2	17.0	16.5	14.6	14.7	15.1	17.2	16.6	17.0	17.5	16.1
09	16.1	15.2	16.2	16.2	16.9	15.1	14.3	15.2	16.9	16.3	17.3	17.1	16.1
10	16.1	14.8	16.0	16.3	17.7	15.9	14.6	15.6	17.3	16.2	17.0	17.1	16.2
11	15.8	15.0	16.4	16.5	17.4	15.8	15.1	16.2	17.7	16.6	16.7	16.9	16.3
12	15.6	15.7	16.9	17.2	17.5	15.3	15.1	16.3	18.2	16.6	16.9	17.0	16.5
13	15.9	15.9	17.2	17.3	17.3	15.3	15.0	15.9	18.1	17.0	17.3	17.1	16.6
14	15.8	16.0	17.5	17.5	17.1	15.4	15.0	15.5	18.2	17.0	18.0	17.5	16.7
15	15.9	16.5	17.7	17.7	17.0	15.9	15.1	16.0	18.1	17.2	18.0	17.6	16.9
16	15.9	16.8	17.7	18.1	17.2	15.7	15.0	15.8	17.8	16.8	17.5	17.0	16.8
17	15.5	16.9	17.4	18.7	17.3	15.4	15.0	16.0	17.5	16.0	17.1	16.7	16.6
18	14.8	16.4	17.2	18.7	17.2	15.6	15.3	15.8	17.3	15.1	16.3	16.2	16.3
19	14.9	15.9	16.8	18.1	17.1	15.7	15.8	15.7	16.7	15.0	16.7	16.5	16.2
20	15.7	15.8	16.7	17.9	16.4	15.7	15.5	15.6	16.4	15.6	17.4	16.8	16.3
21	16.1	16.1	16.7	17.9	16.7	16.8	16.0	16.2	17.1	16.2	17.3	17.0	16.7
22	15.9	16.1	16.5	18.7	17.9	17.2	16.9	16.9	17.8	16.0	16.9	17.2	17.0
23	15.7	16.2	17.0	19.3	18.3	17.3	17.1	17.6	17.7	16.4	17.2	16.9	17.2
24	16.4	16.2	17.5	19.2	17.7	17.6	17.2	17.6	17.3	16.9	17.3	17.3	17.3
Mean	15.9	15.9	17.0	17.9	17.4	16.1	15.6	16.1	17.5	16.5	17.2	17.1	16.7

Good Hours												
3568	3247	3347	2880	2889	3365	3720	3720	3600	3649	3580	3701	

Missing Hours												
152	137	373	720	831	235	0	0	0	71	20	19	

41,266 Hours of Good Data 2,558 Hours Missing 94.2% Data Recovery

Table 8 – Mean Hourly Wind Speeds at 40 Meters

MEAN HOURLY WIND SPEEDS

ROSEBUD SIOUX TRIBE
40M WIND SPEED (CHAN 4) (MPH)

06/01/01 - 05/31/06

Hour	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
01	17.0	16.0	17.8	18.6	17.3	17.6	16.5	17.3	17.4	17.1	18.0	17.6	17.4
02	17.1	16.1	18.0	18.7	17.6	17.4	16.5	17.1	17.6	17.4	18.2	17.6	17.5
03	17.3	16.5	17.7	18.5	17.5	16.8	16.1	16.5	17.3	17.2	18.2	17.7	17.3
04	16.8	16.3	17.4	18.2	17.5	16.3	15.7	15.9	17.0	16.9	18.1	17.6	17.0
05	16.3	16.2	17.2	18.0	17.2	16.3	15.6	15.5	17.1	17.0	17.4	17.6	16.8
06	16.1	15.9	16.7	17.8	16.8	15.7	15.8	15.4	17.2	16.6	17.2	17.4	16.6
07	16.5	15.6	16.3	17.5	16.5	15.3	15.2	15.4	17.2	16.8	17.3	17.6	16.4
08	16.4	15.4	16.0	16.8	16.0	14.4	14.5	15.0	17.1	16.7	17.6	17.8	16.2
09	16.6	15.3	16.1	16.3	16.5	15.0	14.0	15.0	16.8	16.3	17.8	17.6	16.1
10	16.6	15.0	16.0	16.5	17.1	15.7	14.4	15.3	17.1	16.1	17.4	17.5	16.2
11	16.2	15.1	16.4	16.7	17.0	15.6	14.8	16.0	17.6	16.5	17.2	17.3	16.4
12	16.0	15.6	17.0	17.4	17.1	15.3	14.9	16.1	18.1	16.5	17.4	17.4	16.6
13	16.2	15.8	17.4	17.3	16.9	15.2	14.7	15.8	18.0	16.9	17.6	17.4	16.6
14	16.1	16.0	17.9	17.5	16.7	15.4	14.6	15.4	18.1	16.9	18.3	17.7	16.7
15	16.2	16.4	18.0	17.9	16.6	15.8	14.8	15.8	18.0	17.0	18.2	17.7	16.9
16	16.2	16.7	18.1	18.1	16.6	15.5	14.7	15.7	17.7	16.8	17.8	17.2	16.8
17	15.8	16.9	17.8	18.5	16.6	15.2	14.6	15.8	17.3	16.0	17.3	16.8	16.6
18	15.2	16.5	17.6	18.4	16.7	15.5	14.9	15.6	17.2	15.0	16.6	16.3	16.3
19	15.2	16.0	17.1	17.9	16.6	15.6	15.5	15.5	16.5	14.7	16.8	16.7	16.2
20	15.9	16.0	17.0	17.5	15.8	15.5	15.2	15.2	16.2	15.3	17.4	17.1	16.2
21	16.3	16.2	17.0	17.2	16.0	16.5	15.7	15.8	16.9	15.9	17.5	17.2	16.5
22	16.3	16.2	16.8	18.1	16.9	16.8	16.5	16.3	17.5	15.8	17.3	17.4	16.8
23	16.1	16.3	17.3	18.6	17.4	17.0	16.7	17.2	17.5	16.3	17.6	17.2	17.1
24	16.6	16.4	17.8	18.6	17.2	17.5	16.7	17.3	17.1	16.8	17.8	17.6	17.3
Mean	16.3	16.0	17.2	17.8	16.8	16.0	15.4	15.9	17.3	16.4	17.6	17.4	16.7
Good Hours	3560	3204	3549	3600	3585	3365	3720	3720	3600	3648	3525	3684	
Missing Hours	160	180	171	0	135	235	0	0	0	72	75	36	

42,760 Hours of Good Data 1,064 Hours Missing 97.6% Data Recovery

Table 9 – Mean Hourly Wind Speeds at 65 Meters

MEAN HOURLY WIND SPEEDS

ROSEBUD SIOUX TRIBE
65M WIND SPEED (CHAN 1) (MPH)

06/01/01 - 05/31/06

Hour	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
01	17.8	16.7	18.9	20.1	18.7	18.9	18.3	19.3	19.0	18.2	19.1	18.9	18.7
02	17.8	16.6	19.0	20.0	19.0	18.8	18.1	18.9	19.3	18.6	19.3	18.6	18.7
03	18.0	16.8	18.7	19.9	18.7	18.2	17.7	18.2	19.0	18.4	18.9	18.8	18.5
04	17.3	16.6	18.4	19.5	18.6	17.8	17.3	17.4	18.4	18.1	19.0	18.9	18.1
05	16.8	16.5	18.4	19.3	18.4	17.7	17.0	17.0	18.5	18.3	18.5	18.8	17.9
06	16.7	16.3	18.0	19.0	18.0	17.1	17.2	16.7	18.6	17.9	18.4	18.7	17.7
07	17.2	16.3	17.8	19.0	17.7	16.8	16.8	16.7	18.7	18.1	18.4	18.8	17.7
08	17.2	16.5	17.8	18.4	17.2	15.6	15.8	16.4	18.7	18.1	18.6	19.1	17.5
09	17.3	16.5	17.7	17.7	17.4	15.7	14.8	15.9	18.0	17.7	19.0	18.8	17.2
10	17.2	16.1	17.2	17.7	18.1	16.4	14.9	16.0	17.8	17.1	18.6	18.6	17.2
11	17.0	16.0	17.3	17.7	18.0	16.3	15.5	16.6	18.1	17.2	17.9	18.2	17.2
12	16.4	16.5	17.8	18.4	18.1	15.9	15.5	16.7	18.7	17.1	17.9	18.0	17.3
13	16.5	16.7	18.3	18.3	18.0	15.8	15.4	16.4	18.6	17.5	18.1	17.8	17.3
14	16.4	16.6	18.4	18.5	17.7	15.9	15.3	16.0	18.6	17.5	18.8	18.2	17.3
15	16.5	17.3	18.7	18.8	17.5	16.4	15.5	16.3	18.6	17.7	18.8	18.4	17.5
16	16.5	17.6	18.8	19.0	17.6	16.3	15.4	16.2	18.2	17.4	18.4	17.9	17.4
17	16.1	17.7	18.6	19.6	17.6	16.0	15.4	16.4	17.9	16.5	18.1	17.6	17.3
18	15.6	17.4	18.7	19.5	17.5	16.3	15.8	16.2	17.9	15.8	17.6	17.4	17.1
19	15.8	16.9	18.5	19.1	17.5	16.5	16.4	16.3	17.6	16.0	18.1	17.9	17.2
20	16.7	17.0	18.6	19.1	16.8	16.7	16.5	16.6	17.6	16.8	19.0	18.4	17.5
21	17.2	17.4	18.7	18.9	17.2	17.9	17.1	17.4	18.3	17.5	19.2	18.7	18.0
22	17.1	17.2	18.3	19.6	18.3	18.5	18.3	18.2	19.0	17.2	18.8	19.0	18.3
23	16.9	17.0	18.5	20.2	18.9	18.6	18.6	19.1	19.0	17.4	18.8	18.7	18.5
24	17.5	17.0	18.9	20.4	18.6	18.9	18.7	19.2	18.6	17.9	19.0	18.8	18.6
Mean	16.9	16.8	18.3	19.1	18.0	17.0	16.6	17.1	18.4	17.5	18.6	18.5	17.7

Good Hours												
3620	3238	3557	3600	3585	3365	3720	3720	3600	3635	3535	3686	

Missing Hours												
100	146	163	0	135	235	0	0	0	85	65	34	

42,861 Hours of Good Data 963 Hours Missing 97.8% Data Recovery

Table 10 – Mean Hourly Wind Speed at 65 Meters

MEAN HOURLY WIND SPEEDS

ROSEBUD SIOUX TRIBE
65M WIND SPEED (CHAN 2 (MPH)

06/01/01 - 05/31/06

Hour	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
01	18.6	17.5	19.3	20.2	19.0	19.4	18.4	19.5	19.2	18.5	19.9	19.5	19.1
02	18.7	17.7	19.7	20.2	19.3	19.3	18.3	19.1	19.5	19.0	20.0	19.4	19.2
03	18.9	18.0	19.3	20.0	19.0	18.6	18.0	18.5	19.2	18.7	19.9	19.7	19.0
04	18.3	17.6	18.9	19.7	19.0	18.2	17.7	17.7	18.8	18.3	19.8	19.6	18.6
05	17.9	17.5	18.9	19.5	18.8	18.2	17.3	17.3	18.9	18.7	19.3	19.7	18.5
06	17.8	17.4	18.5	19.4	18.4	17.5	17.6	17.2	18.9	18.3	19.2	19.6	18.3
07	18.3	17.3	18.3	19.2	18.0	17.2	17.1	17.1	19.1	18.6	19.5	19.7	18.3
08	18.4	17.6	18.1	18.6	17.6	16.0	16.1	16.9	19.0	18.6	19.6	20.0	18.0
09	18.5	17.6	18.0	17.8	17.8	16.0	15.0	16.3	18.3	18.1	19.8	19.7	17.7
10	18.4	17.2	17.6	17.8	18.4	16.7	15.2	16.3	18.1	17.6	19.4	19.4	17.7
11	18.1	16.9	17.8	17.9	18.2	16.7	15.6	16.8	18.3	17.5	18.6	19.0	17.6
12	17.4	17.2	18.2	18.5	18.3	16.3	15.7	17.0	19.0	17.4	18.5	18.6	17.7
13	17.4	17.3	18.6	18.5	18.1	16.1	15.6	16.7	18.9	17.7	18.8	18.4	17.7
14	17.2	17.4	19.0	18.7	17.9	16.3	15.5	16.3	18.9	17.7	19.4	18.6	17.8
15	17.3	17.9	19.2	19.0	17.8	16.8	15.7	16.6	19.0	17.9	19.4	18.8	17.9
16	17.3	18.3	19.3	19.3	17.8	16.6	15.7	16.5	18.7	17.7	19.0	18.4	17.9
17	17.0	18.5	19.1	19.8	17.8	16.3	15.6	16.6	18.3	16.9	18.6	18.1	17.7
18	16.5	18.2	18.9	19.8	17.9	16.7	15.9	16.5	18.3	16.1	18.0	17.9	17.5
19	16.7	17.9	18.7	19.4	17.9	16.9	16.6	16.6	17.9	16.2	18.6	18.5	17.6
20	17.5	17.9	18.8	19.3	17.3	17.1	16.7	16.8	17.9	17.0	19.3	19.0	17.9
21	18.1	18.3	19.0	18.9	17.4	18.1	17.3	17.5	18.7	17.7	19.6	19.3	18.3
22	18.0	18.1	18.6	19.7	18.5	18.6	18.3	18.2	19.3	17.4	19.4	19.5	18.6
23	18.0	17.9	18.9	20.1	19.1	18.9	18.6	19.2	19.3	17.7	19.6	19.4	18.9
24	18.4	18.0	19.2	20.4	18.8	19.3	18.8	19.4	18.8	18.2	19.8	19.5	19.1
Mean	17.9	17.7	18.7	19.2	18.2	17.4	16.8	17.4	18.8	17.8	19.3	19.1	18.2
Good Hours	3577	3129	3531	3600	3585	3365	3720	3720	3600	3639	3517	3686	
Missing Hours	143	255	189	0	135	235	0	0	0	81	83	34	

42,669 Hours of Good Data 1,155 Hours Missing 97.4% Data Recovery

Table 11 – Mean Hourly Wind Direction at 40 Meters

MEAN HOURLY VALUES

ROSEBUD SIOUX TRIBE
40M WIND DIRECTION (CHAN 8) (DEG)

06/01/01 - 05/31/06

Hour	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
01	224	230	203	200	194	170	156	157	189	200	225	240	199
02	228	234	210	201	205	179	161	169	188	205	232	238	204
03	232	226	205	205	203	185	168	166	195	202	235	240	205
04	229	230	204	208	205	190	175	171	206	205	235	240	208
05	231	223	201	200	212	194	179	177	200	205	235	240	208
06	229	231	205	195	200	204	180	184	195	206	232	241	208
07	230	231	201	201	194	205	169	183	206	211	225	235	207
08	222	220	197	198	192	198	178	183	203	208	225	235	205
09	230	214	197	203	183	196	182	185	208	208	226	240	206
10	231	225	200	202	177	191	180	191	202	209	227	236	206
11	237	224	203	203	182	187	183	188	203	214	228	238	207
12	236	218	212	205	192	181	183	183	201	213	230	242	208
13	239	221	215	204	198	191	181	184	205	221	231	244	211
14	240	225	221	202	196	182	183	186	209	223	235	242	212
15	235	232	220	200	203	181	186	186	212	228	236	244	213
16	233	233	219	208	208	187	174	197	208	226	235	239	214
17	233	228	215	208	202	185	176	187	211	224	234	234	211
18	229	221	210	203	196	188	173	178	218	213	230	230	207
19	227	216	208	204	200	175	164	172	208	198	224	228	202
20	230	210	202	198	191	167	147	154	185	190	222	226	193
21	224	218	199	195	192	159	147	157	184	194	220	226	193
22	228	225	204	191	178	171	144	159	183	193	217	226	193
23	227	229	203	195	199	183	141	159	183	192	225	230	197
24	222	228	202	193	193	171	143	166	192	199	223	233	197
Mean	230	225	207	201	196	184	169	176	200	208	229	236	205
Good Hours	3534	3102	3576	3598	3585	3365	3720	3720	3600	3628	3533	3695	
Missing Hours	186	282	144	2	135	235	0	0	0	92	67	25	

42,656 Hours of Good Data 1,168 Hours Missing 97.3% Data Recovery

Table 12 – Mean Hourly Wind Direction at 40 Meters

MEAN HOURLY VALUES

ROSEBUD SIOUX TRIBE
65M WIND DIRECTION (CHAN 7) (DEG)

06/01/01 - 05/31/06

Hour	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
01	237	233	204	191	195	173	155	156	188	206	235	248	201
02	236	232	209	193	200	184	163	172	188	208	241	252	206
03	238	227	207	199	205	182	173	174	194	207	244	254	208
04	235	224	209	192	207	183	173	174	194	208	239	253	207
05	237	224	203	193	211	192	178	183	197	209	243	252	210
06	232	216	206	186	203	203	173	192	198	207	234	247	208
07	233	219	195	184	192	201	174	190	203	211	228	250	206
08	232	216	199	190	173	193	182	185	196	211	229	249	205
09	231	217	197	192	175	188	184	188	198	213	235	252	206
10	232	219	205	192	170	182	185	181	200	218	231	252	205
11	233	212	204	191	184	186	185	181	199	214	228	248	205
12	233	218	208	189	180	180	190	169	195	216	235	248	205
13	238	221	214	192	194	186	184	177	199	222	236	252	209
14	240	227	209	187	202	185	181	187	199	230	242	254	212
15	242	234	217	191	199	177	177	187	211	230	241	252	213
16	242	230	211	190	200	179	174	190	205	234	241	248	212
17	235	224	213	195	200	180	174	179	196	225	242	247	209
18	232	217	212	189	199	179	162	173	202	216	236	241	205
19	230	220	207	184	193	169	155	170	193	195	231	237	198
20	224	215	207	190	188	167	145	159	174	190	231	232	193
21	227	218	195	191	182	160	141	156	169	187	229	240	191
22	232	222	202	192	178	169	147	161	172	187	229	238	194
23	235	227	200	182	182	172	144	160	180	196	229	240	195
24	236	231	200	197	189	173	147	156	186	209	233	245	200
Mean	234	223	205	191	192	181	169	175	193	210	235	247	204
Good Hours	3533	3101	3612	3598	3585	3365	3720	3720	3600	3628	3535	3695	
Missing Hours	187	283	108	2	135	235	0	0	0	92	65	25	

42,692 Hours of Good Data 1,132 Hours Missing 97.4% Data Recovery

3.3 Wind Rose

A wind rose, showing the joint frequency of wind speed and wind direction at the 65 meter level of the St. Francis Tower, is presented in Figure 4. The predominant wind directions appear to be south, southwest through west, and northwest.

3.4 Wind Shear

Wind shear is the change or increase in wind speed above ground level. The simple wind power law is expressed as:

$$U_2 = U1\,(Z_2/Z_1)^{\text{alpha}}$$

Where U_2 and U_1 are the wind speeds at the upper and lower levels, Z_2 and Z_1 are the upper and lower elevations, and alpha is the wind speed power law exponent. The typical value for the wind speed power law exponent is 0.14 (1/7 power law). Depending on terrain and surface roughness, the value may vary between 0.05 and 0.35.

The hourly data collected at the 30-meter level and the 65-meter level are used to determine the wind shear at the tower. This wind shear is then used to project the 80-meter hub height wind speed at the site. Pairs of hourly data are matched for these two parameters when the wind speed at the 10-meter level greater than or equal to 10 mph (3.5 mps). This condition eliminates overstating the wind shear when the wind speed at the lowest level of the tower is calm. The calculated wind speed ratio between the two levels is 1.12 which results in a determined power law coefficient or alpha value of 0.15.
.

3.5 Peak Wind Speed at Hub Height

The peak 1-second gust recorded at the airport in Valentine, NB, the closest National Weather Service (NWS) Site is 63 mph (28.1 mps), as published in the November 1998 Climatic Wind Data for the United States. Assuming a the measurement height of 6.7 meters (22 feet), and applying the wind power law with the recommended power law exponent of 0.11, the estimated 1-second gust at 80-meters agl is 82.8 mph (36.9 mps).

3.6 Turbulence Intensity

The Turbulence Intensity (TI) is defined as the standard deviation of the wind speed divided by the mean of the wind speed. The turbulence intensity derived from the hourly average wind speed data at the 65-meter level is presented in Table 13. The critical TI value, based in the existing standards for wind turbine engineering design, is the value at 15 mps. On an hourly basis, the TI value is 11.3%; on a 10-minute basis, the TI is approximately 90% of the hourly value, or 10.2%.

Table 13 - Turbulence Intensity Summary at 65 Meters

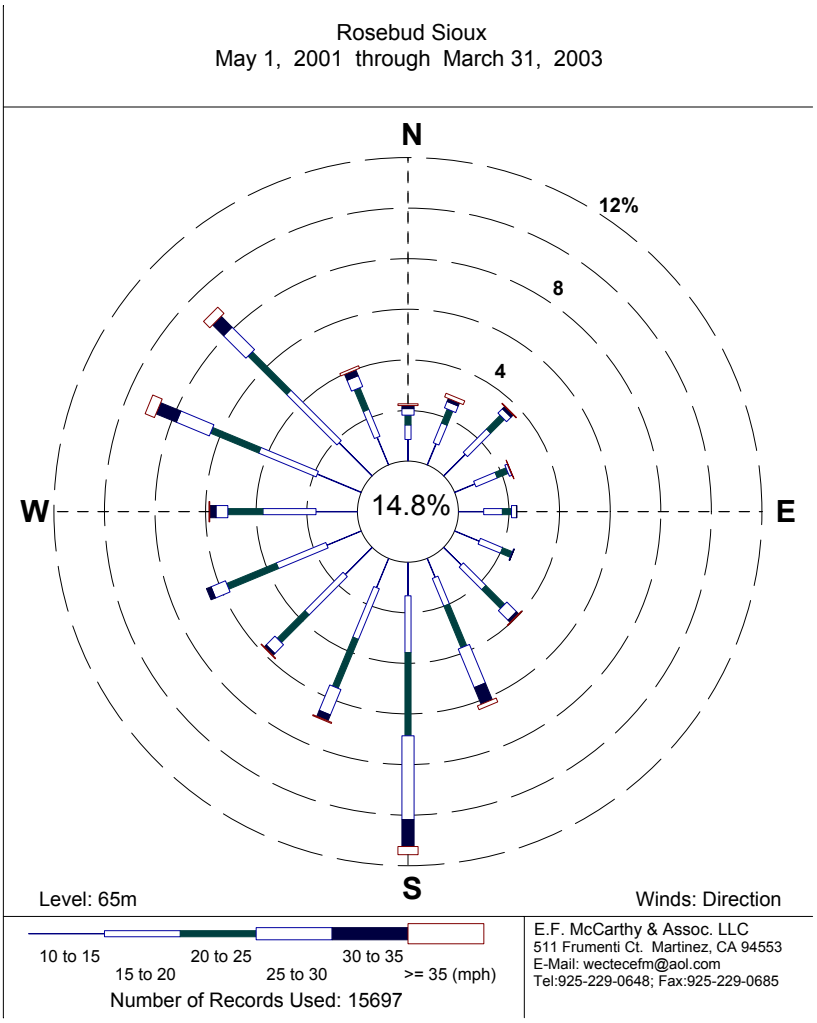
ROSEBUD SIOUX TRIBE
65M WIND SPEED (CHAN 2 □□

06/01/01 to 12/31/04

Wind Speed Frequency and Concurrent TI

Wind Speed (mps)	Frequency of Occurrence Hrs	%	Mean Turbulence Intensity
0-2	1226	4.0	0.538
3	1422	4.7	0.288
4	2013	6.6	0.221
5	2522	8.3	0.179
6	2864	9.4	0.158
7	3137	10.3	0.139
8	3645	12.0	0.122
9	3354	11.0	0.112
10	2988	9.8	0.104
11	2479	8.1	0.100
12	1890	6.2	0.096
13	1184	3.9	0.106
14	771	2.5	0.108
15	457	1.5	0.113
16	237	.8	0.123
17	137	.4	0.121
18	78	.3	0.119
19	30	.1	0.141
20	18	.1	0.119
21	12	.0	0.116
22	9	.0	0.101
23	7	.0	0.105
24	4	.0	0.094
25	0	0.0	*****
26	0	0.0	*****
27	0	0.0	*****
28	0	0.0	*****
29	0	0.0	*****
30	0	0.0	*****
Total Hrs	30484		30484

Figure 4- Wind Rose for the 65-Meter Level, Owl Feather War Bonnet Project Site.



3.7 Air Density

The air density for the site is based on long-term ambient temperature data and calculated station pressure.

Station pressure is calculated using the following formula:

Station Pressure (mb) = MSL Pressure X $(1 - 0.0226z)^{5.25}$

Where MSL Pressure is the standard sea level pressure of 1013.2 millibars (mb) and z is the elevation of the station above sea level expressed in kilometers (km). The station pressure of the site is calculated as 907.969 mb.

The air density of the site is calculated using the following formula:

Air Density (kg/m^3) = 0.3488 X (Station Pressure [mb]/Annual Temperature [Deg K])

Substituting the station pressure of 907.969 and using an annual average ambient temperature of 48 Deg F (282.04 Deg K), the air density is 1.12 kg/m^3.

3.8 Meteorological Hazards

The meteorological hazards at the Owl Feather War Bonnet Project Site principally include thunderstorms (lightning, extreme straight-line wind gusts, and hail), tornadoes, and non-thunderstorm wind gusts.

The National Severe Storms Laboratory in Norman, OK prepared maps with the frequency of occurrence of tornadoes (Fig. 5), wind gusts greater than 50 mph (Fig. 6), and 0.25" or larger hail (Fig 7). The Owl Feather War Bonnet Site experiences, on average, fewer tornados, fewer days with damaging winds, and fewer days with 0.25" or greater size hail than other locations in the central and southern plains. For example, Figure 5 presents the number of tornado days per year in the Continental US. The highest frequency occurs in NW Colorado, N Texas/S Oklahoma, and Florida. For the Owl Feather War Bonnet site, the frequency is small, less than 1 day/yr.

Figure 5 - Number of Tornado Days per Year

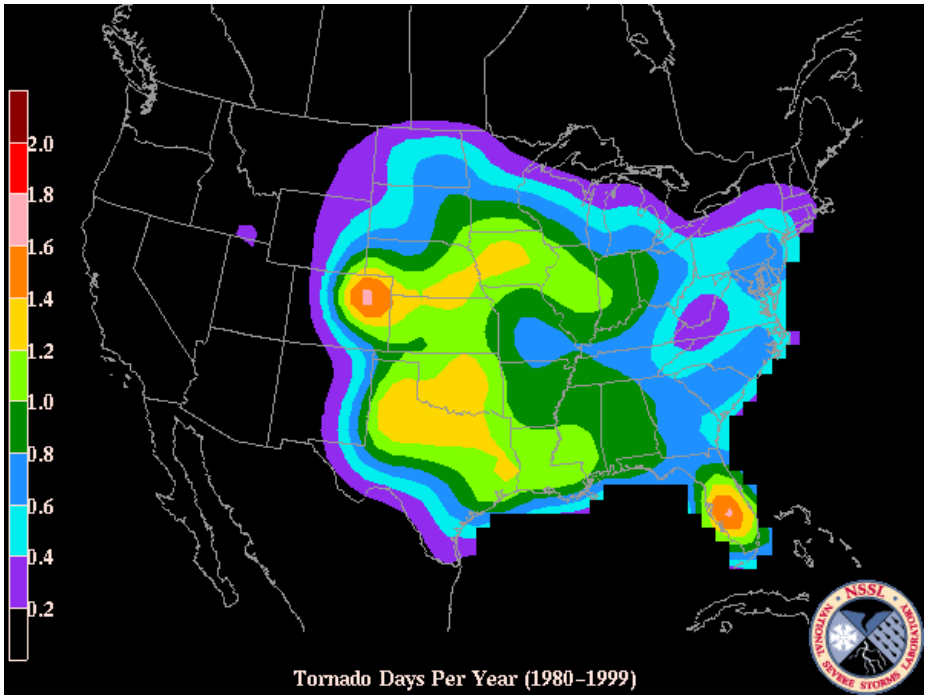


Figure 6 - Number of Days per Year with Wind Gusts in Excess of 50 mph

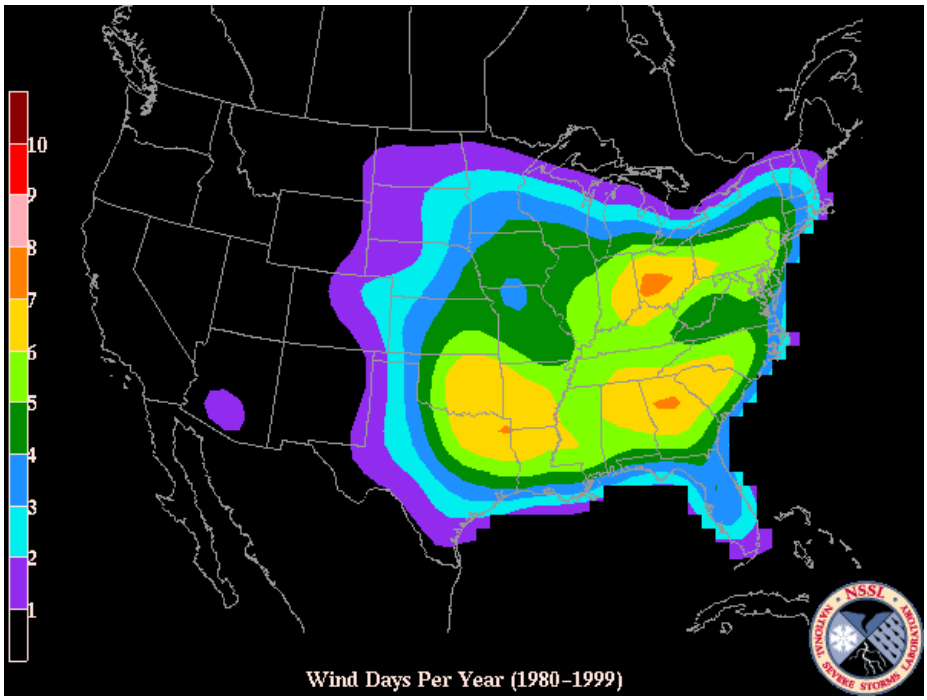
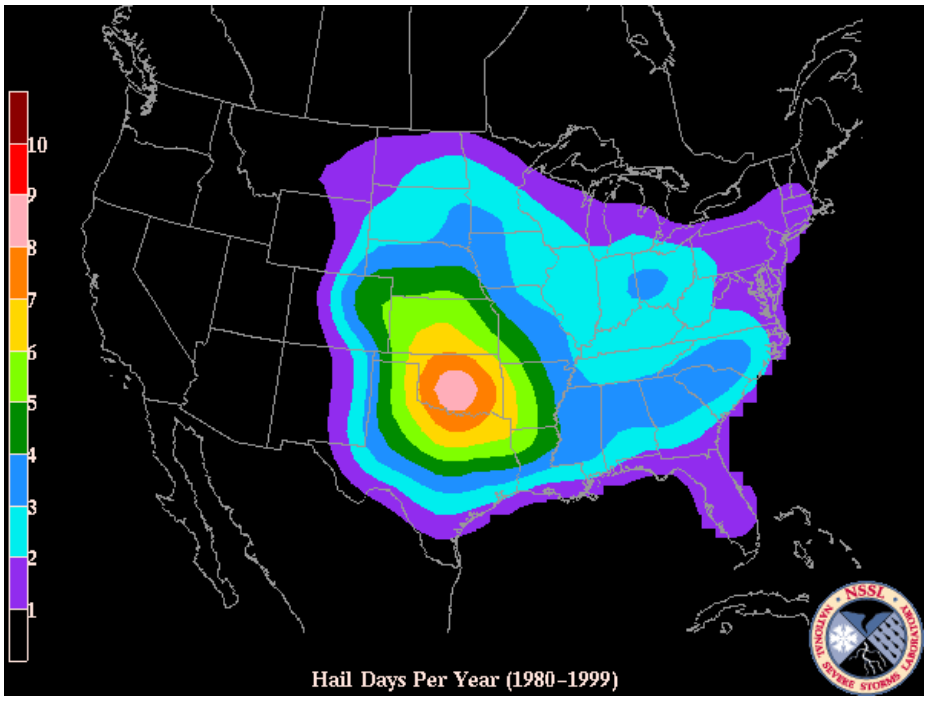


Figure 7 - Number of Days per Year with Hail



4.0 Long-Term Reference and Estimated Hub Height Wind Speed

Five years of wind speed data are collected at the Owl Feather War Bonnet Site. The data collection program began in May 2001 and the latest update includes data collected through June 2006. Data recovery for the 65-meter wind speed exceeds 95% in each year. It is proposed, based on this long period of record, that the long-term annual average wind speed at 65-meters above ground level is 18.2 mph (8.1 mps) and 18.7 mph (8.4 mps) at 80-meters agl.

5.0 Gross Energy Estimate

The Wind Energy Conversion System (WECS) Program is used to create a single turbine theoretical energy estimate for the six turbines and two tower heights (65-meters and 80-meters). These analyses are presented in Table 14.

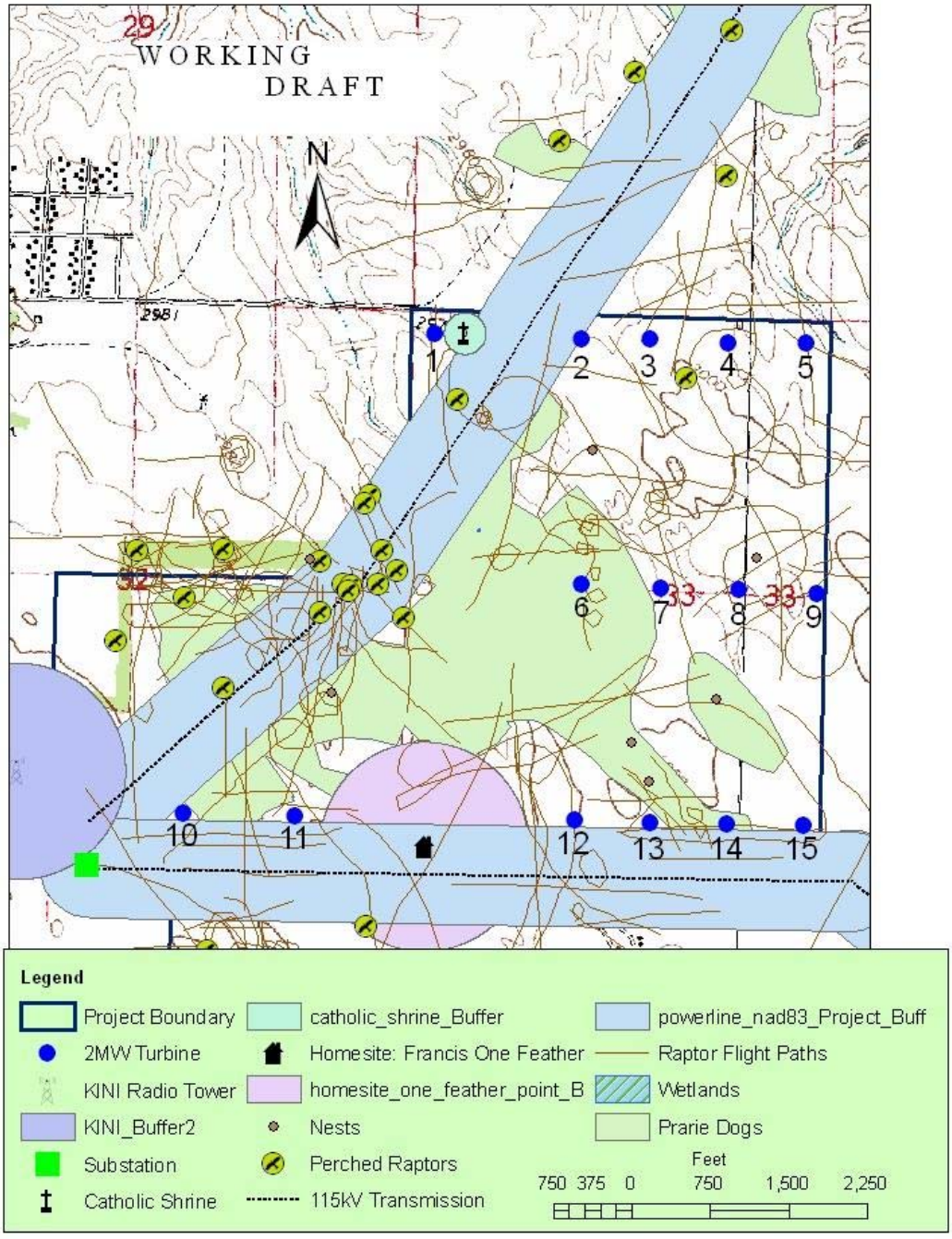
Table 14 – Single Turbine Gross Theoretical Energy Output

Turbine	Rotor Diameter (m)	Rating (kW)	Hub Height (m)	Gross Theoretical Energy (kWh)	Turbine Capacity Factor (Gross) (%)	Annual Wind Speed (mps)
GE	70	1500	65	5,490,985	41.8%	8.1
GE	77	1500	65	5,958,595	45.3%	8.1
Vestas	80	1800	65	6,634,838	42.1%	8.1
Vestas	90	3000	65	9,201,422	35.0%	8.1
Gamesa	87	2000	65	7,775,950	44.4%	8.1
Suzlon	88	2100	65	7,950,115	43.2%	8.1
GE	70	1500	80	5,812,177	44.2%	8.4
GE	77	1500	80	6,263,922	47.7%	8.4
Vestas	80	1800	80	7,012,791	44.5%	8.4
Vestas	90	3000	80	9,782,035	37.2%	8.4
Gamesa	87	2000	80	8,188,022	46.7%	8.4
Gamesa	80	2000	80	7,594,191	43.4%	8.4
Suzlon	88	2100	80	8,395,953	45.6%	8.4

6.0 Site Plan

A preliminary layout of the project showing the possible turbine locations is presented in Figure 8. The possible turbine locations are designated as the blue circles. Three rows of turbines are proposed for the site. Setbacks to address avian issues, an existing residence on the southern boundary of the project, and a transmission line that runs from the southwest to the northeast are indicated.

Figure 8 – Preliminary Turbine Layout for Owl Feather War Bonnet Project



7.0 Net Energy Estimate

The gross energy projections from Section 5 must be discounted to reflect the actual amount of electricity expected to be delivered to the grid. This is referred to as the net energy production.

The list of discount factors is provided along with their estimated magnitude:

Wind Turbine Availability, - 3%: A loss factor of 3% is assigned for wind turbine availability. This is a typical value for current wind turbine technologies.

Transformer/Line Losses/Substation Outages, -2%: A loss factor of 2% is assigned to accommodate energy losses for the internal electrical infrastructure plus any unscheduled losses due to external outages on the part of the local utility (substation and utility downtime).

Wake Losses, -8.0%: Wake losses occur due to the interference between turbines and are a function of turbine spacing and the frequency of occurrence of wind speed and wind direction.

Turbulence/Control Losses, -1%: A discount of 1% is applied to accommodate energy losses associated with high wind hysteresis.

Blade Contamination, -1.5%: Changes to the aerodynamics of the blade and resulting, but only occasional, changes in the power curve of the turbine resulting in reduced energy capture, are accommodated through this loss factor.

Wintertime blade icing is not foreseen as a problem for this project due to the generally dry atmospheric conditions during the winter months. A cold weather operations package will be supplied so cold wintertime temperatures will not pose a problem for operation of these turbines.

To calculate the project energy losses, the wake loss is first subtracted from the gross energy projection. The remaining loss factors are then multiplied together and deducted from 100%. The result, 0.926978, is then used to determine the net energy output.

The theoretical energy output projection for the Owl Feather War Bonnet Project assuming the six turbine types under consideration and the two hub heights are presented in Table 15.

Table 15 – Theoretical Energy Projection Summary For a 15 Turbine Project

Turbine	Rotor Diameter (m)	Rating (kW)	Hub Height (meters)	Single Turbine Gross Output (kWh)	Single Turbine Gross Output Minus Wake Impact	Single Turbine Net Output (kWh)	Annual Energy Output for a 15 Turbine project (kWh)	Turbine Net Capacity Factor
GE	70	1500	65	5,490,985	5,051,706	4,682,818	70,242,277	35.6%
GE	77	1500	65	5,958,595	5,481,907	5,081,605	76,224,080	38.7%
Vestas	80	1800	65	6,634,838	6,104,051	5,658,318	84,874,777	35.9%
Vestas	90	3000	65	9,201,422	8,465,308	7,847,151	117,707,265	29.9%
Gamesa	87	2000	65	7,775,950	7,153,874	6,631,481	99,472,213	37.9%
Suzlon	88	2100	65	7,950,115	7,314,106	6,780,012	101,700,183	36.9%
GE	70	1500	80	5,812,177	5,347,203	4,956,737	74,351,058	37.7%
GE	77	1500	80	6,263,922	5,762,808	5,341,994	80,129,911	40.7%
Vestas	80	1800	80	7,012,791	6,451,768	5,980,644	89,709,661	37.9%
Vestas	90	3000	80	9,782,035	8,999,472	8,342,309	125,134,636	31.7%
Gamesa	87	2000	80	8,188,022	7,532,980	6,982,904	104,743,558	39.9%
Gamesa	80	2000	80	7,594,191	6,986,656	6,476,476	97,147,140	37.0%
Suzlon	88	2100	80	8,395,953	7,724,277	7,160,231	107,403,472	38.9%

8.0 Uncertainty Analysis

In this section, the uncertainty regarding the long-term energy projection for the Owl Feather War Bonnet Site is explored. The sources of uncertainty include the basic wind resource across the site as well as the application of this resource with the siting of the turbines (micrositing) and power curve of the turbine and the energy adjustment factors. The long-term estimate of the hub height wind speed is subject to uncertainty through:

- Anemometer accuracy: A standard value for the Maximum #40 sensor is 3%.
- Shear extrapolations from 65-meters to hub height of 80-meters: The key components in the uncertainty are the mounting arrangements of the booms, the orientation of the booms to the prevailing wind direction, and the methodology used to calculate the change in wind speed with height. The uncertainty is reduced by the following: 1) the booms are standard 43 inch booms provided by NRG Systems, no stub-mounted masts are used at the 50-meter level and 2) only those cases when the hourly average wind speeds are greater than 3.5 mps (10 mph) at the 10-meter level are included in the determination of the power law exponent. A value of +/- 3% is a reasonable value.
- Adjustment to the Long-Term: A value of +/- 5% is a reasonable value for the uncertainty attributable to the long-term adjustment.
- Micrositing: An estimate of the long-term mean annual average hub-height wind speeds for the fourteen turbine locations is based on the single meteorological monitoring tower. Based on the placement of the mast in the middle of the project area and the minor topographic and surface frictional variations across the project area (i.e. flat, grass covered), it is appropriate to use the wind speed values from the single tower. A value of +/- 3% is a reasonable value for the uncertainty attributable to the uncertainty due to micrositing.

The overall uncertainty in the long-term mean annual hub-height wind speed for the project area is the root-mean-square of the individual uncertainties, or +/-7.2%. Gross annual energy output is calculated for the base annual average wind speed of 18.7 mph , the base plus 7.2% and the base minus 7.2 %. The resulting upper and lower bounds for the gross annual output projection for the projects with 80-meter hub heights are presented in Table 16.

The other sources of uncertainty include the wind turbine power curve and the energy loss factor assumptions. The wind turbine manufacturer will provide a power curve warranty which typically warrants that the power curve will be some percentage, plus or minus, of its stated value at each wind speed bin value. Therefore, for the power curve uncertainty, it would be appropriate to use a value of +/-5% of the power curve of the turbine.

The loss factors exclusive of the wake losses – availability, electrical line and utility issues, blade contamination, high wind and hysteresis – are standard values. The uncertainty regarding the combination of all of these loss factors may be on the order of +/- 3%. The gross to net factor, 0.9316, may vary between 0.9037 and 0.9596. The uncertainty in the wake/array loss value, 8.0%, may be the same magnitude as the uncertainty in the other energy loss factors, 3% (-11.0% to -5.0%).

Table 16 – Uncertainty in the Theoretical Energy Output Estimates (Gross) For the Projects With 80-Meter Hub Heights Only Due to Wind Speed Uncertainties Only.

Turbine	Rotor Diameter (m)	Rating (kW)	Hub Height (meters)	Lower Bound	Upper Bound
GE	70	1500	80	-13.49%	12.47%
GE	77	1500	80	-12.05%	10.99%
Vestas	80	1800	80	-13.16%	12.16%
Vestas	90	3000	80	-14.28%	13.85%
Gamesa	87	2000	80	-12.31%	11.32%
Suzlon	88	2100	80	-12.99%	11.91%

Owl Feather War Bonnet Wind Farm
Rosebud Sioux Tribe
DOE Grant DE-FC36-030GO13122

Attachment B

Ethnographic Study Format

Job description format to identify any significant cultural or religious sites on or near the proposed wind farm site near St. Francis

Interview elderly people within the community…. 65 and older

1. Explain the objectives:

a. The Rosebud Sioux Tribe is proposing to build a 20-turbine unit wind farm near St. Francis in order to generate revenue (monies) from this resource, and also for employment. During the construction phase of the wind farm there will be from 30 to 60 people employed to construct the concrete bases, erect the 20-1.5 megawatt turbines, inter-connect the turbines and to upgrade the local substation. There will also be some employment for the operation and maintenance of the turbines.

b. The reason for the interview is to gather information on the possible cultural or religious significance of the site. **Inform the elderly that all interviews will be kept confidential and private**. Showing of the map and possible pictures of area. At this point, raise the question if they are aware of any old campsites, old pow wow grounds, old home sites and any possible gravesites. Anything that would require us to investigate further. The intent is to identify the area, so no disturbance of the area will be done. If they wish to visit the site and the interviewer feels its important, then the interviewer can drive them out to the area.

c. The interview process is to be informal and relaxed. Understanding older people and how they arrive to this question on the site may take a long period of time, which is not a problem. Getting to the point of the interview is the purpose of the interview but not the means of the interview. Take your time and allow the elderly to take their time. Do not go to an interview, with the intent on immediately moving on somewhere else. Some elderly like to tell stories and may start back to their childhood in this, allow it to happen. Information that you acquire may become very valuable in the future and although this information is intended for the wind farm project, some of the information may become important for other projects within the RST perspective or possibly the SGU perspective. You must be attentive to particular events or situations that they relate which may become relevant and important in the future. These matters shall be documented even though they may not pertain to the wind farm. You must understand that these interviews will become a permanent cultural resource. If there is a certain area mentioned, i.e.: campground, home site, wagon trail etc., then a visit to the site is required so that the area is identified both on the map and at the site.

Owl Feather War Bonnet Wind Farm
Rosebud Sioux Tribe
DOE Grant DE-FC36-030GO13122

Attachment C

Ecological Baseline Study (Draft)

Environmental Assessment

Owl Feather War Bonnet Wind Energy Facility
Rosebud Sioux Tribe
St Francis, Todd County, South Dakota
Rosebud Indian Reservation, USA

Bureau of Indian Affairs
Great Plains Regional Office
115 Fourth Avenue S.E.
Aberdeen, South Dakota 57401

Prepared by:

Distributed Generation Systems, Inc. (Disgen)
200 Union Boulevard, Suite 304
Lakewood, CO 80228

and

WEST, Inc
4007 State Street, Suite 109
Bismarck, ND 58503

APPENDICES

LIST OF FIGURES

Chapter One

INTRODUCTION

1.1 Purpose of and Need for the Federal Action

The Rosebud Sioux Tribe (RST) and Owl Feather War Bonnet LLC (OFWB) have negotiated and documented a Grant of Easement and Easement Agreement for the development, construction and operation of a 30 megawatt (MW) wind facility to be placed on RST Trust Land adjacent to the Town of St. Francis in Todd County, South Dakota, Rosebud Indian Reservation. OFWB is solely owned by Distributed Generation Systems, Inc. (Disgen) located at 200 Union Blvd., Suite 304, Lakewood, CO 80228. OFWB has been under development since May 2001. Figure 1 shows the location of the Rosebud Indian Reservation. Figure 2 shows the location of the project area relative to the Rosebud Indian Reservation boundaries.

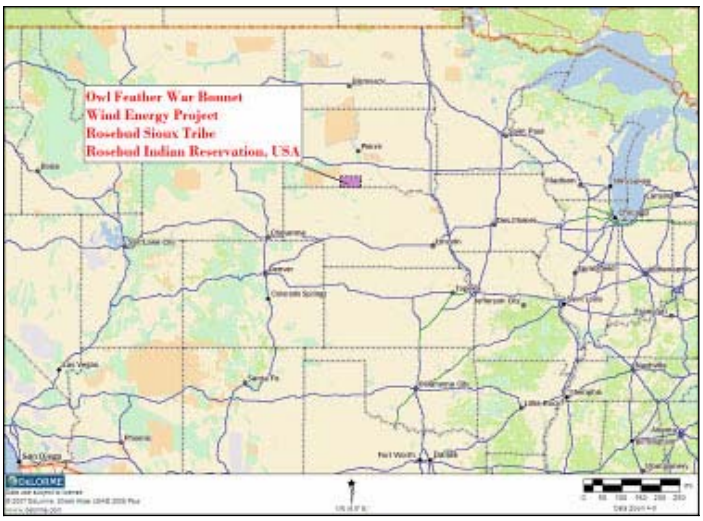


Figure 1 Location of Wind Energy Facility on the Rosebud Indian Reservation

Figure 2 Location of Wind Energy Facility on Rosebud Indian Reservation

The US Department of Energy (DOE) has supported this development with a Wind Energy Feasibility Assessment Grant and a Wind Energy Development Grant under the Tribal Energy Program. Disgen wrote the grant applications and provided the majority of the cost share required under these grants.

The project is planned for fourteen (14) 2100 kW wind turbines. The interconnection to the transmission system will be through a dedicated substation to be constructed within the project area. An exiting 115kV Nebraska Public Power District (NPPD) transmission line crosses the project area between the Mission Substation located at Mission, SD and the St. Francis Substation. The line continues into Nebraska to the Harmony Substation and beyond. In August 2004, NPPD's Transmission Asset Planning has conducted a System Impact Study that support this project, Appendix D.

In addition to turbines, other infrastructure such as meteorological towers, gravel roads, and transmission interconnection facilities will be constructed (Figure 3). Each turbine will be connected to adjacent turbines by an underground collector system. The electrical output of each turbine string will be collected via underground electrical cables and interconnected to a new substation tied to the NPPD transmission line. The electrical collection system within the project area will be buried.

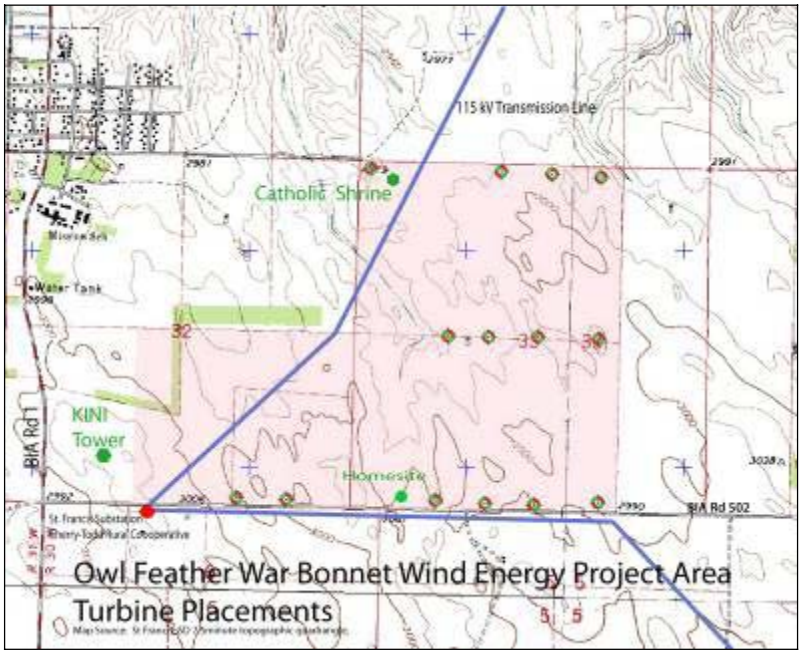


Figure 3 Owl Feather War Bonnet Wind Project Map Area

The project will be monitored and controlled from an operations and maintenance (O&M) building located in the community of St. Francis. Customarily these facilities require less than 3000 square feet with four to five parking spaces adjacent. Existing roads will be improved, and some new graveled roads will be constructed to provide access to the wind turbine locations during construction and for O&M. Wind speeds will be monitored using one permanent meteorological (met) tower.

As Federal Land held in Trust for the benefit of the RST by the BIA, this project requires National Environmental Policy Act (NEPA) compliance using the guidance of the "NEPA Handbook" (30 BIAM Supplement 1, Release No. 9303) and the U.S Department of the Interior Department Manual 5165 DM 6 "Environmental Management". The studies and results provided in this document are meant satisfy NEPA and have been coordinated with the appropriate RST, state and federal agencies in defining the study protocols.

OFWB has been selected to be included for the further review, "short-listed" by NPPD in a recent wind energy solicitation and both NPPD and OFWB are confident that, subject to a favorable judgment of this document and the final approval by Bureau of Indian Affairs (BIA) on the Grant of Easement and Easement document, this project can be operational before yearend 2008.

The relationship between OFWB and the RST has focused on creating exceptional economic benefits for the RST over the life of the project. The RST will have preferential training and employment rights, will receive an annual royalty on gross project revenues of 6.75% and will receive sales and constructor's excise taxes collected for the RST by the State of South Dakota under an existing arrangement.

Currently there are no programmatic NEPA documents within the BIA that specifically address wind power. However, a Bureau of Land Management (BLM) Programmatic EIS Record of Decision on wind power was released in December 2005 (http://windeis.anl.gov).

1.2 Need

The RST Tribal Government seeks to improve the economic conditions on the reservation and believes that these conditions can be improved by supporting the development of renewable energy resources on its reservation. The project was sited on Tribal Trust land to create revenue, jobs and economic opportunities for the Tribe as a whole. The use of wind turbine technology to utilize tribal natural resources is consistent with a Tribal vision established by former Tribal president Alex Little Soldier Lunderman who believed that modern technology could be used by the tribe to advance their well being.

1.3 Purpose of this EA and the NEPA Process

The purpose of this Environmental Assessment (EA) is to provide the RST, BIA, DOE and the public with information on the potential environmental impacts associated with OFWB. The BIA has Trust responsibilities over the natural resources on Tribal Trust and allotted lands. OFWB is sited on Tribal Trust land, which triggers the NEPA process and makes the BIA the lead agency. The DOE has provided funding for the development with a Wind Energy Feasibility Assessment Grant and a Wind Energy Development Grant under the Tribal Energy Program.

1.4 Regulatory Actions and Requirements

The BIA has trust responsibility on actions related to Tribal Trust Land. The proposed project is located entirely on Tribal Trust Land. The BIA and RST will issue a Grant of Easement and Easement Agreement for this land to the Owl Feather War Bonnet, LLC. The BIA is the lead federal agency for the proposed action. The RST Council, Tribal Historic Preservation Office (THPO), Sicangu Lakota Natural Resources Department, and the U.S. Fish and Wildlife Service (FWS) are participating cooperating agencies.

The BIA determination will either be a decision document with a Finding of No Significant Impact (FONSI), or for further review through the preparation of an Environmental Impact Statement (EIS). The BIA determination would result in the future approval of a land use lease or an easement for the proposed action contingent on management and mitigation constraints indicated in this EA.

The RST Council, as elected representatives of the members of the Sicangu Lakota, have declared through a number of resolutions that the OFWB project is consistent with the social, spiritual and economic objectives of the tribe.

The FWS has enforcement responsibilities regarding the Endangered Species Act (ESA), Migratory Bird Treaty Act (MTBA), and Bald and Golden Eagle Protection Act (BGEPA); and will make recommendations to the BIA regarding the significance of potential impacts to wildlife. Compliance with Section 7 of ESA is documented in Appendix A.

Mitigation and monitoring for wildlife impacts are documented in Section 3.6.3. These measures will minimize potential impacts to wildlife as well as document what impacts the project has on local wildlife species, particularly birds and bats. The actual protocols to be implemented will be developed in coordination with the FWS.

The THPO is responsible for compliance with Section 106 of the National Historic Preservation Act (NHPA) and advises the Tribal Council regarding the potential cultural and ethnographic impacts of the proposed action. Compliance with Section 106 of NHPA is documented in Appendix B.

1.5 Public Involvement

Two public scoping meetings were held to request public comment on issues and concerns to be addressed in this EA. Notices were sent to the Todd County Tribune. The first meeting was held in Rosebud at the St. Bridgets Church on March 25, 2004. The second public scoping meeting was held in St. Francis at the community building on May 26, 2004. Sample of comments are shown in Appendix C. Community of St Francis resolution supporting the wind energy project is also included in Appendix C.

CHAPTER TWO

PROJECT DESCRIPTION

2.1 Introduction

Owl Feather War Bonnet LLC (OFWB) proposes to develop, construct and operate a 30 megawatt (MW) wind facility to be placed on Rosebud Sioux Tribal Trust Land adjacent to the Town of St. Francis in Todd County, South Dakota, Rosebud Indian Reservation. OFWB is solely owned by Distributed Generation Systems, Inc. (Disgen) located at 200 Union Blvd., Suite 304, Lakewood, CO 80228. The project is planned for fourteen (14) 2100 kW wind turbines. The interconnection to the transmission system will be through a dedicated substation to be constructed within the project area. An exiting 115kV Nebraska Public Power District (NPPD) transmission line crosses the project area between the Mission Substation located at Mission, SD and the St. Francis Substation. The line continues into Nebraska to the Harmony Substation and beyond. NPPD has conducted transmission studies that support this project.

2.2 Proposed Location

The facility would be located on tracts of Tribal Trust land ¾ of a mile southeast of the Town of Saint Francis within the Rosebud Sioux Indian Reservation in the south-central part of the State of South Dakota in the United States of America. The nearest major highway is BIA Rd 1, which runs north and south through the Town of St. Francis ½ mile west of the project area. A well maintained moderately used dirt road known as BIA Rd 501 runs east and west along the southern border of the project area. Entrance to the project area is from this road. Existing two track roads enter the project area from BIA Rd 501 in the centers of the southern edges of sections 32 and 33.

Wind Turbines will be sited in three east-west strings throughout Sections 32, and 33 (Township 37N, Range 30W), shown in the pink area. Figure 3 shows 14 turbine locations, (). Elevations at the site range from 2980 feet to 3007 feet above mean sea level according to USGS 7.5 minute series topographic quadrangles, 1969. The estimated total disturbed area will be less than 50 acres.

2.3 Existing Activities and Development

The project area is on Tribal Trust land, which is owned by the Tribe as an entity. The remaining land in the project area is allotted land that has been purchased by the tribe. Tracts of non-trust tribal Fee land and allotted land surround the project area on each side.

The project was sited entirely on land owned by the Rosebud Sioux Tribe so that the tribe as a whole could manage the development of the project and realize its economic benefits.

The project area is primarily grazed prairie grassland encumbered by several structures. A radio tower owned by the KINI radio station is located in the proposed project area boundary as well as a homesite and small catholic shrine, each requiring a buffer zone.

The proposed project area is located within the southwest corner of Todd County, South Dakota eight miles north of the Nebraska state line near the town of St. Francis (Figure 2). The project is located in a transition zone just outside of the Nebraska Sandhills within the Keya Paha Tablelands ecoregion (Bryce et al. 1998).

Temperatures in the winter average 25 F, with recorded temperatures dipping as low as 30 below zero F. The average summer temperature is 80 F, ranging from 69 – 110 F from June – August. Average rainfall is 16-17 inches during the summer (Rosebud Sioux Website accessed March 22, 2005).

The current land use for the proposed project area is grazing, and the town of St. Francis is located within one mile of the project area. One existing 115 Kv transmission line, a telephone line and one 350' tall radio tower are also present.

2.4 Proposed Action

OFWB propose to develop a 30 MW wind energy project on the Rosebud Indian Reservation near St. Francis, known as the Owl Feather War Bonnet Windpower Project (Figure 1). The proposed project would consist of the installation, operation, maintenance, and eventual decommissioning of approximately –14 to 30 wind turbines and supporting facilities.

The Proposed Action represents the culmination of a development activity that began in May 2001. Disgen was directed by the US Department of Energy to evaluate Tribal Trust Lands in the Dakotas for wind energy development potential. The RST Reservation was the first visited and several sites were identified as significant opportunities. Upon further evaluation of the RST Reservation, Disgen recommended two sites for further development and focused initially on the St. Francis site because (i) the site is high, flat ground and would likely have an excellent wind resource, (ii) an existing transmission line crosses the project area so new transmission would not be required, and (iii) the location has good paved and gravel roads that will allow relatively easy heavy equipment access. Instrumentation began in 2001. The OFWB Wind project has been short-listed by NPPD and is expected to be constructed before year end 2008. The project will provide in excess of $8 million in economic value to the RST over the life of the project.

The Bureau of Indian Affairs will administer the project under trust responsibilities for the Rosebud Sioux Tribe. The Endangered Species Act (ESA) requires that each federal agency insure that any federal action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat based on best available information.

2.4.1 Wind Turbines

Turbines will be sited in three east-west strings throughout Sections 32, and 33 (Township 37N, Range 30W), and Section 6 (Township 36N, Range 30W). Elevations at the site range from 2980 feet to 3007 feet above mean sea level according to USGS 7.5 minute series topographic maps 1969.

A specific wind turbine model has not been selected as of the writing of this document. At this time, the turbine models will likely be the Suzlon S88 2100kW turbine with an approximate 80m (262ft) tower and 88m rotor (262ft), making the maximum turbine height from base to blade tip

of 40 – 124 (410ft) m. However, smaller or larger turbines may also be chosen. The minimum turbine size would be a 1MW turbine with a 60m (197ft) tower and a 61m (200ft) diameter rotor, creating a total height of 91m (297ft). The maximum size is a hypothetical turbine that uses a 100m (328ft) tower with a 100m-diameter rotor, giving a total height of 150m (492ft). Using the 1MW turbine the site would require 30 wind turbines for a 30MW project size. This is the maximum number of possible turbines for the site. The numbers of turbines required for the 30MW site decreases as larger turbines are used. Currently the largest commercially available onshore turbine is 3MWs, which would require 10 turbines to reach a 30MW project size. It is conceivable that the project could utilize a turbine greater than 3MWs in the future as turbine designs advance. Options exist for wind turbine selection and the final decision will be determined by the owner of the project and the turbines that owner has available under framework purchase agreements with turbine suppliers.

Subsequent to the construction of the roads, each wind turbine location will require a disturbance of approximately 2 acres. The terrain is relatively flat and the assembly of the rotor on the ground will require the majority of this area. In addition, a crane pad must be leveled to accommodate the heavy equipment required to lift the tower and nacelle components. The foundation for each turbine (Figure 4) is expected to be a pier foundation design which will require excavation of a cylinder 32 feet deep and approximately 15 feet in diameter. Two casing are installed in the excavated opening, one significantly larger than the other. Into the wall thickness between the casings diameters are installed tower rings (upper and lower) with anchor bolts installed from the bottom of the excavation to the top. Concrete is subsequently poured into the wall thickness and the excavated material are placed in the inner hole and compacted. Once completed, the remaining disturbed areas will be less than 300 square feet.

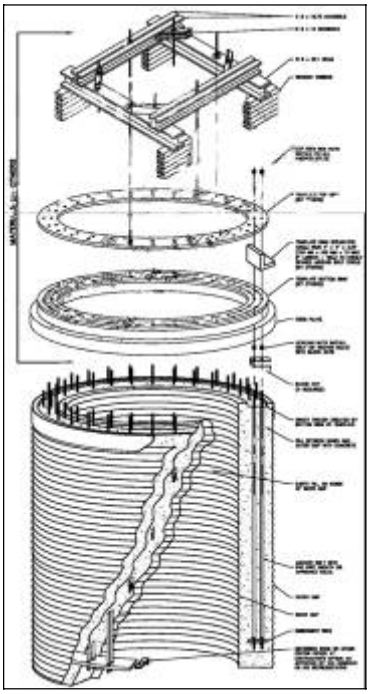


Figure 4 Foundation Schematic

2.4.2 Meteorological towers

In addition to turbines, other infrastructure such as one meteorological tower, roads, maintenance buildings, and powerlines will be constructed. At this time the locations of these facilities has not been determined. Each turbine will be connected to adjacent turbines by an underground collector system. The electrical output of each turbine string would be connected to an existing substation by underground transmission lines. All new powerlines within the project area will be buried, except where powerlines may cross the existing county road. In this area a small section of powerline may be constructed above ground. The project would be monitored and controlled from an operations and maintenance (O&M) building located in the St Francis community.

Existing roads would be improved, and some new graveled roads would be constructed to provide access to the wind turbine locations during construction and for O&M. Wind speeds will be monitored using two permanent meteorological (met) towers (one newly constructed and one existing on the KINI radio tower). The location of the meteorological tower will be located as shown in Figure 5.

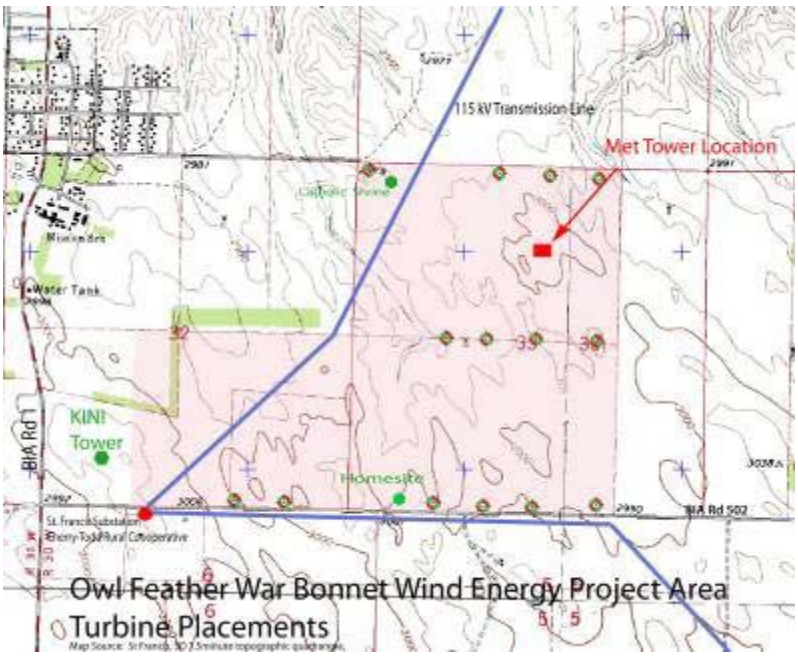


Figure 5 Meteorological Tower Location

2.4.3 Roads and Service Roads

The nearest major highway is BIA Rd 1, which runs north south through the Town of St. Francis ½ mile west of the project area. A well maintained moderately used dirt road known as BIA Rd 502 bisects the southern fifth of the project area. Entrance to the project area is primarily from this road. Existing two track roads enter the project area from BIA Rd 502 in the centers of the southern edges of sections 32 and 33.

The Wind Facility will disturb approximately 50 acres within a project area of approximately 800 acres. The construction of the project will include gravel roads around the eastern perimeter of the project and an access road to each turbine. It is estimated that no more than four miles of roads will be constructed with a maximum disturbance of 40 feet wide; to accommodate the crane widths required for erection. The project roads will disturb approximately 19 acres.

Subsequent to the completion of construction, the disturbed areas will be reseeded leaving a graveled all weather road of approximately sixteen feet in width resulting in 7.78 acres removed from production.

2.4.4 Interconnect Substation

OFWB will construct a substation adjacent to the NPPD 115kV transmission line in the project area approximately at the location shown in Figure 5. A single-story, 20-feet by 28 feet control building will be located within a fenced area of the substation. The substation will require a transformer, line breakers, meters and various other pieces of equipment. The substation will be locked and surrounded with a chain link fence and topped with barbed wire to discourage unauthorized entry.

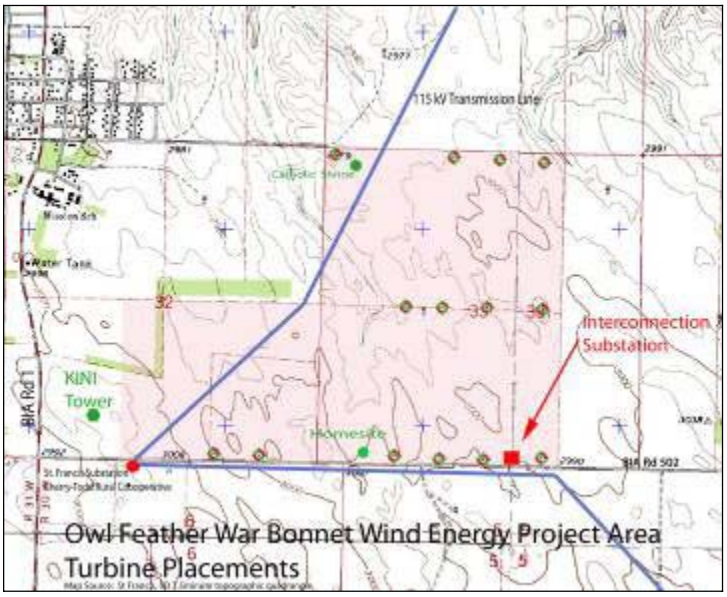


Figure 6. Proposed Wind Facility Interconnection Substation

2.4.5 Electrical Collection System and Communications System

Simultaneously with the construction of the foundations, trenches approximately two feet wide and five feet deep are excavated between all the wind turbines and the interconnect point at the substation. These trenches are typically embedded within the 40 feet disturbance areas of the construction roads. These trenches will accommodate the electrical collection system and the fiber optic communications systems that operate the System Control and Data Acquisition (SCADA) system.

The SCADA system will be installed to collect and transmit performance data on the facility. No permanent spare parts or maintenance buildings or offices are proposed for construction within the project area. Spare parts and maintenance supplies will be stored at a facility in St. Francis.

2.4.6 Project Stages and Timing

Construction of the first turbines is scheduled to commence in September 2008, contingent on the approval of the Grant of Easement and Easement Agreement between the RST and OFWB by the BIA and the resolution of the findings by the BIA on this Environmental Assessment. Access road improvements and service road construction will proceed prior to installation of the turbines. Completion and commercialization will occur prior to year end 2008. The substation will be constructed simultaneously with the wind turbines and will be interconnected to the NPPD 115kV line prior to commercial operations.

2.4.7 Project Work Force

OFWB,will be responsible for the completion of construction activities including the installation of the wind turbines. A maximum of about 15 workers will be on the site. The construction period will be approximately 120 days (if construction starts on September 1, as maybe possible in 2.4.6, then this 120 days will run right to the end of the year. OFWB is committed to using the RST's road crews for the construction of the roads and any re-seeding activities. No personnel are expected to permanently relocate to South Dakota as a result of the construction effort.

The wind turbine manufacturer will provide operations and maintenance training to project personnel with preference for tribal recruiting and employment.

2.4.8 Operations and Maintenance

The wind turbine manufacturer will provide 24 hour monitoring of the wind facility at a remote location. Three to four full time service technicians will be employed on the site providing routine operations services as well as security for the project. Routine maintenance and inspections occur two times per year. Further, a control building is planned to be located in the community of St. Francis where spare parts will be inventoried. In addition the SCADA system will provide real time operations performance on each wind turbine and maintenance technicians will be dispatched from this facility to take corrective actions as required.

2.4.9 Environmental Protection Measures

Environmental protection measures for the proposed project would include the following instructions to prospective contractors bidding on construction of the Project:

- Solid and Sanitary Waste Disposal -- Contractor shall pick up solid wastes and place in containers that are regularly emptied, dispose of garbage in approved containers that are regularly emptied, and prevent contamination of the proposed project site and other areas when handling and disposing of wastes. Upon completion of the work, Contractor shall leave the work areas clean, and control and dispose of wastes.
- Petroleum Products -- Contractor shall conduct fueling and lubrication of equipment and motor vehicles in a manner to protect against spills and evaporation, and shall dispose of unused lubricants and oils in approved manners and locations.
- Dust -- Contractor shall implement dust control at all times in accordance with applicable reservation and state requirements. Contractor shall keep dust down at all times during construction. Air-blowing would be permitted only for cleaning nonparticulate debris such

as steel reinforcing bars. Contractor shall not permit the shaking of bags of cement, concrete mortar, or plaster.

- Temporary Construction – Contractor shall remove temporary construction facilities (erected by and within Contractor's scope), including access road entrance-way build ups, access road corner widenings, crane pads, work areas, structures, foundations of temporary structures, and stockpiles of excess or waste materials.
- Protection of Roads -- Contractor shall plan and practice measures to minimize the impact to the existing landowner, township, county, and state roads. Measures shall include requiring low speed limits for heavy vehicles and equipment traveling on the roads. The contractor shall repair any road damage caused by construction activities.

Additional Best Management Practices (BMPs) to be implemented during construction at the proposed project include:

- Disturbance Minimization – The proposed wind farm would be constructed to fit the existing terrain, thereby eliminating land-disturbing cut and fill activities, minimizing disturbance to existing drainage, and reducing soil erosion potential.
- Sediment Control -- Potential sediment movement to nearby drainages and wetlands resulting from construction disturbance would be controlled by installing silt fencing on the downhill side of access roads along low areas, and installing gravel entrances at county roads prior to grading activities to prevent vehicle tracking.
- Fueling and Equipment Maintenance -- Construction equipment would be fueled and maintained at an equipment maintenance staging area that would be designed to contain spills. Accidental spills would be cleaned up immediately following reservation and state regulations.
- Reclamation/Revegetation – Areas disturbed during construction would be graded to blend with the natural terrain, scarified, and seeded with regionally native species.
- Inspection/Maintenance -- Silt fencing would be inspected within 24 hours of each rain event of 1/2 inch or greater, maintained by removing sediment after a 50 percent loss of capacity, and replaced as necessary.
- Access Road Maintenance – Permanent access road gravel surfaces within the proposed wind farm would be maintained to ensure positive drainage and minimize sediment runoff.
- Weed Control – Areas disturbed during construction would be monitored for infestation by weeds at regular intervals coinciding with routine wind farm maintenance and monitoring activities. Only weeds that do not have cultural significance will be controlled.
- Revegetation Monitoring -- Re-seeding efforts using native grass seed mixes on areas disturbed during construction would be monitored for success annually (in the spring) for two years following construction. If revegetation efforts are not or only partially successful, appropriate reseeding measures would be taken.
- Risk Reducing Site Selection Criteria. In addition to its excellent wind resource, the site is also free from trees and other perching opportunities for raptors. The surface area is used for grazing which is consistent with the deployment of turbines; given the small amount of surface area disturbed.
- Low RPM Turbines. OFWB has limited possible candidate turbines to those that have low rpm which tend to make the rotor of the turbine more visible to avian populations. (Such turbines have demonstrated an apparent lower avian mortality than their predecessors (NWCC 2004).
- Lack of Perching Opportunities. The tubular towers specified for OFWB leave little, if any, opportunity for raptors to assume hunting perches from the structures. While there are significant populations of prairie dogs in the project area, the limited perching

positions and the reduced rotational speeds significantly reduce the possibility of raptor collisions.

- Protection of nesting Birds. Although no known threatened or endangered avian species nest within the project area, the project schedule allows for an early to late fall construction cycle which reduces any potential of disturbing mating and nesting seasons for birds.
- Protection of Existing Land Uses. The project area is leased for surface grazing. The disturbed area of the project is approximately 50 acres. This represent about 6% of the total area and grazing will not be adversely affected by the project.
- Hazardous Materials. Other than during construction when heavy equipment is on site, no hazardous materials will be used or stored on the project site.
- Waste Management. The project will produce no liquid effluent. All sewage at construction will be contained in portable toilets and disposed of at a permitted facility. No manned facility requiring sewage or water services has been proposed within the project area. All debris and routine trash will be collected and disposed of at a permitted facility.
- Cultural Resources. A cultural resources review was conducted by the RST Tribal Historical Preservation Office in consultation with the BIA. No significant cultural resources will be disturbed.

2.5 Alternatives

2.5.1 No Action Alternative

Under a No Action Alternative the Tribe would discontinue development of the Owl Feather War Bonnet Wind Farm. The Tribe would forgo the economic opportunities associated with the wind project, as well as substantial pre-construction development work made possible through Federal feasibility and development grants previously awarded to the initiative. The Tribal Trust land allocated by the Tribe for the project would remain undeveloped and grazing would remain the dominant land use.

2.6 Alternatives Considered But Not Receiving In-Depth Analysis in this EA

2.6.1 Alternative Wind Facility Locations

Several locations on the RST Reservation were examined by Disgen prior to the selection of this site. This site was deemed superior to the other sites examined for the following reasons:

a. OFWB is one of the highest and relatively flat wind sites on the reservation.
b. OFWB project area includes the NPPD 115kV transmission lines which eliminates the construction of additional transmission lines.
c. OFWB is adjacent to gravel roads and within one-half mile of paved roads for easy delivery of equipment and materials.
d. The project area and vicinity of the proposed towers are treeless and devoid of shrub cover.
e. No raptor nests are within the project area.
f. No streams cross the project
g. The area and adjacent sections are devoid of water features such as ponds, streams, or lakes which would be attractive to migratory birds or wildlife.
h. The project area and vicinity have been heavily grazed.

i. There are no timber or forest lands in the project area; and
j. No groundwater aquifers will be affected

Given the estimated low environmental risks associated with the proposed project area, alternative locations for the proposed facility have not been proposed or analyzed in this document.

2.6.2 Alternative Tower Designs

Over the past twenty years, utility scale wind turbine manufactures have settled on a standard design for towers which are tubular, with an inside climb. This design in no small part has become the standard because it virtually eliminates the opportunity for raptors to perch on the towers which increases the potential for collisions between birds and blades of the rotors. In addition, the tower has a “hatch type” door which has a keyed lock and is almost impenetrable. This provides for additional safety and discourages vandalism. Further, the tubular tower provides shelter during maintenance in bad weather. No alternative tower designs, which are commercially acceptable, are available for these wind turbines.

2.6.3 Alternative Access Routes

The project area lies within one-half mile of the north-south BIA Rd 1 which is the only paved road within reasonable proximity to the project area. BIA Rd 1 bisects the community of St. Francis. While this is the anticipated principle route for heavy equipment, a transportation analysis will be required before a final route can be determined

CHAPTER THREE

AFFECTED ENVIRONMENT, PROPOSED ACTIONS, ENVIRONMENTAL IMPACTS & MITAGATIONS

3.1 Introduction

A Technical Advisory Committee (TAC) be convened to develop the mitigation and monitoring program and determine the need for further studies or further mitigation measures. Depending on interest, the TAC will be composed of representatives from the Sicangu Lakota tribe, the FWS, BIA, and project proponents. The role of the TAC will be to coordinate appropriate mitigation measures, monitor impacts to wildlife and habitat, and address issues that arise regarding wildlife impacts during construction and operation of the wind plant. The post construction monitoring plan will be developed in coordination with the TAC.

3.2 Resources Considered But Not Receiving Further Analysis

Potentially affected resources requiring further analysis were identified during RST, BIA, and FWS consultations, public scoping, and on-site inspection of the project area. The following resources are either not found in the project area or vicinity, or would not be affected, either directly or indirectly, by the proposed action; therefore they are not analyzed further in this document:

(i) National parks, recreation areas or monuments;
(ii) Prime or unique farmlands;
(iii) National historic sites;
(iv) Wilderness or wilderness study areas;
(v) Area of critical environmental concern;
(vi) National historic, scenic or recreational trails;
(vii) Wild, scenic and recreational rivers;
(viii) National wildlife refuges;
(ix) State parks or conservation lands or state-designated wildlife protection areas;
(x) Fisheries; and
(xi) Timber, forest lands

3.2.1 Critical Habitat

No critical habitat was identified as occurring in or near the project area for any federally-listed threatened or endangered species (Appendix A). As such, there should be no project-related impacts to critical habitat.

3.3 Soil Resources

The soils are brown silty top soil to a depth of one-half foot, gray-brown, slightly moist stiff sandy silt with clay to a depth of about five feet and to a depth of approximately 26 feet, tan, slightly moist to moist, stiff/medium dense to hard/dense sandy silt/silty sand. The previously described P&H foundation has been designed to the load bearing conditions of these soils. The project

will have direct impacts on the soils where turbines are placed and roads are constructed, but this is a small percentage of the overall area of similar soils.

3.4 Water Resources

Three small wetland areas are within the proposed project area. One drainage contains a wet meadow consisting of species of sedge, and one other small wetland is present near the shelterbelt. No data on surface water quality exists for intermittent streams in sections adjacent to the project area. Besides the small wetlands, no other surface water bodies are found in the project area. No springs have been identified within the project area. The project will not impact the wetlands or other water resources.

3.5 Air Resources

The Clean Air Act establishes certain limits on pollutants allowable in an area and from certain activities; for a windpower project most of those pollutants come into play during construction and/or decommissioning of the turbines. Air quality in the vicinity of the Alternatives is deemed to be very good to excellent, due to relatively low population, lack of significant pollutant sources, and weather patterns. The project area is not in a “non-attainment area” for criteria air pollutant having National Ambient Air Quality Standards under the Clean Air Act Amendments; that is, carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide. The project area is greater than 80 km from Badlands National Park, a Class I area, but is less than 80 km from the Fort Niobrara and Valentine National Wildlife Refuges (NWR) in Nebraska, also Class I or Class-I eligible areas (See figure X below). Other federal lands within 100 km of the sites but with no identified Class I or Class I eligible areas include: portions of Fort Pierre National Grasslands, Buffalo Gap National Grasslands, Lacreek NWR, and Samuel R. McKelvie National Forest. However, based on existing air pollutant levels and prevailing winds, no significant impact on air quality in the NWR is expected from any alternative. The State of South Dakota, Department of Environment and Natural Resources (DENR), has confirmed that the project is reasonably assured to be able to be located, designed, constructed, and operated, in compliance with applicable air quality standards, in accordance with the State Implementation Plan. The project will have temporary, local, impacts on air quality during construction through increased dust entrainment and vehicle exhaust.

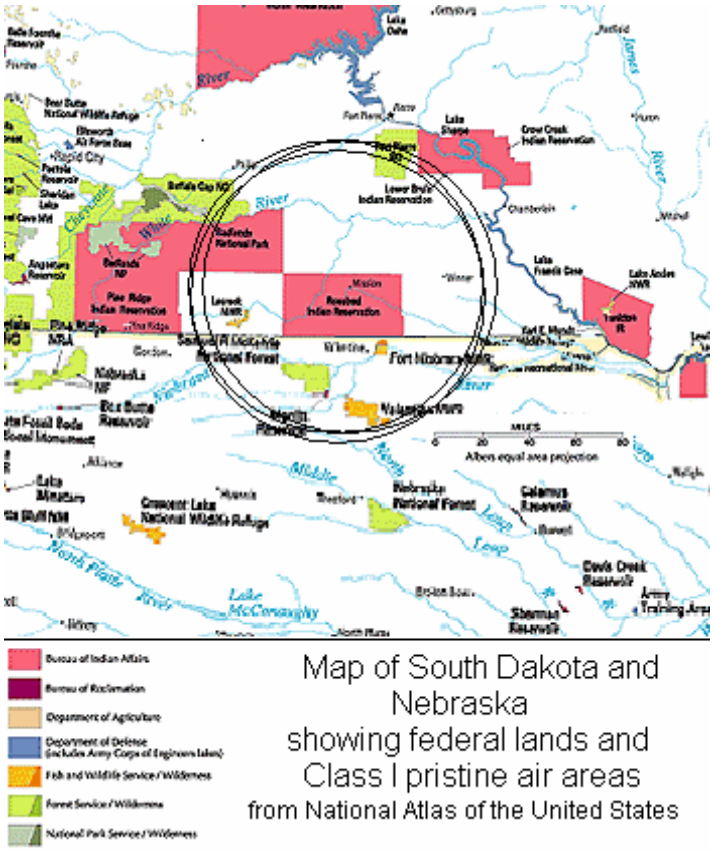


Figure 7. Air Quality Class I and other areas within 100 km (62 miles) radius from proposed sites.

3.6 Living Resources

3.6.1 Wildlife

Ecological baseline studies were conducted by Western EcoSystems Technology, Inc. (WEST) from March 2004–March 2005. The baseline studies consisted of 1) point count and in-transit surveys for wildlife species with an emphasis on raptors, 2) breeding grassland songbird surveys, 3) raptor nest searches, 4) surveys for nesting burrowing owls, 5) searches for swift fox dens, 6) American burying beetle surveys, 7) prairie dog town mapping, 8) vegetation assessment and survey for the western prairie fringed orchid 9) a bat survey.

The recent synthesis of baseline and operational monitoring studies at wind developments by Erickson et al. (2002), as well as other relevant information, was utilized for predicting avian impacts from the proposed wind energy facility.

A total of 61 species were identified during the point count, in-transit, and/or grassland songbird surveys at the project. The number of species observed varied by season with 48 in the summer and 18 in the winter. Higher overall use for large avian groups occurred in the spring (1.65/survey), summer (1.14/survey) and fall (0.92/survey) compared with the winter (0.43/survey).

Raptors were the most abundant large avian group observed in all seasons. The majority of raptor observations were of red-tailed hawks, unidentified buteos (most of which were probably red-tailed hawks), and northern harriers. The next most abundant large avian group varied by season, with corvids higher in spring, shorebirds in the summer, in the fall the only other large avian observations were of a single upland sandpiper and a single ring-necked pheasant, and in the winter the only other large avian observation was a single American crow. The most common corvid species observed was American crow mostly in the spring. Upland sandpipers and killdeer were the most common shorebirds, primarily during summer.

3.6.2 Impact

Some impacts to wildlife species and in particular avian and bat species are expected to occur from the project. Measured use of the site by avian species in addition to mortality estimates from other existing wind plants is used to predict mortality of birds and bats for the project. For example, use of the site by raptors lower than the average observed at other wind plants and mortality estimates of raptors from other "newer generation" wind plants are relatively low (e.g. <0.04 raptors/turbine/year for Foote Creek Rim wind plant, Wyoming; <0.01 raptors/turbine/ year for the Buffalo Ridge wind plant, Minnesota). Therefore mortality estimates for raptors from the project are expected to be within the range of fatalities observed at windpower projects outside of California.

Flight height characteristics were estimated for avian species and groups. Percentages of observations below, within, and above the rotor swept area (RSA) of 30 to 150 m above ground level were reported. Overall, most of the birds observed were recorded below the defined RSA, some were within the RSA and very few were flying above the RSA. Fourteen large avian species had observations flying within the RSA, all other species had all their observations below the RSA. Of those 14 species only three had 20 or more groups observed flying and none were observed within the RSA for the majority of the observations. Only two large avian species, mallards and unidentified eagles, were always observed within the RSA but only based on a single individual.

A relative exposure index (avian use multiplied by proportion of flying observations within the RSA) was calculated for each species. This index is only based on flight height observations and relative abundance and does not account for other possible collision risk factors such as foraging or courtship behavior. Canada geese, unidentified buteos and red-tailed hawks had the highest three exposure indices. Red-tailed hawks and American kestrels have been the most common species of the raptor fatalities at older wind projects in California, and lower numbers of fatalities of these species have been observed at some new generation projects outside of California.

A total of 415 individual bird detections within 299 separate groups were recorded during the grassland songbird transects with an overall mean avian-use of 2.31. Cumulatively, three species, horned lark, western meadowlark and grasshopper sparrow, comprised approximately nearly 80% of the observations and the overall mean use. Shaffer and Johnson (2004) recorded 16 species during grassland songbird surveys, with the most abundant species (measured as the number of breeding pairs per 100 ha) being western meadowlark (41.35), grasshopper sparrow (36.65), horned lark (23.77), killdeer (7.35), and burrowing owl (2.54).

The most probable direct impact to birds resulting from the project is mortality or injury due to collisions with the turbines or guy wires of temporary or permanent meteorological towers.

Fatality rates from projects in the Rocky Mountains and the Pacific Northwest have been closer to the national average, ranging from 0.9 – 2.9 fatalities per MW. Assuming fatality rates are similar to those documented in the Rocky Mountains and Pacific Northwest, from 27 – 87 total avian fatalities per year are expected using per MW fatality rates. An additional 0 – 8 total avian fatalities per year can be expected from the proposed met tower.

The potential exists for some species of grassland songbirds to be displaced by construction activities and the presence of tall wind turbines. Pre-construction surveys have been completed, and post-construction surveys to measure actual displacement impacts will be built in to the project requirements.

3.6.3 Mitigation

Post construction monitoring is proposed to validate mortality predictions and monitor the actual level of mortality from the project. Other impacts include direct loss of habitat due to the project facilities, and indirect impacts such as disturbance and displacement from the wind turbines, roads and human activities.

The following are potential mitigation measures for impacts to wildlife from construction and operation of the OFWB wind power project:

- An environmental inspector should be designated by the TAC (see above) to monitor construction activity and ensure compliance with the mitigation measures.
- Sensitive habitat areas such as wetlands and raptor nest sites should be mapped, flagged, and identified to all contractors working on-site and should be designated as “no disturbance zones” during the construction phase. If any new nesting, denning, or otherwise sensitive wildlife sites are located during construction, these areas should also be mapped and flagged and included in the off-limit areas.
- During project construction, best management practices should be employed to reduce peripheral impacts to adjacent vegetation and habitats and to minimize the construction footprint.
- The project should adhere to the storm water permit stipulations, including erosion control measures during construction;
- All areas disturbed during construction should be re-seeded with native plant mixes to minimize the spread of weeds;
- Revegetation Monitoring -- Re-seeding efforts using native grass seed mixes on areas disturbed during construction would be monitored for success annually (in the spring) for two years following construction. If revegetation efforts are not or only partially successful, appropriate reseeding measures would be taken;
- Any hay bales used during construction should be certified as weed free;
- A site management plan should be developed in coordination with the TAC to address the following items at a minimum:
    - minimizing road construction and vehicle use where possible to reduce impacts to sensitive habitats
    - educating construction personnel to the sensitive nature of the habitat and wildlife resources
    - maintaining and enforcing reasonable driving speeds so as not to harass or accidentally strike wildlife
    - providing adequate on-site waste disposal
    - identifying off-limit zones

identifying fire management and erosion control procedures
identifying animal carcasses that may attract eagles and other raptors and arrange for removal

- The raptor nests on-site should be monitored for activity prior to construction of the wind plant to determine the need for construction timing and use restrictions around the nest or adjustment to the project design to avoid impacts;
- Turbines should not be placed in areas of high buteo and eagle use;
- Construction of new overhead lines will be minimized to the greatest extent possible;
- Adhere to APLIC suggested practices (APLIC 1996) for construction of raptor safe overhead power lines and associated poles;
- Install raptor perch guards on all power poles constructed for the wind plant;
- Install bird flight diverters on all guy wires associated with new met towers;
- Project infrastructure, such as roads, underground powerlines etc should be located outside of prairie dog colonies to the greatest extent possible

Threatened and Endangered Species

Information on sensitive plant and wildlife species within the vicinity of the project area was requested from the U.S. Fish and Wildlife Service (USFWS), South Dakota Natural Heritage Program (SDNHP), and the Sicangu Lakota Game, Fish and Parks Department. Based on correspondence received from the U.S. Fish and Wildlife Service (USFWS) dated March 7, 2005, the following species or their potential habitat may occur within the proposed project area (Appendix B). A letter requesting an updated species list was sent to the FWS on October 31, 2007. The species identified in the 2005 as protected under the Endangered Species Act (ESA) include:

American burying beetle (*Nicrophorus americanus*)	Endangered
Bald eagle (*Haliaeetus leucocephalus*)	Threatened
Western prairie fringed orchid (*Platanthera praeclara*)	Threatened

As bald eagle has been delisted, they are not discussed further in this section. Prior to initiation of any construction, the species list should be confirmed and the Biological Assessment revised or amended if: (1) the scope of work changes significantly so as to create potential effects to listed species not previously considered; (2) new information or research reveals effects of the proposed Project may impact listed species in a manner not previously considered; or (3) a new species is listed or critical habitat is designated that may be affected by the project.

American burying beetle

Backlund and Marrone (1997) conducted surveys throughout eastern Todd County and found only one American burying beetle on the border of Todd and Tripp counties. The American burying beetle is known to occur in extreme eastern Todd County; however, no American burying beetles were detected in the proposed project during two surveys (Peyton 2004). Habitat or soils in Todd County do not appear to be suitable for the American burying beetle (D. Backlund, SDGFP, pers. comm.), limiting their distribution to the extreme eastern portion of the county. The proposed project occurs within western Todd County. No American burying beetles were found during two surveys within the proposed project area (Peyton 2004), and the American burying beetle is considered absent from the project area. The project will likely not impact the American burying beetle.

Western prairie fringed orchid

The Western prairie fringed orchid is a perennial orchid associated with native wet meadows in tall grass prairies (http://www.fws.gov/southdakotafieldoffice/ ORCHID.HTM). As the proposed project occurs in a highly grazed short-grass prairie with minimal wetlands, the likelihood that the species would be found there is remote. The proposed action will not impact the wetland areas. Further, no western prairie fringed orchids were found during surveys on July 6, 2005 (Good et al. 2005). No impacts to Western prairie fringed orchid are expected form the proposed action.

Black-footed ferret

The FWS did not identify black-footed ferret as potentially occurring within the proposed project area. While the likelihood of a ferret being found in prairie dog towns on the project is remote, all ferrets within Gregory, Mellette, Todd, and Trip counties are considered part of the Non-essential Experimental Population (NEP) planned for release on the Rosebud Indian Reservation (Federal Register, 67, No. 176, September 11, 2002). Impacts to black-footed ferrets are not expected from the project.

Vegetation

Other than baseline studies conducted for the proposed project, little background information is available specific to the project area.

The only source of information that is potentially specific to the project area is a historical account of flora present on the Sicangu Lakota Reservation. A priest who lived in St. Francis from the 1920's to the 1950's collected approximately 300 plant species on the Reservation in the immediate vicinity of St. Francis (Rogers 1980). The only orchid collected was a *Cyperipedium spp*. No western prairie fringed orchids were collected. Active prairie dog colonies are also present in the project area.

Areas surrounding the project area are a mixture of cultivated hay fields, native prairie, and the community of St. Francis.

Habitats within the project area are dominated by relatively dry, upland mixed-grass prairie. Native prairie grasses were the most common species observed and include little bluestem (*Schizachyrium scoparium*), sand bluestem (*Andropogon hallii*), blue grama (*Bouteloua gracilis*), prairie sandreed (*Calamovilfa longifolia*), Indian grass (*Sorghastrum nutans*), needle-and-thread grass (*Stipa comata*), red threeawn (*Aristata purpurea*), and June grass (*Koeleria macrantha*). Common forbs observed include milkweeds (*Asclepias pumila, A. speciosa*), annual wild buckwheat (*Eriogonum annuum*), sageworts (*Artemesia frigida, A. ludoviciana, A. campestris*), pricklypear cacti (*Opuntia macrorhiza, O. polyacantha, O. fragilis*), Indianwheat (*Plantago patagonica*), Missouri goldenrod (*Solidago missouriensis*), stiff sunflower (*Helianthus pauciflorus*), and New England aster (*Aster novae-angliae*).

Shrub species include leadplant (*Amorpha canescens*) and prairie rose (*Rosa arkansana*). One shelterbelt is present in the northern portion of the project area. The shelterbelt consists of an overstory of Siberian elm (*Ulmus pumila*), a shrub layer of chokecherry (*Prunus virginiana*), and an understory of smooth brome (*Bromus inermis*) and crested wheatgrass (*Agropyron cristatum*).

3.7 Cultural Resources

The impacts on this category of resources are of particular importance to the Tribal Community, Oyate, and to the individual members of the Tribe. These resources have generated the second greatest number of remarks from both individuals and organizations (including government agencies), second only to concerns for improving support for the Rosebud Indian Health Services Hospital.

In accordance with Section 106, of the National Historic Preservation Act of 1966, as amended, 16 USC §§ 470, et seq., as amended, there is a requirement for Federally-funded projects to be evaluated for their effects on historic and cultural properties. The Archeological and Historical Preservation Act of 1974 provides for the survey, recovery, and preservation of significant scientific, prehistoric, archeological, and paleontological data. In addition, the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 encourages, and the American Indian Religious Freedom Act of 1978 requires, EO 13175, Consultation and Coordination with Indian Tribal Governments, provides for consultation and coordination, and tribal consultation regardless of eligibility for listing on the National Register of Historic Places (NRHP). Pursuant to 16 USC § 470w-3(a) and 16 USC § 470hh, confidentiality of information concerning the nature and location of archeological resources, the specific information is not made available to the public and is exempt from Freedom of Information Act requests, because of the sensitivity of the data.

Two cultural resource management specialist interviewed 17 tribal members and 1 non-tribal member (but with a long history of living in the area) for assistance in identifying cultural, historic, or religious sites in or near the project area (Quigley and Emery 2004). The specialist concluded that the area had been occupied by a few scattered homes of extended families; they practiced their cultural and other ceremonies on site. The area is also historically significant due to the presence of a Catholic “shrine” or “prayer station”. Quigley and Emery (2004) recommended a full 100% pedestrian ground survey of the entire site and monitoring of the ground breaking activities by a qualified cultural resource management specialist.

A Class I files search of historical records was conducted by C. Murdy, regional archaeologist of the BIA (2005) and by W. Akard, Lakota Studies Department, Sinte Gleska Univ. (letter 12-04-04); they found that no cultural resources were identified and no previous inventories existed for the project area.

A Class III reconnaissance cultural resource survey was conducted by C. Murdy (2005) on 160 acres and by W. Akard et. al (letter 12-04-04) on 540 acres of the project site. No eligible historic properties were located within the project area. Murdy (2005) and Akard (letter 12-04-04) recommended cultural clearance for the project area. No impacts to cultural resources are expected form the proposed action. If culturally sensitive materials are unearthed during construction of the project, all activities will be halted and the appropriate agency (e.g. THPO) personnel will be contacted.

3.8 Socioeconomic Conditions

The project area is located in Todd County, SD which lies wholly within the boundaries of the Rosebud Sioux Tribe Reservation. In 2003 the county had an estimated population of 9,468 residing in 2,462 residences. Native Americans comprise 85.6% of the population and the

county is the fifth poorest in the USA with a per capita income of $7,714 resulting in a poverty level of 48.3%. As a comparison, the State of South Dakota per capita income in 2003 was $29,234.

The community of St. Francis located near the project area is an economically disadvantaged community comprised of 96% Native Americans. There are no industrial or manufacturing facilities in St. Francis. The unemployment rate exceeds 50% and any job creation is a significant benefit to the community. There is expected to be 3-4 permanent full time manufacturing quality maintenance jobs created by this project. RST members have employment preference under the easement agreement between the RST and OFWB.

As previously described, the OFWB will produce approximately $8 million in economic value for the members of the RST

3.8.1 Noise and Light

The noise dissipation curves for modern wind turbines show that turbine generation noise will be reduced to approximately 30dba (approximately the sound level of a bedroom while sleeping) at about 1000 linear feet. The setback from the single occupied dwelling within the project area is 1250 feet. There are no other human activities occurring within the project area that might be affected by the sounds of the wind turbines.

3.8.2 Visual

The single greatest environmental issue of concern for communities with wind turbines is their size and the resultant impact on view shed. Consequently Disgen, as a matter of routine development, prepares photo-simulations of the proposed project area and shows these simulations in community information meetings. The following photo-simulations have been shown and explained in multiple community and tribal council meetings (the number of wind turbines exceeds the fourteen). Following these presentations, both the St. Francis District (Appendix C) and the RST Council have passed resolutions in support of the Owl Feather War Bonnet Wind Facility.

Figure 8. Photo Simulation from the West

Figure 9. Photo Simulation from the North

3.8.3 Public Health and Safety

The natural hazards most likely in the area would be high winds, rain, snow and occasional tornados. Wind turbines and electrical equipment might present the risk of electrocution, fall or aircraft collisions. The Federal Aviation Administration (FAA) written notification before construction of any structure 200 feet in height above ground level or higher. The FAA determines through its application for determination process the required obstruction lighting for the project. Discussion of potential health risks associated with high-voltage power lines would not be germane as no such lines have been proposed. Roads into the project area will be gated and are not generally open to members of the public.

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APPENDICES

Appendix A – Documentation of compliance with Section 7 of Endangered Species Act

Appendix B – Documentation of compliance with Section 106 of the National Historic Preservation Act

Appendix C – Documentation of public comments during scoping meetings

Appendix D – Documentation of Nebraska Public Power System Impact Study, 2004

Environmental Assessment

Owl Feather War Bonnet Wind Energy Facility
Rosebud Sioux Tribe
Rosebud Indian Reservation, USA

Appendix A

Documentation of Compliance with Section 7 of the Endangered Species Act.

Prepared by:

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and

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

March 7, 2005

Mr. Rhett E. Good
Western EcoSystems Technology, Inc.
2003 Central Avenue
Cheyenne, Wyoming 82001

Re: Proposed Rosebud Windpower Project,
Todd County, South Dakota

Dear Mr. Good:

This letter is in response to your request dated February 9, 2005, for a list of federally threatened and endangered species potentially occurring within the above referenced 30 MW windpower project (the Owl Feather War Bonnet project) proposed for an area owned by the Rosebud Sioux Tribe located southeast of St. Francis, Todd County, South Dakota.

In accordance with section 7(c) of the Endangered Species Act, as amended, 16 U.S.C. 1531 et seq., we have determined that the following federally listed species may occur in the project area (this list is considered valid for 90 days):

Species	Status	Expected Occurrence
American burying beetle (Nicrophorus americanus)	Endangered	Resident.
Western prairie fringed orchid (Platanthera praeclara)	Threatened	Possible Habitat, No Recent Specimens.
Bald eagle (Haliaeetus leucocephalus)	Threatened	Migration, Winter Resident, Possible Nesting.

As per earlier communications regarding this project, we are aware that surveys for the American burying beetle were performed in the project area in 2004, and no individuals of this species were located.

The Western prairie fringed orchid has not recently been documented in South Dakota, although it is recognized that the life cycle of the plant often makes it difficult to detect. Populations currently exist in the sandhills of Nebraska, south of the project area. Potential habitats generally include mesic upland prairies, wet prairies, sedge meadows, subirrigated prairies, and swales in sand dune complexes. If these habitats exist within the project area, surveys for the Western prairie fringed orchid should be considered prior to construction.

Bald eagles occur throughout South Dakota, and new nests are appearing each year. No construction should occur within one-quarter mile of any known active bald eagle nest, although the distance necessary to avoid disrupting nesting activities may be greater than one-quarter mile depending partly on visibility between the project site and nest. The species' nesting season is January to August. Any nests found should be reported to this office. The species is also found in South Dakota during the winter months and, as per previous correspondences with yourself and Chris Bergen of DISGEN, we are aware that bald eagles were observed utilizing the proposed project area in 2003 and 2004. However, current submitted information indicates that the risk of mortality of bald eagles at this site is very low due to the relatively low number of individuals sighted, limited time frame of their presence (primarily December sightings), and the overall relatively low mortality rate of raptors in general at other established windpower projects.

If the Bureau of Indian Affairs or their designated representative determines that the project "may adversely affect" listed species in South Dakota, it should request formal consultation from this office. If a "may affect - not likely to adversely affect" determination is made for this project, it should be submitted to this office for concurrence. If a "no effect" determination is made, further consultation may not be necessary. However, a copy of the determination should be sent to this office. For more information regarding Federal action agency responsibilities as related to section 7 of the Endangered Species Act, please refer to the Service's Endangered Species Act Consultation Handbook which is available online at http://endangered.fws.gov/consultations/index.html.

Previous correspondence with our office has also discussed other natural resource issues with the proposed project in addition to listed species under the Endangered Species Act. We are reiterating some of that information in this letter as well.

As an attachment to our January 13, 2004, response to your December 13, 2003, submittal of a Proposed Ecological Baseline Study and Phase One Screening Report on this project, we included an exerpt from the U.S. Fish and Wildlife Service's (Service) Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines (found in their entirety online at: http://www.fws.gov/r9dhcbfa/ windenergy.htm). We outlined specific concerns regarding placement of the proposed turbines within intact grasslands with prairie chicken leks, a prairie dog town, and known bald eagle use. Additional issues included the use of the site by numerous other raptor species, bats, additional listed species (the American burying beetle and Western prairie fringed orchid as described above), and possible habitat fragmentation/avoidance impacts to grassland nesting birds.

Note that current section 7 consultation with this office as per the Endangered Species Act does not preclude nor constitute compliance with the Migratory Bird Treaty Act of 1918 (MBTA), as amended, 16 U.S.C. 703 et seq., and the Bald Eagle Protection Act of 1940 (BEPA), as amended, 16 U.S.C. 668 et seq. Please be apprised of the potential application of the MBTA and BEPA to your project. The MBTA does not require intent to be proven and does not allow for "take," except as permitted by regulations. Section 703 of the MBTA provides: "Unless and except as permitted by regulations . . . it shall be unlawful at any time, by any means, or in any manner, to . . . take, capture, kill, attempt to take, capture, or kill, possess . . . any migratory bird, any part, nest, or eggs of any such bird . . . ." The BEPA prohibits knowingly taking, or taking with wanton disregard for the consequences of an activity, any bald or golden eagles or their body parts, nests, or eggs, which includes collection, molestation, disturbance, or killing activities.

The Service appreciates the opportunity to provide comments. If you have any questions on these comments, please contact Natalie Gates of this office at (605) 224-8693, Extension 34.

Sincerely,

for Scott Larson

Pete Gober
Field Supervisor
South Dakota Field Office

cc: BIA; Aberdeen, SD
(Attention: Diane Mann-Klager)
USFWS-LE; Pierre, SD
(Attention: Bob Prieksat)

Environmental Assessment

Owl Feather War Bonnet Wind Energy Facility
Rosebud Sioux Tribe
Rosebud Indian Reservation, USA

Appendix B

Documentation of Compliance with Section 106 of the National Historic Preservation Act.

Prepared by:

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(605) **856-4463**
CHARTERED BY THE ROSEBUD SIOUX TRIBE 1971

ACCREDITEDBY
THE NORTH CENTRAL ASSOCIATION
OF COLLEGES AND SCHOOLS 1983

A Letter of No Findings for the Owl Feather War Bonnet Wind Farm Construction Site on the Rosebud Sioux Reservation, Todd County, done for Rosebud Sioux Tribe Resource Development Office, Bureau of Indian Affairs Case Number AAO-1163/RB/04

December 4, 2004

The Project

A tract of land was identified for archaeological survey and historic resource assessment by the office of Resource Development of the Rosebud Sioux Tribe. The project is the site for the proposed construction of the Owl Feather War Bonnet Wind Farm, a wind generated power production project for the Rosebud Sioux Tribe. The proposed project will consist of the construction of 25 – 35 wind generators and the necessary support buildings and access roads. The proposed complex will occupy approximately 580 acres (See **Map** 1).

The project area is located 0.25 mile southeast of St. Francis. The legal location of the project area is: 660 feet of SW ¼ of Sec. 32, SE ¼ of Sec. 32, W ½ of Sec. 33 and the W ½, E ½ of Sec. 33, T37N, R30W on the USGS 7.5 St. Francis Quad. (See **Map** 1). Approximately 160 acres of the project area was surveyed by BIA Archeologist Dr. Carson Murdy (See **Map** 1: the dotted lined area). The approximate area of the proposed construction project discussed in this letter is 420 acres (See **Map** 1: the solid lined area).

The Principal Investigator was initially contacted by Ken Haukaas of the RST Resource Development Office on June 25, 2004, requesting that a Phase I records search and Phase III field survey be carried out for the project area not surveyed by Murdy to be included in the planned construction project. This letter covers the area identified that was surveyed beginning on October 8, 2004 and was completed October 11, 2004.

Records Search

The records search was carried out on October 6, 2004. The Rosebud Tribal Site Files and the South Dakota Archaeological Research Center (SARC) were consulted when the project site were defined and subsequently assigned for survey. Additionally, an ethnographic survey of local elders familiar with the local history was also conducted and this data was also reviewed and considered prior to the field survey. The site is located in Todd County, and is part of the Lower White Study Unit (Winham and Hannus 1991).

One recorded site (RST 18) was found near the project area. The site, a culturally sensitive site, is located 0.25 miles west of the project area. The St. Francis Mission Complex is also on the National Register. The Mission is located approximately 0.5 miles northwest of the project area. Neither site will be impacted by the proposed project activities

The records search also indicated that a total of four surveys (see references) have been done in proximity to the proposed project area. None of the surveys yielded any results to indicate that cultural or historic resources were located in or near the project area except Akard (2002). RST 18, was observed and recorded during the survey. The project will not affect the site as previously discussed. The ethnographic survey did indicate that a few families lived on the land within the project area. They had "tar paper shacks" in the area. Some of the residents were traditional practioners and at least one was a non-Indian resident. Local informants were consulted and gave no indication of any additional known cultural or historic resources to be in or near the proposed project area.

Field Survey

The Class III Survey was carried out beginning on October 8, 2004 by the Principal Investigator and students from the SGU CRM Program. The work continued until October 11, 2004. The entire 420 acre tract was surveyed because of the potential for secondary impacts due to construction activities.

Field methods utilized were parallel pedestrian transects (Mueller 1974) at approximately 10 meter intervals spanning the proposed project area therefore providing 100% coverage. The transects were intermittently modified to examine rodent burrows, eroded areas and any other exposed subsurface areas to sample substrata. Ground visibility ranged from 20 – 60% over the project area. The weather conditions were dry and clear.

Results

The field survey of the Owl Feather War Bonnet Wind Farm project area near St. Francis, done October 8 – 11, 2004, yielded minimal evidence of previous human activities except for recent usage. The land was currently in use for grazing. There were two exceptionally light scatters of historic debris observed during the survey. One was

located around the well (See **Map 1:Site** 1). The debris was non-diagnostic and included a glass sherd, metal and crockery. This area was intensively disturbed by livestock trampling and wind erosion. The area is fairly unstable and probably will not be useful for construction, therefore, this area will probably not be impacted by the proposed construction.

Along the western boundary of the project area located in SW ¼, SW ¼, SW ¼, NW ¼ of Section 33 (See **Map** 1: **Site 2**), there was a dump of concrete pieces that had been a floor. This was evident from adhesive and linoleum found attached to some of the concrete pieces. It appeared that this was recent and had been deposited there to arrest erosion. A glass sherd and non-diagnostic metal was also observed nearby the dump site. Since the area is along the property boundary, it will not be impacted by the planned construction project.

At the north end of the project area located in the NE ¼, NE ¼, NW ¼, NW ¼ of Section 33 (See **Map** 1: **Site** 3), a small fenced in area that had been there for some time. It was a site that the Catholic Church had erected, but it had not been used for a long period of time. It appeared to be a place for meditation and prayer, yet all markers or potential descriptors had been removed. The fence was battered and the surrounding area was heavily eroded from livestock activities. A senior member of the local clergy was asked about the site and made no indication of its relevance or significance. The site is on Tribal land. Since this site is at the edge of the property, and if it is no longer used, then it is doubtful that it would be impacted by the proposed construction.

Informant inquiry and the records checks yielded no knowledge of any other cultural or historic usage of the area. No other cultural or historic materials were discovered during the field survey of the project area.

Conclusion

It is the opinion of the principal investigator that home site of the non-Indian resident was probably located in proximity to the well. The reasoning is that if the settler purchased the land, he probably could afford to dig a well. The well is currently still in use for watering livestock and the immediate area is heavily trampled by the livestock. It is located in a sandy area that is a blowout. Therefore virtually all evidence of this site is gone except the four – six pieces of non – diagnostic historical debris observed at the site.

No evidence of the other home sites were observed except for possibly the two pieces of historical debris found near the concrete dump site. This appears to be the result of the tar paper shacks used as homes in this instance. The information from informants indicates that these structures were basically wood frames on skids that were covered with tar paper. They were dragged on to an allotment to satisfy the legal requirement for residence on the land tract. They were fairly mobile, in other words, easy to move and did not really impact the environment to any extent. The principal investigator has surveyed other such sites, including one where there structures were built and found

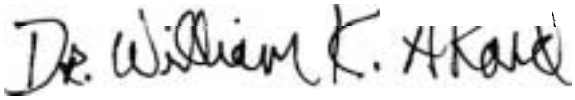
virtually no evidence of their presence remaining (Akard 2002a). There were no worn areas or even vegetation variations.

In the ethnographic survey, it states that the area is eligible for nomination to the National Register. I do not agree with that statement. With no real physical presence, a site cannot be defined or bounded. Since the historical debris was also exceptionally light in density and non-diagnostic, the only record remaining at this time appears to be oral history.

Local informants were also asked about the Catholic meditation/prayer site and seemed reluctant to talk about it. It was suggested that this was used as a place for disciplinary action for priests and nuns. If this is so, then the reluctance to talk about the site would be appropriate. While the site may be old enough for National Register eligibility, as a site solely related to religious activities, it would probably be exempted. Since the site does not appear to be currently used and would most certainly not be directly impacted by construction and there was no attempt to offer reasoning or justification for its purpose, it should not be impacted by the proposed project.

On the basis that no cultural or historic resources of significance were discovered during the survey at the project site, it is recommended that Section 106 clearance be granted allowing the undertakings to proceed as planned. However, if during project construction, any materials are uncovered, the project activity should cease until a qualified investigator could assess the uncovered materials.

Sincerely,



Dr. William K. Akard
Principal Investigator
Lakota Studies Dept.
Sinte Gleska University

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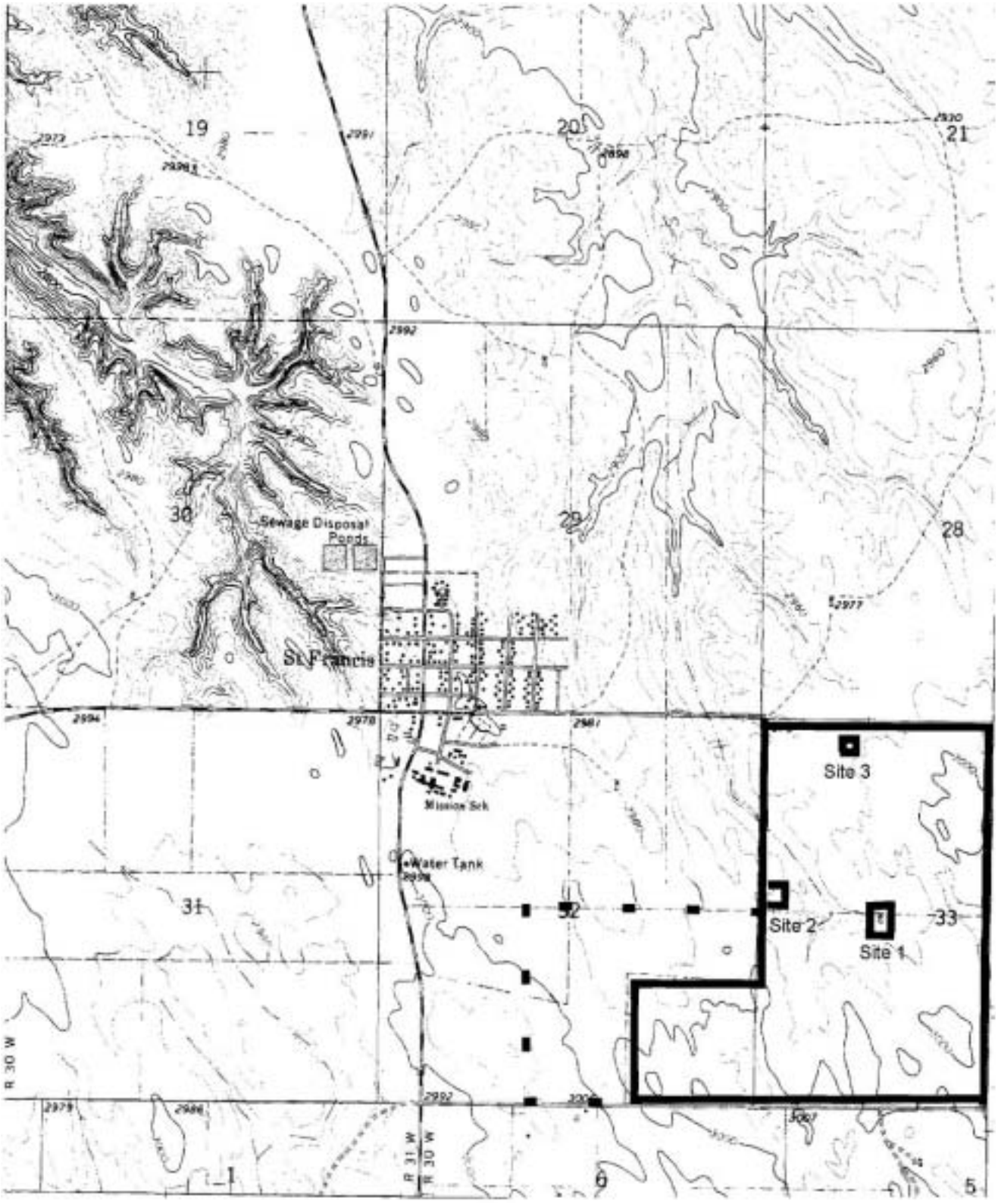


Map 1: USGS 7.5 St. Francis Quad. T37N, R30W

A RECONNAISSANCE CULTURAL RESOURCE SURVEY OF THE PROPOSED OWL FEATHER WAR BONNET WIND FARM ON THE ROSEBUD RESERVATION, TODD COUNTY, SOUTH DAKOTA

Carson N. Murdy

February 2005

Carson N. Murdy, Ph.D.
Regional Archaeologist
Great Plains Regional Office
Bureau of Indian Affairs
115 Fourth Avenue Southeast
Aberdeen, South Dakota 57401

BIA Case No. AAO-1163/RB/04

ABSTRACT: A reconnaissance cultural resource survey was conducted of part of a proposed wind farm in the Lower White archaeological region on the Rosebud Reservation, Todd County, South Dakota. Approximately 160 acres were inventoried. No eligible historic properties were located within the project area. Cultural resource clearance is recommended for this project to proceed as planned.

Project: Owl Feather War Bonnet Wind Farm (Figure 1)

Legal Location: E1/2E1/2SW¼, and N1/2 and SW1/4SE1/4 Sec. 32, T.37N., R.30W.

USGS 7.5' Quad.: St. Francis, S. Dak. (1969)

Project Description: An array of wind turbine generators will be constructed in the project area.

Environment/Setting: The project area is located on high rolling plains at elevations varying 2980'-3000' above mean sea level. No bedrock outcrops were observed within the project area. Drainage of the area is generally to the north. The soils are primarily dark grayish brown fine sandy loams of the Holt-Vetal Complex (Springer 1974) with local slopes varying from 5-20%. The vegetation cover ranges 60-90% and consists primarily of switchgrass, western wheatgrass, and occasional patches of downy brome.

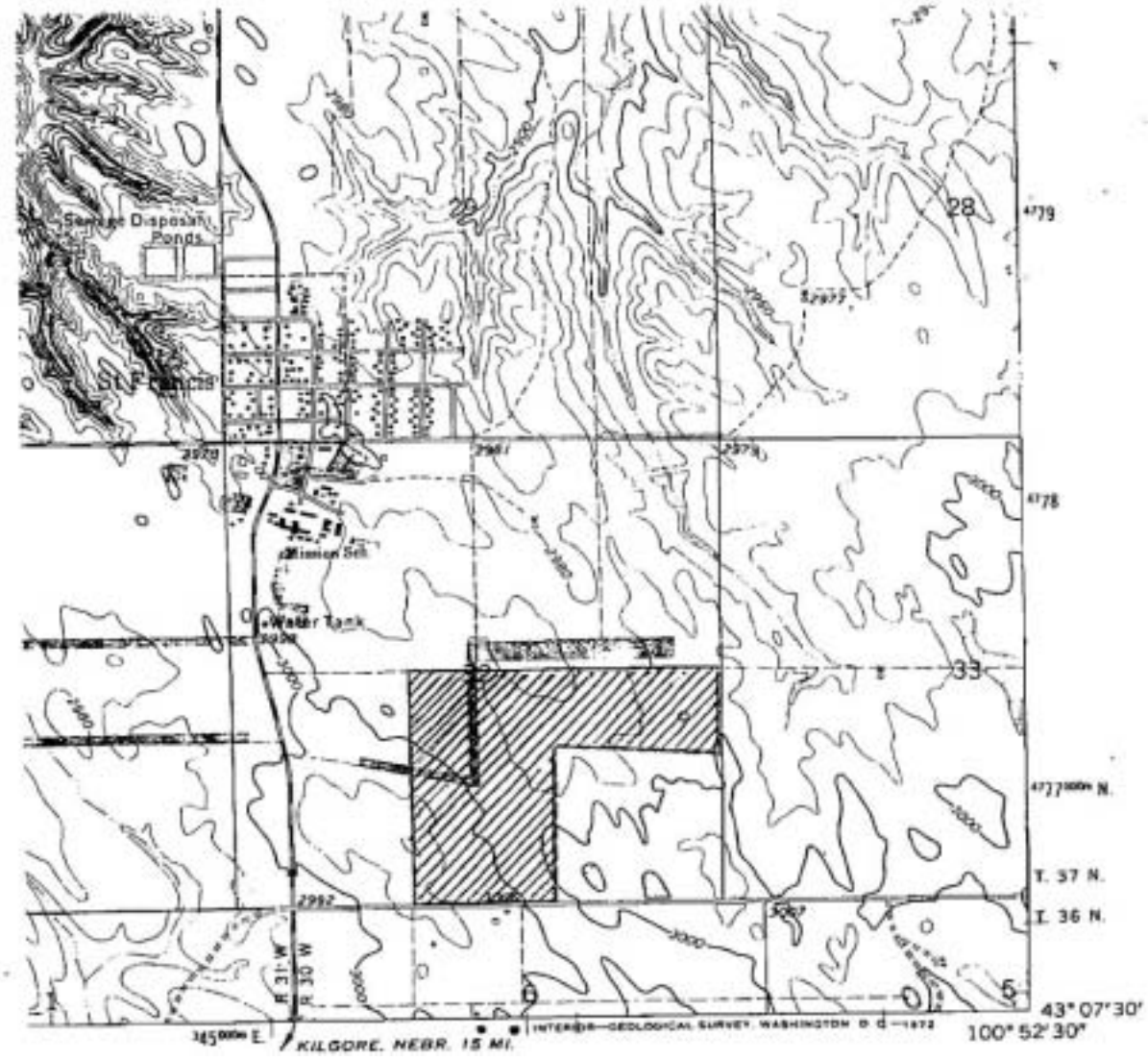
Disturbance/Land Use: Most of this land is used as hayland/pasture. A portion in the E1/2NE1/4SW1/4 Sec. 32 has been cultivated and is bordered to east and south by a shelterbelt. A block foundation and the debris of a recent farmstead are located in the NW1/4SE1/4 Sec. 32.

Prior Studies: A files search was conducted on March 19,2004 by Carson N. Murdy at the Great Plains Regional Office of the Bureau of Indian Affairs, Aberdeen, South Dakota. No cultural resources or previous inventories were known to exist within the project area. Within a mile radius, inventories have been conducted for the St. Francis Indian School (Nowak 1987; Akard 2002), housing and streets in the town of St. Francis (Chevance 1991; Buechler 2000), the St. Francis West Road (Buechler 1998), and most recently for the eastern portion of this project (Akard 2004).

Fieldwork: A pedestrian reconnaissance survey of the project area was conducted on April 27-28,2004 by Carson N. Murdy. This survey consisted of a series of parallel transects spaced *ca.* 30 m apart over the project area, as well as more detailed inspection of high points.

Results/Recommendations: No eligible cultural resources were located and no further work is recommended. The remains of the farmstead will not be impacted by the project as currently designed. This project should proceed as planned.

Figure 1: From USGS 7.5' **St.** Francis Quad., showing location of the Owl Feather War Bonnet Wind Farm survey in the E1/2E1/2SW¼, and N1/2 and SW1/4SE1/4 Sec. 32, T.37N., R.30W.



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Environmental Assessment

Owl Feather War Bonnet Wind Energy Facility
Rosebud Sioux Tribe
Rosebud Sioux Indian Reservation, USA

Appendix C

Documentation of Public Comments during Scoping Meeting -St. Francis Community Resolution supporting Wind Energy Project.

Prepared by:

Distributed Generation Systems, Inc. (DISGEN)
200 Union Boulevard, Suite 304
Lakewood, CO 80228

and

Clayton Derby and Ann Dahl
WEST, Inc
4007 State Street, Suite 109
Bismarck, ND 58503

Appendix C – Documentation of public comments during scoping meetings

PUBLIC COMMENT FORM

Owl Feather War Bonnet Wind Farm
Environmental Assessment

due April 8th

Name: Mary Valdez **Date:** 3/25/04

Affiliation: RST Utility Commission
Address: PO Box 430
Rosebud SD 57570
Phone: 747-4097
Fax: 747-4099
Email: TUEQQ@gwtc.net

Comments:

I thought that the meeting was very well presented and put together. I think that the public will be able to understand what the meeting is about.

I am looking forward to working with you guys on your public scoping mtgs.

Please Submit To:
Chris Bergen • Disgen, Inc. • 200 Union Blvd. Suite 304 • Lakewood, CO 80228
cbergen@disgenonline.com

PUBLIC COMMENT FORM

Owl Feather War Bonnet Wind Farm
Environmental Assessment

Name: Ione Quigley **Date:** 3/25/04

Affiliation: RST member/CKM
Address: Box 321 St Francis, SD.
Email: iquigley@sinte.edu

Phone: 605-747-5110 - Cell
Fax: 856-4463, 605-856-8100 X 8454
605-856-5163

Comments:

did ethnographic/historic survey for proposed Wind Farm - see Ken Haukass for recommendations the Lakota know/understand their environment - flora/fauna keeps in touch with the culture concerning flora/fauna.

Please Submit To:
Chris Bergen • Disgen, Inc. • 200 Union Blvd. Suite 304 • Lakewood, CO 80228
cbergen@disgenonline.com

PUBLIC COMMENT FORM

Owl Feather War Bonnet Wind Farm
Environmental Assessment

Name: Randy Emery

Date: 3/25/09

Affiliation: ~~[illegible]~~ SGU/CRM/Lakota Studies

Address: PO Box 8
Mission, SD 57555

Phone: (605) 856-4463 ↗ 856-8100

Fax: (605) 856-5163

Email: remery@sgu.edu

Comments:

I work for the project as a cultural resource facilitator. Professionally, I believe the project [illegible] support and promotes tribal self-sufficiency and economic development.

Wes - Wildlife biologist 1992 - Monitoring protocol.

Please Submit To:
Chris Bergen • Disgen, Inc. • 200 Union Blvd. Suite 304 • Lakewood, CO 80228
cbergen@disgenonline.com

Resolution for St. Francis Community Wind Farm

ST. FRANCIS COMMUNITY
RESOLUTION NO. 03-06

Authorizing Rosebud Sioux Tribe to Pursue St. Francis wind farm

WHEREAS, The Rosebud Sioux Tribe is a federally recognized Indian Tribe organized pursuant to the Indian Reorganization Act of 1934 and all pertinent amendments thereof; and

WHEREAS, The St. Francis Community is a duly recognized community under Article V, of the Rosebud Sioux Tribe's constitution and bylaws; and

WHEREAS, The Rosebud Sioux Tribe has developed a single 750 kW turbine wind project as a demonstration of the Rosebud Sioux Tribe's potential for additional tribally owned wind generation development on the Rosebud Reservation; and

WHEREAS, The Rosebud Sioux Tribe Economic Development Committee held a regular meeting on December 3, 2002 and has heard presentations with regard to the progress and status of tribally owned wind energy development project from Tribal Utility Commission consultant Robert Gough, and also from consultants Mr. Patrick Spears and Mr. Dale Osborn of DisGen, Inc., who worked on the DOE Demonstration Project at the Rosebud Casino and Hotel site; and

WHEREAS, Some wind feasibility studies have been undertaken by DisGen since the Spring of 2001 at St. Francis where anemometers have been placed on the existing KINI radio tower, and

WHEREAS, The collected anemometer data indicates that the prospect for the Tribe to develop a wind generation facility (a wind farm or wind ranch) from 30 to 350 megawatts at this site is very positive; and

WHEREAS, The St. Francis Community fully supports the tribe's selection of the St. Francis wind farm site, and requires that a portion of the funding income produced by the St. Francis wind generation facility (a wind farm or wind ranch), be directed into the Community of St. Francis for economic development projects or community approved budget disbursements, and

THEREFORE BE IT RESOLVED THAT the St. Francis Community hereby authorizes and directs the Rosebud Sioux Tribe, and its consultants to conduct and complete any necessary feasibility studies, wind assessments and pre-development activities for the St. Francis wind farm (ranch) site.

CERTIFICATION

This is this to certify that the above resolution was passed unanimously at a duly called community meeting of the St. Francis on 4/22/03, 2003, with a community quorum present, with a vote of 26 in favor, 0 opposed, and 1 not voting.

ATTEST:

Chairman, St. Francis Community

Secretary, St. Francis Community

Environmental Assessment

Owl Feather War Bonnet Wind Energy Facility
Rosebud Sioux Tribe
Rosebud Indian Reservation, USA

Appendix D

Documentation of Nebraska Public Power District System Impact Study, 2004

Prepared by:

Distributed Generation Systems, Inc. (DISGEN)
200 Union Boulevard, Suite 304
Lakewood, CO 80228

and

Clayton Derby and Ann Dahl
WEST, Inc
4007 State Street, Suite 109
Bismarck, ND 58503

Owl Feather War Bonnet Wind Farm
Rosebud Sioux Tribe
DOE Grant DE-FC36-030GO13122

Attachment D

Systems Impact Study

Owl Feather War Bonnet Wind Project

System Impact Study

Conducted on behalf of the

Rosebud Sioux Tribe
And
Distributed Generation Systems, Inc.

August 2004

Prepared by: Energy Delivery – Transmission Asset Planning

Nebraska Public Power District
"Always there when you need us"

Table of Contents

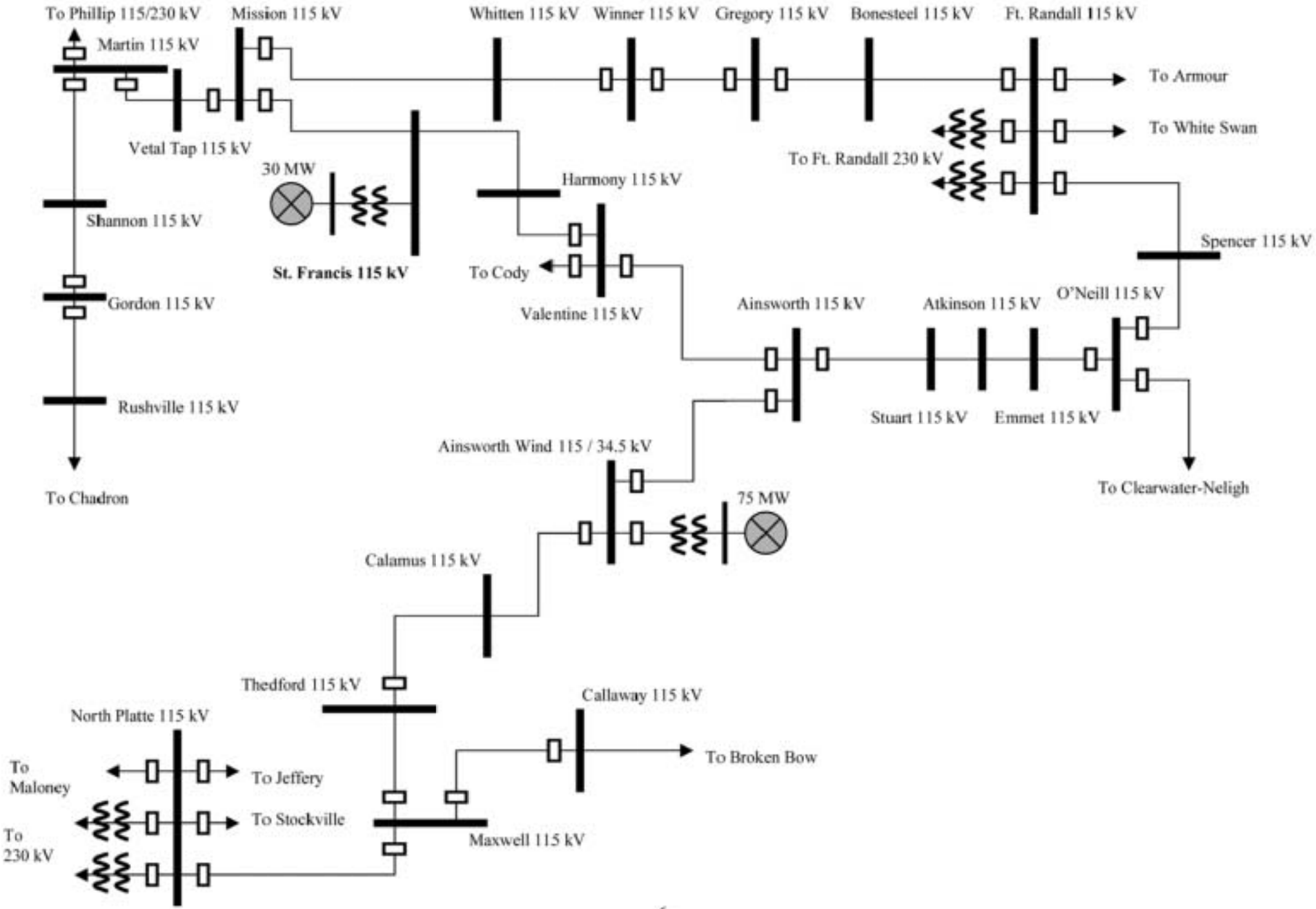
Listing of Tables & Figures

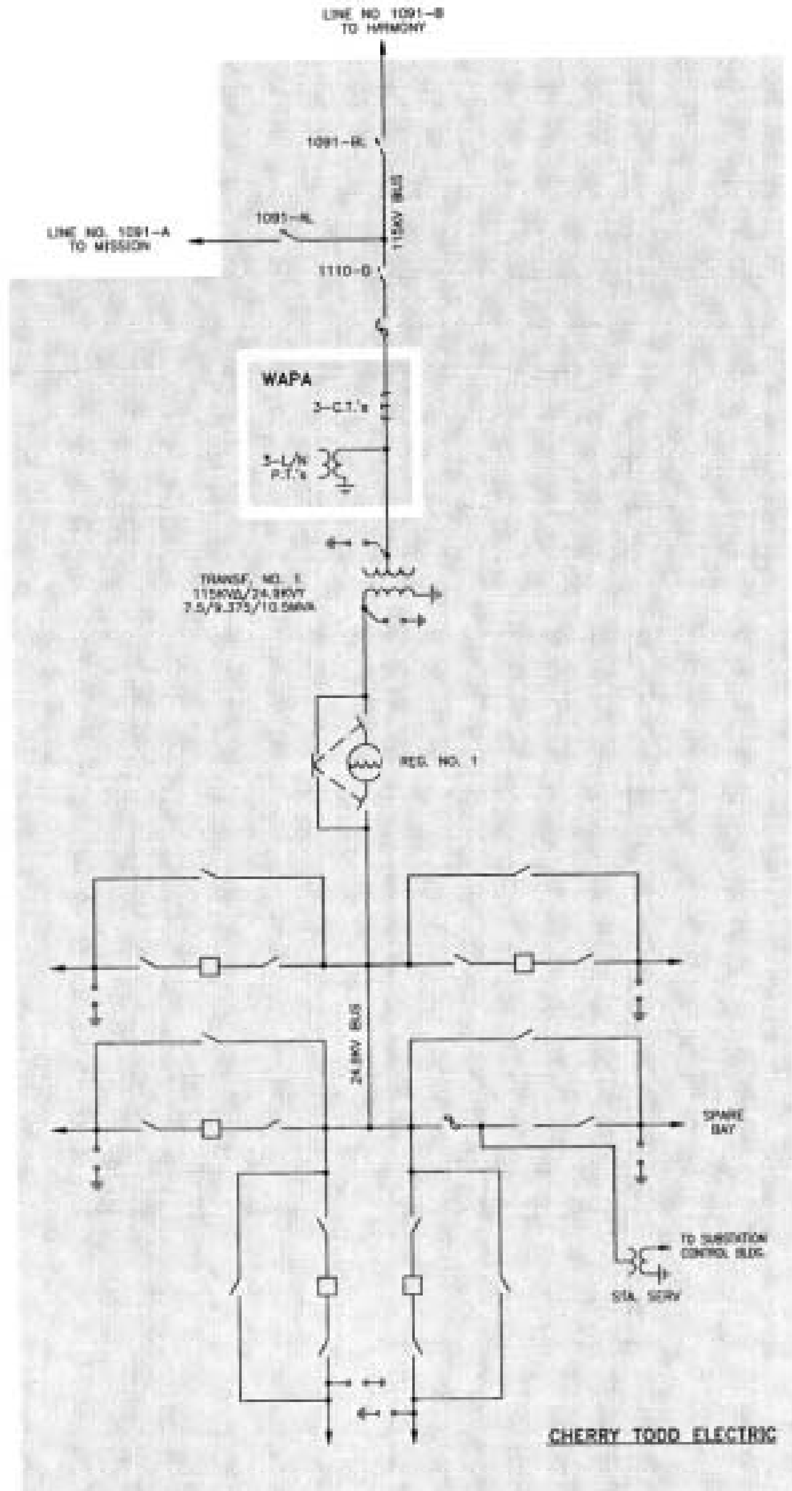
1.0 Introduction

This system impact study was performed at the request of Distributed Generation Systems, Inc. (Disgen) on behalf of the Rosebud Sioux Tribe. The objective of this study was to evaluate the transmission system impacts for a proposed 30 MW Owl Feather War Bonnet (OFWB) Wind Project interconnected at the St. Francis 115 kV substation on the Rosebud Sioux Tribe Reservation in southern South Dakota. Figure 1 below displays the local area transmission system and the proposed interconnection site of the OFWB wind facility. Figure 2 on the following page displays a more detailed one-line diagram of the St. Francis Area Transmission System.

Figure 1. Owl Feather War Bonnet Wind Project - Local Area Transmission System

Figure 2. St. Francis Area Transmission One-line





SCANNED

CADD DRAWING

DO NOT REVISE MANUALLY

CONTRACT NUMBER	915151				3510	

ST. FRANCIS SUBSTATION
ONE-LINE SWITCHING DIAGRAM

DRAWN KS DATE 12-13-74

CHECKED DATE

APPROVED JWH DATE

FILMED 5-23-80

NC40433

REVISION 5

Nebraska Public Power District

2.0 Study Scope

This system impact study will be performed to evaluate the steady-state impacts of interconnecting a 30 MW wind facility to the St. Francis 115 kV substation in southern South Dakota. The steady-state impacts of the wind facility interconnection will be assessed based on NPPD's facility connection requirements and adherence to MAPP System Design Standards and MAPP Planning Standards. Following the evaluation of the steady-state impacts, any required system improvements will be detailed and outlined in Section 7.0.

In order to evaluate the steady-state impacts of the 30 MW wind facility, the following loadflow analysis was performed. All single element (N-1) contingencies, 115 kV and above, in the NPPD, LES, OPPD, and southern WAPA (zones 653-654) control areas were evaluated with PSS/E activity, ACCC. ACCC monitored all bus voltages and transmission facility loadings in the NPPD, LES, OPPD, WAPA, and MEC control areas and flagged any loadings above 95% of normal ratings (RATE A) or voltages outside of the normal operating range (0.95 pu – 1.05 pu). Multiple element contingencies in the NPPD area will also be evaluated in the ACCC analysis and the impact due to the wind facility addition will be assessed.

Additional loadflow analysis will be performed to evaluate critical contingencies near the St. Francis 115 kV substation. This analysis will be utilized to evaluate the generation outlet capability of the St. Francis area transmission system following the addition of the 30 MW OFWB wind facility. Both local area N-1 and N-2 contingencies will be evaluated in this analysis.

A Regional Constrained Path Analysis (DF Analysis) will be performed to assess the impacts of the proposed generation addition on the MAPP regional constrained interfaces. Distribution Factor (PTDF and OTDF) calculations will be performed to examine the incremental impacts of the OFWB wind facility on currently defined constrained interfaces in the MAPP evaluation process. The results of the DF screening will flag the potential need to address impacts on regional transmission constraints in the MAPP region for different points of delivery.

Following the analysis of the steady-state impacts of the wind farm addition, the preliminary transmission facilities plan will be developed for the 30 MW OFWB wind facility. The preliminary transmission facilities plan will include the transmission facility upgrades required for interconnection at the St. Francis 115 kV substation.

3.0 Model Development

This study was conducted using Rev 26.2 of Power Technology Inc.'s (PTI's) Power System Simulator (PSS/E) software package and the following SPP model 2003 series base cases:

2009 Summer Peak

2009 Summer Off-Peak (North to South transfers)

2009 Winter Peak (South to North transfers)

These cases were chosen to address the impact of the new wind generation on the transmission system during the out-year timeframe. The 2009 cases will provide a reasonable out-year assessment of the transmission system as the installation of the Ainsworth Wind Facility, Beatrice Power Station, Council Bluffs Unit 4 along with planned transmission additions were included.

Wind facility generation was dispatched off-system to generating units in North Dakota, Minnesota, and Iowa to simulate off-system deliveries of the energy produced at this facility. This generation dispatch scenario will provide worst-case system conditions for this interconnection evaluation. Specific delivery points and transmission service requests will be evaluated further in the load delivery and facilities study.

A single 30 MW generating unit terminated at the 115 kV bus was included to represent a simplified model of the OFWB wind facility. The customer supplied wind turbine data of GE wind turbines with the GE WindVAR capability. The reactive capability of the equivalent wind generator was then estimated to be +9 MVAR to –14 MVAR or +0.95 to –0.90 power factor. Also, the reactive power control system of the wind generator was set to voltage control mode regulating the 115 kV interconnection bus voltage at 1.030 pu.

4.0 Study Criteria

Facility Loading Criteria

Overloads of equipment are defined as greater than 100% of the normal continuous rating (Rate A). An emergency rating (Rate C) may be utilized for a period of less than 30 minutes during which the facility must be returned to normal operating limits. This emergency rating is typically defined as 110% for transmission line equipment and 125% for transformers.

Any identified facility overload will be analyzed on a Distribution Factor (DF) basis where comparisons between the base case and the wind farm generation cases will be utilized to determine the impact on the overload due to the proposed wind farm addition. The incremental increase (or decrease) in flow on the identified overloaded facility will be divided by the incremental generation addition associated with the wind facility. The identified overloaded facilities are considered significantly affected facilities (SAF) if the corresponding DF due to the addition is greater than 2.0% and greater than 1 MW.

Voltage Criteria

Normal steady-state voltage levels are defined as 0.95 to 1.05 pu. Emergency steady-state voltage levels are defined as 0.90 – 1.10 pu and may be utilized for less than 30 minutes.

A bus voltage condition that varies by 0.01 pu or greater following the facility addition is considered significantly impacted.

5.0 Loadflow Analysis

ACCC analysis was performed on the cases with and without the wind facility addition to evaluate the impact on any identified overloads or voltage criteria violations. Both single and multiple element contingencies were evaluated in the ACCC analysis. Local area contingencies (N-1 and N-2) were evaluated and screened for thermal and voltage violations using full AC loadflow solutions and PSS/E activities, RATE and VCHK.

5.1 ACCC Analysis

To evaluate the impacts of the wind farm addition on the regional transmission system, a system-wide contingency analysis (ACCC) was performed. All single element (N-1) contingencies, 115 kV and above, in the NPPD, LES, OPPD, and WAPA (zones 653-654) control areas were evaluated with PSS/E activity, ACCC. ACCC monitored all bus voltages and transmission facility loadings in the NPPD, LES, OPPD, WAPA, and MEC control areas and flagged any loadings above 95% of normal ratings (RATE A) or voltages outside of the normal operating range (0.95 pu – 1.05 pu). This ACCC analysis was performed on all cases with and without the wind farm addition. The wind generation was dispatched off-system to generating units in North Dakota, Minnesota, and Iowa. The ACCC results were compared with the IPLAN routine, SCREENACCC, to analyze the impact of the wind farm on overloads or bus voltage violations according to the criteria defined in Section 4.0. Non-converged solutions discovered in the ACCC analysis were ran manually and screened for adverse system conditions with PSS/E activities, RATE and VCHK. Any facility loadings outside of normal limits will be discussed in the summaries of each case. Any bus voltage conditions that were impacted by the wind facility addition were mentioned in the summary of that case. Local area bus voltage conditions and facility loadings were further analyzed in the local area contingency analysis in Section 5.2. The full ACCC output files and screened ACCC output files are located in Appendix I.

2009 Summer Peak

Seven overloaded transmission facilities were discovered in the single element ACCC analysis of the 2009 SUPK base case. Only a single overload was negatively impacted by the wind generation addition and off-system generation dispatch. With the 30 MW wind facility, the Canaday 230/115kV transformer overloaded to 107.9% of Rate A for the loss of Crooked Creek – Riverdale 230kV. The impact due to the facility addition was 0.7 MVA or 2.3% DF. The overload is less than emergency limits and the impact due to the facility addition is less than 1 MW.

The multiple element ACCC analysis revealed three contingencies which loaded facilities above normal ratings. Only one facility was impacted by greater than 2.0%. The wind facility impact on the Canaday 230/115 kV transformer overload was 0.6 MVA or 2.0%

DF, but the overload did not exceed emergency limits and may not be an issue. Existing NPPD operating procedures can address this overload in the event of the loss of the Crooked Creek - Riverdale 230 kV line or loss of the Riverdale 230kV bus by either increasing Canaday generation or removing the Canaday 230/115 kV transformer from service. However, mitigation may be required to reduce the impact of OFWB on this facility overload. This issue will be addressed in the load delivery study.

The local area independent N-2 ACCC analysis of the 2009 Summer Peak case did not reveal any facility loadings greater than normal limits. Several N-2 contingencies which resulted in voltage collapse in the base case were significantly improved by the addition of the wind generation. Table 5-1 below summarizes the ACCC results of the 2009 Summer Peak case.

Table 5-1. ACCC Results – 2009 Summer Peak

		Base	30 MW OFWB Wind		
N-1 Contingency	**Overloaded Facility**	**% Rate A**	**% Rate A**	**D.F. MVA**	**% D.F.**
Grand Island T2 345/230kV Trf.	Grand Island T1 345/230kV Trf.	111.1	110.8	-0.8	-2.7
Grand Island T1 345/230kV Trf.	Grand Island T2 345/230kV Trf.	111.0	110.6	-0.8	-2.7
North Platte T9 230/115kV Trf.	North Platte T8 230/115kV Trf.	104.4	103.3	-2.0	-6.7
North Platte T8 230/115kV Trf.	North Platte T9 230/115kV Trf.	104.0	102.9	-2.1	-7.0
Crooked Creek - Riverdale 230 kV	Canaday 230/115 kV Trf.	107.2	107.9	0.7	**2.3**
Keystone – Ogallala 115 kV	Ogallala 230/115 kV Trf.	100.3	100.1	-0.3	-1.0
Humboldt - S1280 161 kV	OPPD S1263 161/69 kV Trf.	104.0	103.9	0.0	0.0
NPPD Area - Multiple Element Contingencies					
Grand Island - McCool 345 kV & Grand Island T1 345/230 kV Trf.	Grand Island T2 345/230 kV Trf.	143.3	143.5	0.4	1.3
Riverdale 230kV bus	Canaday 230/115 kV Trf.	109.9	110.5	0.6	**2.0**
Humboldt – Sub 1280 161 kV & Humboldt – Kelly 161 kV	OPPD Sub 1263 161/69 kV Trf.	111.5	111.3	-0.1	-0.3
Local Area - Independent N-2 Contingencies					
- none -	- none -	-	-	-	-

The ACCC analysis of the 2009 Summer Peak case revealed only a single facility overload (Canaday 230/115 kV transformer) that was impacted by the wind farm generation addition by greater than 2.0% DF. The Canaday 230/115 kV transformer overload is within emergency limits and the impact due to the facility addition was less than 1 MW. Existing NPPD operating procedures can address this overload in the event of the loss of the Crooked Creek - Riverdale 230 kV line or loss of the Riverdale 230kV bus by either increasing Canaday generation or removing the Canaday 230/115 kV transformer from service. However, mitigation may be required to address the impact of the OFWB wind project on this facility overload. This issue will be addressed in the load delivery study.

2009 Summer Off-Peak (w/ North – South transfers)

A single overloaded transmission facility was discovered in the single element ACCC analysis of the 2009 SUOP base case. This overload was impacted by the wind generation addition and off-system generation dispatch. With the 30 MW wind facility, the Canaday 230/115kV transformer overloaded to 117.0% of Rate A for the loss of Crooked Creek – Riverdale 230kV. The impact due to the facility addition was 0.7 MVA or 2.3% DF.

The multiple element ACCC analysis revealed four contingencies which loaded facilities above normal ratings. Two contingencies resulted in significantly affected facility overloads. The GGS 345/230 kV T1 transformer overloaded to 111.5% for the loss of GGS – Keystone 345 kV and GGS 345/230 kV T2. The GGS T1 overload was impacted by 3.7 MVA or 12.3% DF, but was less than emergency limits. This overload could be eliminated by reduction in the output of GGS Unit 1 following the stuck breaker contingency at GGS. The North Platte – Stockville 115 kV line overloaded to 103.2% for loss of the GGS 345 kV double circuit (GGS – Sweetwater ckt #2 345 kV and GGS – Red Willow 345 kV). The wind facility impacted this overload by 0.9 MVA or 3.0% DF. This contingency and overload pair is a currently defined MAPP flowgate, WNE_WKS, and flows are restricted to meet operating criteria. OFWB may be limited during excessive transfer conditions due to its impacts on the WNE_WKS flowgate.

The local area independent N-2 ACCC analysis of the 2009 Summer Off-Peak case did not reveal any facility loadings greater than normal limits. Due to the dynamic reactive compensation system, there were no bus voltage conditions which were negatively impacted by the wind facility. Table 5-2 below summarizes the ACCC results of the 2009 Summer Off-Peak case.

Table 5-2. ACCC Results – 2009 Summer Off-Peak (w/ North – South transfers)

N-1 Contingency	Overloaded Facility	Base	30 MW OFWB Wind		
		% Rate A	% Rate A	D.F. MVA	% D.F.
Crooked Creek - Riverdale 230 kV	Canaday 230/115 kV Trf.	116.3	117.0	0.7	**2.3**
NPPD Area - Multiple Element Contingencies					
Grand Island - McCool 345 kV & Grand Island T1 345/230 kV Trf.	Grand Island T2 345/230 kV Trf.	143.9	144.1	0.4	1.3
Riverdale 230kV bus	Canaday 230/115 kV Trf.	115.8	116.1	0.3	1.0
GGS - Sweetwater 345 kV #2 &	N.Platte - Stockville 115 kV	102.5	103.2	0.9	**3.0**
GGS - Red Willow 345 kV Dbl Ckt	N.Platte 230/115kV T8	100.0	99.6	-0.9	-3.0
GGS - Keystone 345 kV GGS 345/230kV T2	GGS 345/230kV T1	110.4	111.5	3.7	**12.3**
Local Area - Independent N-2 Contingencies					
- none -	- none -	-	-	-	-

The ACCC analysis of the 2009 Summer Off-Peak case revealed three facility overloads that were impacted by the wind facility generation addition greater than 2.0%. All facility overloads were within emergency limits. Existing operating procedures are in place to address the post-contingency loadings of these facilities. However, mitigation may be required to address the impact of the OFWB wind project on these facility overloads. This issue will be addressed in the load delivery study.

2009 Winter Peak (w/ South – North transfers)

Nine overloaded transmission facilities were discovered in the single element ACCC analysis of the 2009 WIPK base case. Only a single overload was significantly impacted by the wind generation addition. With the wind facility, the Canaday 230/115kV transformer overloaded to 113.5% of Rate A for the loss of Crooked Creek – Riverdale 230kV. The impact due to the facility addition was 0.6 MVA or 2.0% DF. A single bus voltage condition was discovered at the Rapid City 230 kV bus for the loss of the Stegall 345/230 kV transformer which was above 1.05 pu (1.057 pu). The impact due to the wind facility was 0.013 pu. Local capacitor banks at the Rapid City 230kV bus are online in this case and could be deenergized to reduce the 230kV bus voltage to below 1.05 pu.

The multiple element ACCC analysis revealed three contingencies which loaded facilities above normal ratings. One contingency resulted in a significantly affected facility overload. The Canaday 230/115 kV transformer overload was 111.5% with the wind facility addition resulting in an impact of 0.7 MVA or 2.3% DF. The Canaday transformer overload did not exceed emergency limits and should not be an issue. Existing operating procedures are in place to address the loading on this facility. However, mitigation may be required to address the impact of the OFWB wind project on this facility overload. This issue will be addressed in the load delivery study.

The local area independent N-2 ACCC analysis of the 2009 Summer Off-Peak case revealed three contingencies which loaded facilities above normal ratings. Each of these contingencies resulted in bus voltages that were below 95% in the base case and were significantly improved by the wind generation addition. No facility overloads were significantly impacted by the wind facility. Table 5-3 below summarizes the ACCC results of the 2009 Winter Peak case.

Table 5-3. ACCC Results – 2009 Winter Peak (w/ South – North transfers)

N-1 Contingency	Overloaded Facility	Base	30 MW OFWB Wind		
		% Rate A	% Rate A	D.F. MVA	% D.F.
Bison - Maurine 230 kV	Antelope - Char.Ck 345 kV	137.0	136.9	-0.3	-1.0
Crooked Creek - Riverdale 230 kV	Canaday 230/115 kV Trf.	112.9	113.5	0.6	**2.0**
Wayside - Stegall 230 kV	Victory Hill 230/115 kV Trf.	118.1	117.2	-1.6	-5.3
Humboldt 161/69 kV Trf.	OPPD S1263 161/69 kV Trf.	133.4	133.1	-0.2	-0.7
Stegall 345/230kV Trf.	Big Springs - Blue Creek 115 kV	104.7	103.5	-1.4	-4.7
	Blue Creek - Wild Horse 115 kV	100.5	*99.3*	-1.4	-4.7
	Wild Horse - Covalt 115 kV	100.4	*99.1*	-1.5	-5.0
	Covalt - Lynn 115 kV	*99.5*	*98.1*	-1.6	-5.3
	Lynn - Snake Creek 115 kV	124.0	122.4	-1.6	-5.3
NPPD Area - Multiple Element Contingencies					
Grand Island - McCool 345 kV & Grand Island T1 345/230 kV Trf.	Antelope - Char.Ck 345 kV	117.1	116.6	-1.2	-4.0
Riverdale 230kV bus	Canaday 230/115 kV Trf.	110.8	111.5	0.7	**2.3**
Humboldt – Sub 1280 161 kV & Humboldt – Kelly 161 kV	OPPD Sub 1263 161/69 kV Trf.	130.5	130.3	-0.1	-0.3
Local Area - Independent N-2 Contingencies					
Ainsworth - Valentine 115 kV Gregory - Winner 115 kV *	Antelope - Char.Ck 345 kV	118.9	117.1	-4.3	-14.3
	Martin - Vetal Tap 115 kV	115.1	*36.2*	-63.2	-210.7
	Mission - Vetal Tap 115 kV	114.6	*34.4*	-64.1	-213.7
Ainsworth - Valentine 115 kV Martin - Vetal Tap 115 kV *	Ft. Randall - Bonesteel 115 kV	179.2	*80.8*	-59.0	-196.7
	Bonesteel - Gregory 115 kV	173.9	*75.0*	-59.3	-197.7
	Gregory - Winner 115 kV	139.5	*47.6*	-55.1	-183.7
St. Francis - Mission 115 kV Bonesteel - Ft. Randall 115 kV *	Mission - Whitten 115 kV	103.8	104.0	0.1	0.3
	Martin - Vetal Tap 115 kV	102.1	102.2	0.1	0.3
	Mission - Vetal Tap 115 kV	101.7	101.8	0.2	0.7

**Voltage Collapse in base case*

This ACCC analysis discovered a single facility overload that was significantly impacted by the wind facility. The Canaday 230/115 kV transformer overload is within emergency limits and may not be an issue. Existing NPPD operating procedures can address this overload in the event of the loss of the Crooked Creek - Riverdale 230 kV line or loss of the Riverdale 230kV bus by either increasing Canaday generation or removing the Canaday 230/115 kV transformer from service. However, mitigation may be required to address the impact of the OFWB wind project on this facility overload. This issue will be addressed in the load delivery study.

ACCC Summary

The results of the ACCC analysis did not reveal any facility overloads which would require system improvements due to the 30 MW wind generation addition interconnected at the St. Francis 115 kV substation. All facility overloads that were significantly impacted by the wind generation addition were within emergency limits and existing operating procedures are in place to address the overloads. However, the OFWB wind facility did significantly impact facility overloads and mitigation may be required on a pro rata basis. As such, OFWB generation limitations may be required on a post-contingency basis to address the impact of the wind project on the facility overloads identified in the study. This issue will be addressed in the load delivery study.

There were no bus voltages conditions which would require system improvements due to the wind generation addition. The OFWB wind facility did impact a high bus voltage condition at the Rapid City DC 230kV bus, but adjusting local area switched shunts addressed the issue. Further analysis of the local area bus voltages near the St. Francis 115 kV substation is in the local area contingency analysis section below or Section 5.2.

5.2 Local Area Contingency Analysis

Local area contingencies were evaluated to determine the worst-case N-1 & N-2 contingencies with the wind facility. Full AC loadflow solutions were utilized to analyze system conditions following each of the contingencies that were screened in this portion of the study. The following table, Table 5-4, summarizes the contingencies evaluated in this analysis.

Table 5-4. Local Area Contingencies

N-1 Contingencies
St. Francis – Mission 115 kV
St. Francis – Harmony 115 kV
Ainsworth – Stuart 115 kV
Ainsworth Wind – Calamus 115 kV
Ft. Randall – Bonesteel 115 kV
Mission – Whitten 115 kV
Mission – Vetal Tap 115 kV
Ft. Randall – Bonesteel 115 kV
Independent N-2 Contingencies
Mission – St. Francis 115 kV and Ainsworth – Stuart 115 kV
Ainsworth – Stuart 115 kV and Ainsworth Wind – Calamus 115 kV
Mission – St. Francis 115 kV and Ainsworth Wind – Calamus 115 kV
North Platte – Maxwell 115 kV and Broken Bow – Callaway 115 kV

Voltage criteria violations or transmission facility overloads were identified using PSS/E activities, VCHK and RATE, respectively. Each of the contingencies in Table 5-4 were simulated on all cases with the 30 MW wind facility. Any identified criteria violations (voltage and thermal) were recorded and evaluated. Powerflow one-line diagrams for system intact and post-contingent system conditions are located in Appendix II.

No overloaded transmission facilities or voltage criteria violations were discovered as a result of this analysis. The OFWB wind facility coupled with the dynamic reactive compensation system provided additional source strength to the area. The OFWB wind facility absorbed MVAR's in each of the three base cases to hold the 115 kV system voltage at 1.03 pu. The dynamic reactive compensation system was required to both absorb and provide MVAR's on a post-contingency basis to control the 115 kV system voltage within criteria limits. Further discussion with regards to the dynamic reactive compensation system is contained in Section 5.3.

5.3 Dynamic Reactive Compensation

This system impact study was conducted under the assumption that the proposed wind generation facility will include a dynamic reactive compensation system that can both provide and absorb MVAR's (–0.90 to +0.95 power factor) on a continuously active basis at the point of interconnection at the St. Francis 115 kV substation. Voltage fluctuation is a great concern in the north central Nebraska and southern South Dakota area due to long 115 kV transmission lines and relatively small amounts of local load. Several switched

shunt devices are currently utilized to control transmission voltages to within voltage criteria limits.

NPPD is constructing a wind energy facility south of Ainsworth, Nebraska, which requires a dynamic reactive compensation system to control system voltages in the area. This wind facility is electrically near the St. Francis 115 kV substation (OFWB wind facility interconnection) and the results of the local area contingency analysis show that both facilities behave similarly with respect to dynamic reactive compensation. Both facilities absorb MVAR's during the system intact conditions studied and may be required to absorb or provide MVAR's on a post-contingency basis to control system voltages with voltage criteria limits. Without dynamic reactive compensation, the system voltages in the area would exceed normal voltage criteria limits and could not be controlled to meet system voltage criteria. System voltages would also change dramatically with slight changes in the wind speed at St. Francis or Ainsworth. Without dynamic reactive compensation, the system would be at risk of violating voltage criteria limits and system operating parameters. Utilization of the local area capacitor banks and reactors alone would not be adequate to control the rapidly changing system voltages without dynamic reactive compensation.

As such, a dynamic reactive compensation system would be required with the OFWB wind turbine generators to provide adequate control of the transmission system voltage in the area. The dynamic reactive compensation system should have a power factor range of –0.90 (absorbing MVAR's) to +0.95 (providing MVAR's) and have the ability to constantly adjust to changing system conditions and wind generation output. The dynamic reactive compensation system should be able to continuously regulate the system voltage at the point of interconnection.

6.0 Regional Constrained Path Analysis

Distribution Factor (PTDF and OTDF) calculations were performed to examine the incremental impacts of the 30 MW OFWB wind facility on currently defined constrained interfaces in the MAPP evaluation process. Pursuant to MAPP Design Review Subcommittee policy, two separate generation dispatch scenarios were analyzed (GEN to GEN and GEN to LOAD). Both generation and load scaling were utilized to effect the 30 MW transfer of wind generation to different points of delivery. In order to approximate the impact of the OFWB wind facility on regional constrained interfaces, the following six point of delivery dispatch scenarios were evaluated:

1)	NPPD	30 MW
2)	OPPD	30 MW
3)	LES	30 MW
4)	WAPA	30 MW
5)	XCEL	30 MW
6)	Equal Shares (1-5)	30 MW (5 X 6 MW)

The following sections detail the results for the six separate dispatch scenarios. Any PTDF impacts greater than 5.0% (3% OTDF) and greater than 1 MW are considered significantly impacted and may require mitigation if Available Transmission Capacity (ATC) is unavailable. A PTDF impact of 5.0% due to the 30 MW wind facility is 1.5 MW. Table 6-7, located in Section 6.7, summarizes the results of all dispatch scenarios evaluated. The DFCALC output files are located in Appendix III.

6.1 NPPD

This generation dispatch scenario assumes that 30 MW will be dispatched to entities within the NPPD control area. The following table, Table 6-1, summarizes the DF impacts on constrained interfaces in the MAPP region. Impacts greater than 5% on a PTDF interface or 3% on an OTDF interface are considered significant.

Table 6-1. NPPD Dispatch Impacts

Type	Interface	NPPD	
		Gen-Gen	Gen-Load
PTDF	COOPER_S	-6.2	-3.6
	FTCAL_S	**14.2**	**7.2**
	GGS	-31.4	**5.4**
	GRIS_LNC	-6.7	-6.9
	WNE_WKS	-4.4	1.8
	MWSI	**5.5**	3.4
OTDF	S1226TEKAMAH	-5.5	-1.5

The results of this analysis indicate that three defined constrained interfaces in the MAPP region were significantly impacted by the wind facility addition. The FTCAL_S, GGS, and MWSI Interfaces were impacted by greater than 5.0%.

Further analysis of the OFWB wind facility delivery impacts will be required as part of the facilities study once the specific participants and delivery points are known.

6.2 OPPD

This generation dispatch scenario assumes that 30 MW will be dispatched to entities within the OPPD control area. The following table, Table 6-2, summarizes the DF impacts on constrained interfaces in the MAPP region. Impacts greater than 5% on a PTDF interface or 3% on an OTDF interface are considered significant.

Table 6-2. OPPD Dispatch Impact

Type	Interface	OPPD	
		Gen-Gen	Gen-Load
PTDF	COOPER_S	-8.5	-6.9
	FTCAL_S	**8.1**	**17.9**
	GGS	**13.1**	**13.1**
	GRIS_LNC	**27.1**	**27.1**
	MNTZUMA_W	4.7	**5.0**
	MWSI	**6.2**	**6.0**
	WNE_WKS	4.8	4.6
OTDF	S1226TEKAMAH	-10.4	-11.0

The results of this analysis indicate that five defined constrained interfaces in the MAPP region were significantly impacted by the wind facility addition. The FTCAL_S, GGS, GRIS_LNC, MNTZUMA_W and MWSI Interfaces were impacted by greater than 5.0%.

Further analysis of the OFWB wind facility delivery impacts will be required as part of the facilities study once the specific participants and delivery points are known.

6.3 LES

This generation dispatch scenario assumes that 30 MW will be dispatched to entities within the LES control area. The following table, Table 6-3, summarizes the DF impacts on constrained interfaces in the MAPP region. Impacts greater than 5% on a PTDF interface or 3% on an OTDF interface are considered significant.

Table 6-3. LES Dispatch Impact

Type	Interface	LES	
		Gen-Gen	Gen-Load
PTDF	COOPER_S	-8.4	-9.1
	FTCAL_S	**20.9**	**20.7**
	GGS	**13.9**	**13.8**
	GRIS_LNC	**31.7**	**31.8**
	MWSI	**5.6**	**5.6**
	WNE_WKS	3.1	2.8
OTDF	S1226TEKAMAH	-8.3	-8.2

The results of this analysis indicate that four defined constrained interfaces in the MAPP region were significantly impacted by the wind facility addition. The FTCAL_S, GGS, GRIS_LNC, and MWSI Interfaces were impacted by greater than 5.0%.

Further analysis of the OFWB wind facility delivery impacts will be required as part of the facilities study once the specific participants and delivery points are known.

6.4 WAPA

This generation dispatch scenario assumes that 30 MW will be dispatched to entities within the WAPA control area. The following table, Table 6-4, summarizes the DF impacts on constrained interfaces in the MAPP region. Impacts greater than 5% on a PTDF interface or 3% on an OTDF interface are considered significant.

Table 6-4. WAPA Dispatch Impact

Type	Interface	WAPA	
		Gen-Gen	Gen-Load
PTDF	COOPER_S	4.8	3.2
	FTCAL_S	0.3	-2.0
	GGS	0.4	4.7
	GRIS_LNC	**6.5**	**10.2**
	NDEX	-46.4	-37.2
	WNE_WKS	2.4	3.1
OTDF	S1226TEKAMAH	-0.4	0.5

The results of this analysis indicate that one defined constrained interface in the MAPP region was significantly impacted by the wind facility addition. The GRIS_LNC Interfaces was impacted by greater than 5.0%.

Further analysis of the OFWB wind facility delivery impacts will be required as part of the facilities study once the specific participants and delivery points are known.

6.5 XCEL

This generation dispatch scenario assumes that 30 MW will be dispatched to entities within the XCEL control area. The following table, Table 6-5, summarizes the DF impacts on constrained interfaces in the MAPP region. Impacts greater than 5% on a PTDF interface or 3% on an OTDF interface are considered significant.

Table 6-5. XCEL Dispatch Impact

Type	Interface	XCEL	
		Gen-Gen	Gen-Load
PTDF	COOPER_S	**6.3**	**5.2**
	FTCAL_S	-1.5	-2.1
	GGS	**11.1**	**11.0**
	GRIS_LNC	**17.7**	**17.6**
	MWSI	-26.7	-23.2
	PRI-BYN	-17.4	-13.7
	WNE_WKS	**5.3**	**5.1**
OTDF	LKFFOXLKGWLM	**7.9**	**8.3**
	S1226TEKAMAH	-0.1	0.1
	SPETRILAKRAU	**5.0**	4.5

The results of this analysis indicate that six defined constrained interfaces in the MAPP region were significantly impacted by the wind facility addition. The COOPER_S, GGS, GRIS_LNC, WNE_WKS, LKFFOXLKGWLM and SPETRILAKRAU Interfaces were impacted by greater than 5.0%.

Further analysis of the OFWB wind facility delivery impacts will be required as part of the facilities study once the specific participants and delivery points are known.

6.6 Equal Shares

This generation dispatch scenario assumes that 30 MW will be dispatched in equal shares (6 MW) to the NPPD, OPPD, LES, WAPA, and XCEL control areas. The following table, Table 6-6, summarizes the DF impacts on constrained interfaces in the MAPP region. Impacts greater than 5% on a PTDF interface or 3% on an OTDF interface are considered significant.

Table 6-6. Equal Shares Dispatch Impact

Type	Interface	Equal Shares	
		Gen-Gen	Gen-Load
PTDF	COOPER_S	-2.1	-1.8
	FTCAL_S	**8.5**	**8.6**
	GGS	1.4	**9.7**
	GRIS_LNC	**15.3**	**16.0**
	WNE_WKS	2.3	3.6
OTDF	LKFFOXLKGWLM	2.0	2.0
	S1226TEKAMAH	-4.9	-4.0

The results of this analysis indicate that three defined constrained interfaces in the MAPP region were significantly impacted by the wind facility addition. The FTCAL_S, GGS, and GRIS_LNC Interfaces were impacted by greater than 5.0%.

Further analysis of the OFWB wind facility delivery impacts will be required as part of the facilities study once the specific participants and delivery points are known.

6.7 All Dispatch Scenarios Summary

The following table, Table 6-7, summarizes the DF impacts on constrained interfaces in the MAPP evaluation process for all dispatch scenarios analyzed in this study. Further analysis of the OFWB wind facility delivery impacts will be required as part of the facilities study once the specific participants and delivery points are known.

Table 6-7. All Dispatch Scenarios Summary

Type	Interface	NPPD		OPPD		LES		WAPA		XCEL		Equal Shares	
		Gen-Gen	Gen-Load	Gen-Gen	Gen-Load	Gen-Gen	Gen-Load	Gen-Gen	Gen-Load	Gen-Gen	Gen-Load	Gen-Gen	Gen-Load
PTDF	COOPER_S	-6.2	-3.6	-8.5	-6.9	-8.4	-9.1	4.8	3.2	**6.3**	**5.2**	-2.1	-1.8
	ECL-ARP	2.3	1.2	2.2	2.0	2.0	2.0	-0.1	-1.0	-9.3	-9.4	-0.4	-0.8
	FTCAL_S	**14.2**	**7.2**	**8.1**	**17.9**	**20.9**	**20.7**	0.3	-2.0	-1.5	-2.1	**8.5**	**8.6**
	GGS	-31.4	**5.4**	**13.1**	**13.1**	**13.9**	**13.8**	0.4	4.7	**11.1**	**11.0**	1.4	**9.7**
	GRIS_LNC	-6.7	-6.9	**27.1**	**27.1**	**31.7**	**31.8**	**6.5**	**10.2**	**17.7**	**17.6**	**15.3**	**16.0**
	LKM-WFB	0.1	0.1	0.2	0.2	0.2	0.2	-0.2	-0.2	-1.8	-1.7	-0.3	-0.3
	MHEX_N	-0.5	-0.5	-0.9	-0.8	-0.7	-0.8	-0.4	-0.4	-0.9	-1.0	-1.1	-1.1
	MHEX_S	0.5	0.5	0.9	0.9	0.7	0.8	0.4	0.4	1.0	1.0	1.2	1.2
	MH_SPC_E	0.9	0.8	1.2	1.2	1.1	1.0	0.2	0.3	0.3	0.3	0.9	0.9
	MH_SPC_W	-1.0	-0.8	-1.2	-1.2	-1.1	-1.1	-0.2	-0.3	-0.3	-0.3	-0.9	-0.9
	MNTZUMA_W	1.1	2.1	4.7	**5.0**	3.9	3.9	-3.2	-2.6	-8.5	-8.3	-0.6	0.0
	MWSI	**5.5**	3.4	**6.2**	**6.0**	**5.6**	**5.6**	-1.9	-3.2	-26.7	-23.2	-1.9	-1.9
	NDDC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NDEX	-1.1	-1.0	-1.9	-1.8	-1.7	-1.6	-46.4	-37.2	-2.0	-1.6	-10.7	-8.8
	PRI-BYN	3.2	2.2	4.0	4.0	3.6	3.6	-1.8	-2.3	-17.4	-13.7	-1.5	-1.1
	QUADCITY_W	0.3	1.0	1.7	2.0	1.9	1.6	-2.3	-1.6	-3.5	-3.1	-0.8	0.1
	WNE_WKS	-4.4	1.8	4.8	4.6	3.1	2.8	2.4	3.1	**5.3**	**5.1**	2.3	3.6
	Y2DC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTDF	ARNVINARNHAZ	-0.8	-0.3	-0.7	-0.5	-0.6	-0.5	-0.2	0.2	1.9	2.1	-0.1	0.1
	DAVCALQUARCK	-0.6	0.0	-0.4	0.1	-0.2	-0.3	-0.1	0.5	0.9	1.7	0.0	0.3
	LACWGRLACSTI	0.8	0.8	2.0	1.9	1.9	2.1	-1.1	-0.7	-0.8	-0.6	0.3	0.6
	LKFFOXLKGWLM	0.6	0.1	0.3	0.3	0.4	0.3	1.3	0.9	**7.9**	**8.3**	2.0	2.0
	LORTRKWEMPAD	-0.1	-0.1	-0.5	-0.2	-0.5	-0.6	0.2	0.6	2.4	2.7	0.1	0.3
	POWREAMTZBON	0.2	0.6	1.2	1.5	1.1	1.1	-1.1	-0.8	-2.5	-2.4	-0.3	0.1
	S1226TEKAMAH	-5.5	-1.5	-10.4	-11.0	-8.3	-8.2	-0.4	0.5	-0.1	0.1	-4.9	-4.0
	SALXFMWEMPAD	-1.7	-1.3	-0.9	-1.1	-0.3	-0.2	0.1	-0.1	1.0	1.6	0.0	-0.1
	SPETRILAKRAU	-1.2	-0.9	-1.6	-2.2	-1.6	-1.0	1.6	0.9	**5.0**	4.5	0.6	-0.1

7.0 Transmission System Protection Analysis

7.1 Fault Current Analysis

The fault current analysis was performed to evaluate fault currents at several substations electrically close to the St. Francis 115 kV substation following the interconnection of the OFWB wind facility. Both three phase and single line to ground bus faults were evaluated in this analysis.

This analysis was conducted using an Aspen One-Liner short circuit model developed by Nebraska Public Power District. The OFWB wind facility was modeled using typical synchronous generator models to simulate ride through capability of modern wind turbine generators. Twenty 1.5 MW wind turbines were modeled with two 4.5 mile 34.5 kV feeders extending from the 115 kV transmission interconnection. A 56 MVA 115/34.5 kV transformer was also modeled with typical data to interconnect the 34.5 kV collector bus to the 115 kV transmission system at St. Francis.

The results of the fault current analysis is summarized in Table 7-1 below. The cases with and without the 30 MW wind facility were compared to assess the impacts due to the addition. The largest impacts on fault current were discovered at St. Francis, Mission, Harmony and Valentine.

Table 7-1. Fault Current Analysis Results

	Base Case w/ 75 MW Ainsworth Wind		Change Case w/ 30 MW OFWB		Change	
Sub Name	3ph Apri	L-G Apri	3ph Apri	L-G Apri	3ph Apri	L-G Apri
Ainsworth 115kV	2670	2787	2755	2851	+85	+64
Atkinson 115kV	2431	1854	2452	1862	+21	+8
Calamus 115kV	2182	1774	2214	1789	+32	+15
Clearwater 115kV	3703	2894	3709	2896	+6	+2
Cody 115kV	854	665	897	692	+43	+27
Emmet 115kV	2684	2087	2703	2095	+19	+8
Ft Randall 115kV	9982	10770	10032	10812	+50	+42
Harmony 115kV	1661	1637	1866	1891	+205	+254
Maxwell 115kV	5347	3979	5352	3981	+5	+2
Mission 115kV	2116	1730	2403	2109	+287	+379
Neligh 115kV	5056	4576	5060	4580	+4	+4
O'Neill 115kV	3452	2953	3470	2962	+18	+9
Spencer 115kV	4166	3221	4181	3227	+15	+6
Stuart 115kV	2271	1731	2296	1741	+25	+10
St. Francis 115kV	1772	1488	2198	2288	+426	+800
Thedford 115kV	1994	1513	2007	1518	+13	+5
Valentine 115kV	1675	1774	1853	1978	+178	+204
Ainsworth Wind 115kV	2732	2836	2801	2885	+69	+49

7.2 Protection Scheme Analysis

Existing protection at the Mission and Valentine 115kV subs is electromechanical KD phase distance three zones forward relaying and one ground over-current relay. Mission to St. Francis L1091A is 19.4 miles while Valentine to Harmony to St. Francis L1091BC is 32.02 miles long. Placing a 56MVA 115/34.5kV transformer at St. Francis will allow the distance relaying at Mission and Valentine to see the low side 34.5kV faults at St. Francis.

Setting Mission zone 2 relaying (0.33s trip time) reach to minimum setting of 115% of line to Valentine allows the St. Francis 34.5kV transformer bus to be just outside of relaying reach by a small margin. The 34.5kV bus is approximately 109% of the zone 2 reach. Unfortunately, in feed from the wind farm does not allow Mission zone 2 reach to see Valentine 115kV bus at this setting. Zone 2 reach must be set to 115% of apparent impedance to Valentine. This setting allows Mission zone 2 to easily see the 34.5kV bus at St. Francis and is not desirable. Mission zone 2 trips after 0.33s and would be acceptable trip coordination time as long as there is differential tripping on the 34.5kV bus and instantaneous tripping on the feeders. If there is instantaneous cutout on the feeders or a bank secondary time over current backup relay there is a possibility of mis-coordination with zone 2 relaying.

If L1091C at Valentine is taken out of service then Mission zone 2 reach sees further onto the 34.5kV system and coordination concerns increase. In addition, the 34.5kV bus would be just outside the reach of the Mission zone 1 instantaneous tripping protection. Existing Zone 1 is set to see 90% of line to Valentine so the St. Francis 34.5kV bus is approximately 105.5% of the Mission zone 1 reach. This means there could be a race between the transformer 34.5kV differential or instantaneous feeder protection and the Mission 115kV line relaying protection. The line relaying could trip and re-close into a 56 MVA transformer or 34.5kV fault and is not desirable. Zone 1 reach from Mission may also cover less of the line to Valentine with instantaneous tripping when there is wind farm in-feed during faults. This cannot be compensated for since zone 1 must never see the far end 115kV Valentine bus. A breaker and line relaying at St. Francis for the line to Mission would be the preferred option to eliminate these concerns.

The line relaying at the Valentine sub has similar issues for a 56 MVA transformer at St. Francis. Zone 2 reach from Valentine must be set to 115% of apparent impedance to Mission due to wind farm in feed. This zone 2 setting will see the wind farm 34.5kV bus if L1090A is out of service at Mission. In this case the same concerns apply as above and is not desirable.

After a new breaker is placed on the line at St. Francis to Mission it would be logical to also place a new breaker at St. Francis for the line to Valentine. This would eliminate issues with tripping in a single breaker/circuit switcher scheme and blinking the wind farm for faults on the line to Valentine. Breakers at St. Francis would also allow coordination time between the primary fuse on the existing St. Francis 115/24.9kV transformer and the Mission and Valentine 115kV line relaying.

Limited fault and outage data is available in this area. A new wind farm would introduce new issues and increase the need for fault and outage data. New line panels at Mission and Valentine subs would improve fault and outage information for the transmission system and wind farm.

The recommendation is to place breakers and line relaying panels at St. Francis and also replace line-relaying panels at Mission and Valentine. Breaker and equipment ratings may also need to be reviewed in the area depending on final wind farm size.

8.0 Transmission Interconnection Plan

This study evaluated the interconnection of a 30 MW wind facility at the St. Francis 115 kV substation on the Rosebud Sioux Tribe Reservation in southern South Dakota. This plan did NOT address the load delivery or transmission service aspects of transferring power from the wind facility. The transmission interconnection plan ONLY addressed the interconnection of the 30 MW wind facility at the St. Francis 115 kV substation. Load delivery and transmission service would require further study and detailed evaluation to meet regional requirements.

The results of the technical analysis of the interconnection show that a dynamic reactive compensation system that can absorb and provide MVAR's (–0.90 to +0.95 power factor) on a continuously active basis at the point of interconnection would be required to control the transmission system voltages in the area.

The ACCC analysis revealed that the OFWB wind facility significantly impacted facility overloads of the Canaday 230/115 kV transformer and mitigation may be required on a pro rata basis. As such, OFWB generation limitations may be required on a post-contingency basis to address the impact of the wind project on the Canaday 230/115 kV transformer overload.

The transmission system protection analysis revealed that two 115 kV circuit breakers would be required at the St. Francis 115 kV substation to adequately protect the transmission system following the addition of the 30 MW OFWB wind facility. Also line panels at Mission and Valentine would need replaced to accommodate the reliable interconnection of the 30 MW wind facility.

The interconnection of the 30 MW wind facility at St. Francis would also require additional transformer capacity to interconnect to the 115 kV transmission system. In order to supply the full MVA output of the wind facility to the 115 kV grid, at least 35 MVA of transformation capacity must be available.

Interconnection metering and Remote Terminal Unit (RTU) must also be installed to monitor system conditions via NPPD's EMS / SCADA system in accordance with the NPPD Facility Connection Requirements.

The transmission facilities required for interconnection at the St. Francis 115 kV substation are listed below. The transmission facilities listed are those required for interconnection of the wind facility at St. Francis and do NOT address the load delivery aspects of the project. A rough cost estimate for the transmission interconnection plan is provided in Appendix IV.

Owl Feather War Bonnet Wind Facility Interconnection Plan

St. Francis 115 kV substation

- Dynamic Reactive Compensation System*
- Two 115 kV Power Circuit Breakers (PCB)
- Two 34.5 kV PCB's
- Four 115 kV PCB Disconnects
- Expand 115 kV substation to accommodate PCB's & transformer
- Additional transformation capacity of at least 35 MVA
- Remote Terminal Unit (RTU)
- Interconnection Metering

Mission 115 kV substation

- Replace Line-Relaying Panel on 1091A to St. Francis

Valentine 115 kV substation

- Replace Line-Relaying Panel on 1091C to Harmony

**Assumed to be incorporated into wind facility design. Either substation-based or turbine-based dynamic reactive compensation system would be adequate.*

9.0 Conclusions

This study evaluated the interconnection of the proposed 30 MW Owl Feather War Bonnet (OFWB) Wind Project at the St. Francis 115 kV substation on the Rosebud Sioux Tribe Reservation in southern South Dakota. Voltage fluctuation is a great concern in this area, due to weak system conditions, relatively small amounts of local load and long 115kV transmission lines. The need for a dynamic reactive compensation system at the OFWB wind facility was identified and would be required for interconnection at the St. Francis 115 kV substation. The dynamic reactive power range of –14 MVAR to +9 MVAR (–0.90 to 0.95 power factor) was utilized in this study to maintain voltage criteria with the interconnection of the 30 MW OFWB wind facility.

The results of the ACCC analysis did not reveal any facility overloads which would require system improvements due to the 30 MW wind generation addition interconnected at the St. Francis 115 kV substation. All facility overloads that were significantly impacted by the wind generation addition were within emergency limits and existing operating procedures are in place to address the overloads. However, the OFWB wind facility did significantly impact facility overloads and mitigation may be required to reduce the impact due to the wind facility. This issue will be further addressed in the load delivery study. There were no post-contingency bus voltage conditions discovered which would require system improvements due to the wind generation addition.

Further steady-state analysis was performed to evaluate single element and double element worst-case contingencies near the St. Francis interconnection. No overloaded transmission facilities or voltage criteria violations were discovered as a result of this local area contingency analysis with the wind facility and dynamic reactive compensation system.

The points of delivery for energy produced at the OFWB wind facility are unknown at this time. Each participant or point of delivery must be identified in order to properly evaluate the impacts and delivery issues on regional constrained interfaces with the OFWB wind facility. This study evaluated the impacts of several participants based on the customer's request. Section 6.0 documents the results of this analysis and describes the interfaces which could be impacted for each potential participant. Further analysis of the OFWB wind facility delivery impacts will be required as part of the facilities study once the specific participants and points of delivery are known.

A transmission system protection analysis was performed to evaluate fault currents and protection schemes following the addition of the OFWB wind facility. The fault current analysis did not reveal any equipment that was over the fault current rating and significantly impacted by the project. The system protection analysis did reveal the need for two 115 kV breakers at St. Francis and line panel replacements at the Mission and Valentine 115 kV substations.

The interconnection transmission facilities plan was developed for the 30 MW OFWB wind facility which included a dynamic reactive compensation system and substation facilities required to accommodate the interconnection at the St. Francis 115 kV substation. A detailed description of transmission interconnection plan is located in Section 8.0. This plan did NOT address the load delivery or transmission service aspects of transferring power from the wind facility. The transmission interconnection plan ONLY addressed the interconnection of the 30 MW wind facility at the St. Francis 115 kV substation. Load delivery and transmission service would require further study and detailed evaluation to meet regional requirements.

This study demonstrates that the implementation of the initial 30 MW OFWB wind facility transmission interconnection plan would provide adequate generation outlet transmission capacity under various system intact and contingency conditions. Further steady-state analysis, stability analysis and fault duty review would need to be performed for the load delivery study once the participants of the wind facility are known.

Owl Feather War Bonnet Wind Farm
Rosebud Sioux Tribe
DOE Grant DE-FC36-030GO13122

Attachment E

Roger Freeman's Letter

▫ Ferriter Scobbo & Rodophele PC ▫

ATTORNEYS AT LAW

125 High Street, Boston, Massachusetts 02110
Tel: (617) 737-1800 Fax: (617) 737-1803

Honorable Rodney M. Bordeaux, Pres.
Honorable Wayne Boyd, Vice Chairman
Members of the Rosebud Sioux Tribal Council and Administration.

Reference: Owl Feather War Bonnet Wind Farm

Dear President Bordeaux:

I appreciate the opportunity to provide an independent review of the wind farm transaction structure proposed by Disgen. I offer this business advice on an informal basis to assist in your decision making process. It is important to note that while I am a lawyer and the Managing Director of Energy Ventures for Citizens Enterprises Corporation (a for-profit subsidiary of Citizens Energy Corporation), neither Citizens Energy nor Citizens Enterprises is in the business of providing advice on development projects, and they have not been formally engaged to offer advice or consultation in this matter. The views expressed herein are solely my own based on my experience in the wind development business.

I have reviewed the proposed MOU, and quickly reviewed some of the other project documents provided by Ken Haukaas. I have not thoroughly investigated the proposed project or the underlying data or assumptions. Accordingly, my first recommendation is that if you decide to proceed with the project as proposed by Disgen, that you formally engage expert legal counsel and perhaps an independent consultant to advise you in greater depth regarding the complexities of the proposed transaction. I could make some recommendations if that would be helpful to you.

The Memorandum of Understanding (MOU) provided outlines the role that Disgen will play in the development of the Owl Feather War Bonnet Wind Farm. The key elements establish the responsibilities that Disgen will take on, the costs they will incur, and the compensation they will receive in return. Based on my experience and knowledge, the terms proposed by Disgen appear fair and reasonable on their face. The key aspects of the transaction involve Disgen spending development capital with no assurance of repayment. Disgen only recovers their costs if they are successful in developing the project. This includes raising the money from outside investors. While Ken indicated that the tribe has discussed capping the fee reimbursement amount, I suggest that since Disgen only gets to recover their expenses from capital invested by outside investors (and not from the Sioux), then it is more important that the expenses be reasonable and supported by proper documentation. Disgen should recover all expenses reasonably incurred. If you wanted to set a cap, you might put it at no more than the development fee.

The amount of the development fee they will receive -- .05% of the project cost – is reasonable. In fact, it is quite low by private development standards. Similarly, the proposed investment banking fee of 1.5% (of funds raised) is low by industry standards. On its face, the transaction as proposed by Disgen seems advantageous for the Rosebud Sioux.

The real challenge will be to bring the project through to completion. The project ownership and transaction structure proposed by Disgen – the so-called "flip-structure" -- is relatively new and innovative. In addition, the proposed structure includes significant amounts of debt. Finally, the project is on tribal reservation lands. All these factors add complexity to the transaction. If successful, the Rosebud Sioux and Disgen will be breaking relatively new ground.

In summary terms, Disgen is proposing the formation of a limited liability company (LLC) to own the project. In the energy business, it is common practice to establish a limited liability company as a separate entity to own the assets of the energy project. This structure is often necessary to facilitate financing of the project. This structure also will insulate the tribe from liability for the debts of the project. The investors and lenders who provide capital for the project construction will only be able to look to the assets of the project company to secure their investment.

As proposed in the "flip structure," the ownership of the project company LLC will change over time. Initially, the ownership of the LLC will be outside institutional investors who can utilize tax benefits available to owners of wind projects, the PTC and accelerated depreciation. These investors are typically referred to as "Tax Equity Investors." As described in the project documents, after a period of time which will be negotiated and depend on the project economics, the period of tax benefits and the return requirements of the investors, the majority of the ownership of the project will flip back to the Tribe.

The details of arranging a flip structure transaction are complex, but very important and they will require significant attention. In addition, the Tax Equity Investors will need to be assured that the agreements they enter are enforceable. I am not aware of any wind projects on tribal reservation land that has included so-called tax investors, so there will likely be an education process that must take place for both sides to get comfortable with a transaction.

An additional layer of complexity is introduced if the project will also rely on debt financing. As contemplated by Disgen, the Owl Feather War Bonnet Wind Farm will raise roughly 75% of the necessary capital to construct the project in the form of debt. Some tax investors are wary of investing in projects that also have debt. The reason is that if the project fails to perform, the lender has a superior claim to the project assets. If the lender forecloses on the project, then the tax investor could possibly lose the tax benefits.

While the transaction can be structured to address the issues raised, it is clear that including both debt and tax investors in a project makes the transactions more complicated and raises transaction risk and legal costs. Again, the importance of good legal and business advice cannot be overstated.

Ken asked that I briefly address the question why the tribe cannot own a controlling stake in the project from the beginning and through the life of the project?

The simple answer is economics. There is nothing stopping the tribe from owning a controlling stake in a wind project from beginning to end. However, that would require an investment by the tribe in the project equity, which could be more than 10 millions dollars. However, and perhaps more importantly, tribal ownership would likely preclude full realization of certain tax benefits, including the Production Tax Credit and accelerated depreciation.

As discussed above, the PTC and accelerated depreciation are tax benefits that offset taxes or taxable income. If you don't pay taxes or have taxable income, you cannot realize the benefit. Thus, tax-exempt entities (like tribes) typically cannot directly realize the benefits of the PTC or accelerated depreciation. In the private development context, small developers also typically do not have the taxable income necessary to fully realize the benefits of the PTC and accelerated depreciation. The problem is that these tax benefits are very valuable and typically necessary to make a wind project economically viable.

In prior years, the only solution was for a small wind developer/sponsor to sell their project to a large integrated wind company like Florida Power & Light. However, in recent years, a solution to this dilemma has emerged. Now, outside institutional investors are willing to invest in wind projects in order to capture the value of the tax credits. Project sponsors can thus retain long term ownership interests in the projects they develop. This creates an opportunity for the Rosebud Sioux to act as a project sponsor, and retain a long term ownership interest in a wind project.

The tribe could pursue raising funds for the project by issuing Clean Renewable Energy Bonds (so-called CREBs), a funding mechanism established by the Treasury Dept. to allow municipalities and other tax-exempt entities (including tribes) to raise very low cost financing. The CREB's were designed in recognition of the fact that tax exempt parties cannot receive benefits of PTC. To issue a CREB, the Tribe would need to obtain an allocation of CREB rights from the Treasury Department. 2006 was the first year that CREBs authorizations were made available. Applications for 2006 allocations were due in April of 2006.

However, my own prior research on this point indicates that the benefits of the CREBs do not equal the combined benefits of the PTC and accelerated depreciation. Therefore, the project economics for a project utilizing CREBs are not as favorable as for one that captures the full value of the PTC and accelerated depreciation. This is the reason why it arguably makes sense to bring in an outside equity investor.

I note that the PTC expires at the end of 2007, which means that any project must be completed by that date to be sure of capturing the PTC benefit. This fact will be important to any outside investor who is basing their investment decision in part at least on the availability of tax credits.

In conclusion, my personal opinion is that the transaction structure proposed by Disgen is fair and reasonable to the Rosebud Sioux, and makes sense. Disgen is proposing a structure that

will allow the Rosebud Sioux to be an active participant in the management of the project, and assume a long term ownership position. Outside investors will provide the equity needed to fund the project. The fees to be charged by Disgen are very reasonable. If the project is developed as proposed by Disgen, the benefits to the Rosebud Sioux are favorable, particularly when compared to the very low risk incurred. The challenge will be bringing the project to completion and addressing the complexities discussed in this letter.

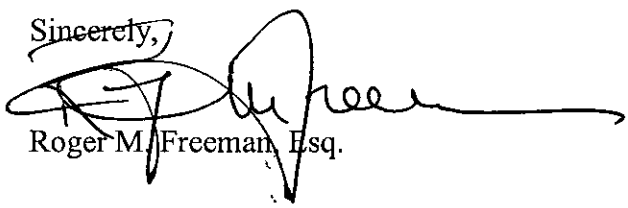
There are many questions that will need to be answered as part of the diligence process in bringing the transaction to a successful completion. Some questions that come to mind include:

- Will the project be completed by end of 2007? Will completion by this date be necessary to obtain tax equity investors?
- The proposed transaction includes both tax investors as well as senior debt, are the issues between equity investors and the lender sufficiently addressed?
- Have wind turbines been secured for the project? This is important if project needs to be completed by 2007?
- Has other critical equipment – such as substation transformers – been secured?
- Have transportation and construction matters been planned?

As mentioned above, the views expressed herein are my own. They are based on a cursory review of the draft MOU and related documents. The terms proposed by Disgen appear fair and reasonable and if successful, the transaction seems to hold significant benefits for the Rosebud Sioux.

If you require further information about this project, you may contact me at 1-617-775-3386.

Sincerely,



Roger M. Freeman, Esq.

Owl Feather War Bonnet Wind Farm
Rosebud Sioux Tribe
DOE Grant DE-FC36-030GO13122

Attachment F

Grant of Easement Report

Rosebud Sioux Tribe
Resource Development Office
PO Box 517, Rosebud, SD 57570
Phone (605) 856-5644
Fax (605) 856-5647
www.rosebudsiouxtribe-nsn.gov

KEN HAUKAAS, Acting Director
SHANNON BRILL – Admn Assist.
SKYLA GOOD SHIELD - Planner
PHIL D. TWO EAGLE - Planner
KATHY WOODEN KNIFE. - Planner

Rosebud Sioux Tribe
Report to Council on Owl Feather War Bonnet Wind Farm
Ken Haukaas
11.27.06

The developer has agreed to pay the tribe a percentage of 6.75% of gross revenues. The developer has a draft power purchase agreement for the sum of $26.33 per Mw or 2.633 cents per Kwh, escalating at 1.5% annually, capacity factor is around 41%, wind speed is 18.1mph, and has been measured since May of 2001. **110376 Mwh total annual production to meter is *assumed*, based on a Gamesa G87, 2.0 Mw turbine performance characteristics.**

110376 Mwh times $26.33 per Mwh = $2,906,200.08 for the first year.
The price per Kwh will escalate at 1.5% annually.

$2,906,200.08 gross receipts X 6.75% = $196,168.51 for the first year.

The Rosebud Sioux Tribe gets $196,168.51 for the first year, based on the assumptions of wind average and wind turbine characteristics.

This is for about 80 acres of land.

Per acre, $2,452.11 annually
Or,
$13,077.90 per turbine, per year, @15 turbines,
or,
$6,538.95 per Mw per year.

Plus DISGEN brings forth a trust of $50,000.00 annually for enrolled tribal members to assist with post high school education needs.

This total is approx. $250,000.00 annually for the tribe and its members.

The first year after construction has been done, sales tax on the project for the tribe's share is estimated to be around $1,300,000.00, which will be forthcoming from the state on this project.

Tribe must not impose TECRO taxes on project. If taxes are imposed it will be paid out of the tribes royalty payments. Note Section 8.2 on TECRO Taxes.

The tribe has been offered by Native Energy, an upfront payment of 3.26 million dollars for Lifetime green tags of 10 Mw of the 30 Mw potential.
This dollar amount shall be invested into the project as buy down against the loan.

The tribe takes no risk and is basically a passive landowner.

My Concerns in the draft agreement:

Section 2.3, Access to other properties.

This suggests that there is intent to build on these other properties.

My concern, will the waiver of TECRO taxes carry over onto this other property?

Section 8.4, Additional Taxes, suggests something to this affect. The **project** as opposed to the **property**. Can the project expand without additional taxes?

Section 7.
Ownership of Power Facilities, the Tribe will have an option to buy the project, **if and only if**, the LLC wishes to sell it to the tribe at the end of the use of the Production Tax Credits. Ten Years.

RUS – NPPD Power Project
RUS Financing – NPPD Base Case – Sensitivity Analysys

Project Assumptions

Turbine Manufacturer	Gamesa G87	
Number of Turbines	15	
KW Rating	2,000	kW
Capacity Installed	30.00	MW
Gross Annual kWh per Turbine	8,161,491	kWh
Net Output as Percent of Gross	92%	
Availability	98%	
Annual Production to Meter per Turbine	7,358,400	kWh
Total Annual Production to Meter	110,376	MWh
Total Project Cost	$ 46,192,451	
Base Year for Capital Costs	2006	
Construction Duration	9	months
Construction Closing	3/1/2006	
Commercial Operations	12/1/2006	

Operations Expenses

Operations and Maintenance			
1st Year of Operation	2006		
1st Month of Operation	December		
Maint Pmt per Turbine (escalating)	$19,500		
Annual Warranty Payment to Supplier	$0	Begins Yr	5
Repairs & Major Maint Per Turbine (esc)	$25,000	Begins Yr	6
Landowner Payments			
% of Gross Revenues (fixed)	3.5%		
Fixed Annual Pymt	$0		
Minimum Annual Pymt	$3,500	per turbine	
Interconnect/Standby Electric/Wheeling			
Standby Electric Rate (escalating)	0.060	$/kWh	
Standby Electric Consumption/turbine	17,520	kWh	
Insurance			
Annual Insurance (escalating)	$225,000		
Minimum Annual Insurance Premium	$20,000		
Management and Administratve			
Annual Management Expense (esc)	$100,000		
Audit/Legal/Miscellaneous (esc)	$10,000		
Administration (esc)	$150,000		
Other Expenses (constant)	$0		

Debt Financing

Senior Loan		
Calculated Debt Amount	20,324,679	
Fixed Interest Rate	5.00%	
Amortization Period (Years)	25	
Interest Only Period (Years)	-	
Total Term	25	
Cover. Ratios - Senior Debt		
Average	0.00	
Minimum	0.00	
Debt Service Reserve (% of Annual)		
Debt Service Reserve (% of Annual)	0%	
Initial DSR (% of 1st Year Debt Servi	0%	
% of Cash Flow to Fund Reserves	0%	
Construction Debt		
Amount	80%	of Cost
Interest Rate	5%	
Commitment Fee on Unused Funds	0.0%	
Initial Loan Fee	0.0%	
Annual Agency Fee	0	

Power Sales Assumptions

Year	$/MWh Energy Price	REC Price	Total
2006	23.00	0.00	23.00
2007	23.04	0.00	23.04
2008	23.50	0.00	23.50
2009	23.97	0.00	23.97
2010	24.45	0.00	24.45
2011	24.94	0.00	24.94
2012	25.44	0.00	25.44
2013	25.95	0.00	25.95
2014	26.46	0.00	26.46
2015	26.99	0.00	26.99
2016	27.53	0.00	27.53
2017	28.08	0.00	28.08
2018	28.65	0.00	28.65
2019	29.22	0.00	29.22
2020	29.80	0.00	29.80
2021	30.40	0.00	30.40
2022	31.01	0.00	31.01
2023	31.63	0.00	31.63
2024	32.26	0.00	32.26
2025	32.91	0.00	32.91

Income & Other Taxes

Income Taxes	Federal	SD	
Tax Rates	35%	0%	
1st Yr PTC	1.9	cents/kWh	
Annual PTC Escalation	2%		
Property Taxes			
Cost of Equipment	41,526,746		
Assessed Value as Percent	100%		
Mil Rate ($ per $1000)	3.00		
Decr in Prop Value/Yr	5%		
Sales Taxes			
Rate	6.00%		

Internal Rates of Return/Development Fees

Internal Rates of Return

Monthly Cashflow Years	Simple Pre-tax	Annually After-tax
15+	#DIV/0!	42.2%
20+	#DIV/0!	42.2%
25+	#DIV/0!	42.2%
30+	#DIV/0!	42.2%
Annual Cashflow		
15+		35.8%
20+		35.8%
25+		
30+		35.7%

Development Fees

Development Fees	720,000
Unreimbursed Development Costs	-

File Name: RUS ROSEBUD 30MW Revised 5-18-05.xls

Ken Haukaas

From: "Dale Osborn" <daleosb@msn.com>
To: "Ken Haukaas" <khaukaas@gwtc.net>
Sent: Tuesday, November 28, 2006 1:29 PM
Subject: Re: Grant of easement, Clarification

What the investors want to be assured of is that after the project is constructed and operational, the RST will not come back and levy additional taxes on the project. It is for the parcels of land included in the agreement and the project located on that land only

----- Original Message -----
From: Ken Haukaas
Sent: Tuesday, November 28, 2006 12:11 PM
To: Dale Osborn
Cc: MATO STANDING HIGH
Subject: Grant of easement, Clarification

Dale,
I need clarification on 8.4 Additional Taxes. When the term "project" is used in this sense, is the term exclusive of this property mentioned in the grant easement.
Ken Haukaas
Tribal Planner
Resource Development Office
Rosebud Sioux Tribe
Work Phone 605-856-5644
Cell Phone 605-441-6490
email: khaukaas@gwtcnet

CHART A. *Wind Energy Lease/Easement Compensation: Summary of Information from Published Sources*

PROJECT INFORMATION							LANDOWNER PAYMENT INFORMATION			
Project	Location	Commission Date	Project Owner/ Developer	Power Purchaser	Project Size	Turbine Information	Per Turbine Per year	Per MW Per Year	Notes	Source
Iowa Distributed Wind Energy Project	Iowa	1998	Consortium of Municipal Utilities	Consortium of Municipal Utilities	2.25 MW	3 750 kW Zond Z-50	$1,800	$2,400	Plus a $2,500 up front payment	1
Lake Benton I	Minnesota	1998	GE Wind	Xcel Energy	107.25 MW	143 Enron Z-48 (750 kW)	$1,500	$2,000	Estimated payments for 15 of 143 turbines. See Lake Benton II for compensation structure of remaining 128 turbines	2, 3, 14
Delaware Mountain Wind Farm	Texas	1999	American National Wind Power	Lower Colorado River Authority and Reliant Energy HL&P	30 MW	40 Zond 750 kW turbines	$1,500	$2,000		2
Lake Benton II	Minnesota	1999	FPL Energy	Xcel Energy	103.5 MW	138 Enron Z-50 (750 kW)	•	•	$450/acre for wind rights; $1,200/acre for easement on land needed for roads and towers; $5,000 for each tower constructed. (One time payments)	3, 4
Storm Lake I and II	Iowa	1999	GE Wind	MidAmerican and Alliant/IES Utilities	192.75 MW	257 Z-50 750 kW turbines	$2,000	$2,667	$750/turbine + 2% of revenue, comes to about $2,000 per turbine	4, 5, 6, 7, 8
Vancyle Ridge	Oregon	1999	FPL Energy	Portland General Electric	25 MW	38 Vestas 660 kW turbines	$1,500-$2,000	$2,272-$2,667		2
Waverly II	Iowa	1999	Waverly Light & Power	Waverly Light & Power	1.5 MW	2 750 kW Zond Z-50	$1,740	$2,320	Plus a $2,500 up front payment	1
Madison Windpower	New York	2000	PG&E National Energy Group	Merchant Plant	11.55 MW	7 Vestas 1,650 kW	$2,000-$4,000	$1,212-$2,424		9
Farmer Project	Minnesota	2001		Xcel Energy	1.5 MW	2 NEG Micon 750 kW	$2,000	$2,667	Landowner owns the project, has additional revenue streams	10
Indian Mesa	Texas	2001	FPL Energy/National Wind Power	Lower Colorado River Authority and TXU Electric Company	82.5 MW	125 Vestas V47 660 kW turbines	•	•	Royalty rate of 4% for years 1-10, 6% for years 11-20, and 8% for years 21-30. Plus signing bonus of $2,000 per MW. Hunting prohibited for 1 year	11
Woodward Mountain	Texas	2001	FPL Energy	TXU Electric	159.7 MW	242 Vestas V47 660 kW turbines	•	•	Royalty rate of 4% for years 1-10 and 6% for years 11-20. Plus signing bonus of $2,000 per MW	11
Nine Canyon Wind Farm	Washington	2002	Energy Northwest	Public Power Members of Energy Northwest	48 MW	37 Bonus 1,300 kW	•	•	Annual "rent" of the greater of $1000 per turbine or 3.5% of gross revenues. EN will also compensate landowners for any increase in property taxes	12
Top of Iowa	Iowa	2002	Northern Iowa Windpower LLC	Alliant Energy (15 yr PPA, WI RES)	80.1 MW	89 NEG Micon 900 kW	$2,400	$2,667		13
Colorado Green	Colorado	2003	Xcel Energy/GE Wind Corp (sold to PPM Energy)	Xcel Energy	162 MW	108 GE 1,500 kW	$3,000-$6,000	$2,000-$4,000	98 of 108 turbines are hosted by one landowner	14, 15
High Winds Energy Center	California	2003	FPL Energy	Marketed by PPM Energy to Sacramento Municipal Power District	162 MW	90 Vestas 1,800 kW	$9,500	$5,185	Estimated $21.5 million in lease payments over 25 years (contains an escalator). Average payment is about $9,555/turbine/year.	16
Mendota Hills Wind Farm	Illinois	2003	Navitas Energy (Gamesa)	ComEd	50.4 MW	63 800 kW Gamesa	$1,800-$2,000	$2,250-$2,500		17
New Mexico Wind Energy Center	New Mexico	2003	FPL Energy	Public Service Company of New Mexico	204 MW	136 GE 1,500 kW turbines	$4,000	$2,700	Estimated based on $550,000 in total lease payments	14, 18
Woodward	Oklahoma	2003	FPL Energy and Oklahoma Municipal Power Authority	Oklahoma Municipal Power Authority and Oklahoma Gas & Electric	102 MW	68 GE 1,500 kW turbines	$4,000	$2,667	"Up to $4,000" per turbine per year	19
Ainsworth Wind Energy Facility	Nebraska	2005	Nebraska Public Power District	NPPD and consortium of NE Municipals	59.4 MW	36 1,650 kW Vestas turbines	$2,500	$1,515		20
Crescent Ridge Wind Farm	Illinois	2005	Illinois Wind Energy/ Eurus Energy America	ComEd	54.5 MW	33 Vestas 1,650 kW	$5,000	$3,030	Greater of either flat rate of $5,000/turbine/year or a percentage of revenue estimated at $6,200/turbine/year.	21
Trimont Area Wind Farm	Minnesota	2005	PPM Energy	Great River Energy	100.5 MW	67 1,500 kW GE turbines	$3,500-$4,500	$2,500-$3,000	Based on estimates of $250,000-$300,000 total payments. Trimont Area Wind Farm LLC (comprised of 46 local landowners) also has revenue participation that could be worth as much double the easement payments.	22

Owl Feather War Bonnet Wind Farm
Rosebud Sioux Tribe
DOE Grant DE-FC36-030GO13122

Attachment G

RST Corporate Resolution 2006-06

ROSEBUD SIOUX TRIBE
CORPORATE RESOLUTION NO. 2006-06

WHEREAS, the Rosebud Sioux Tribe is a federally recognized Indian Tribe organized pursuant to the Indian Reorganization Act of 1934 and all pertinent amendments thereof; and

WHEREAS, the Rosebud Sioux Tribe is governed by a Tribal Council made up of elected representatives who act in accordance with the powers granted to it by its Constitution and its By-Laws; and

WHEREAS, the Rosebud Sioux Tribe was awarded a Department of Energy grant, DEPS36-03G093002, titled, Wind Energy Development on Tribal Lands, in July of 2003; and

WHEREAS, the DOE grant has successfully allowed the Rosebud Sioux Tribe in conjunction with its consultant, DISGEN Inc., of Lakewood, Colorado to pursue all the necessary pre-construction activities to access funding to support the actual construction of the Owl Feather War Bonnet Wind Farm; and

WHEREAS, the Rosebud Sioux Tribe is committed to the use of grant opportunities to bring forth self sustainable business enterprises for the greater good of the Sicangu Oyate; and

WHEREAS, it is in the best interests of the Rosebud Sioux Tribe to continue the effort to build the Owl Feather War Bonnet Wind Farm; and

WHEREAS, DISGEN Inc., has provided technical and in-kind financial support for the Rosebud Sioux Tribe in the development of the Owl Feather War Bonnet Wind Farm; now

THEREFORE BE IT RESOLVED, that the Rosebud Sioux Tribal Council hereby approves the Grant of Easement and Easement Agreement, between the Rosebud Sioux Tribe and Distributed Generation Systems Inc., of Lakewood, Colorado, concerning the development of the Owl Feather War Bonnet Wind Farm; and

BE IT FURTHER RESOLVED, that the Rosebud Sioux Tribal Council hereby authorizes and directs the Tribal Chairman or his designee to sign any and all documents related to said resolution.

ROSEBUD SIOUX TRIBE
CORPORATE RESOLUTION NO. 2006-06

CERTIFICATION

This is to certify that the above Corporate Resolution No. 2006-06 was duly passed by the Corporate Board of the Rosebud Sioux Tribe in Corporate Session on November 29, 2006 by a vote of eleven (11) in favor, none (0) opposed and none (0) not voting. The said resolution was adopted pursuant to authority vested in the Corporate Board. A quorum was present.

ATTEST:

Gerri Night Pipe, Secretary
Rosebud Sioux Tribe

Rodney M. Bordeaux, President
Rosebud Sioux Tribe

Owl Feather War Bonnet Wind Farm
Rosebud Sioux Tribe
DOE Grant DE-FC36-030GO13122

Attachment H

BIA DEMD Report to Aberdeen on Grant of Easement

United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, D.C. 20240

Division of Energy and
Mineral Development

JUL 20 2007

MEMORANDUM

To: Regional Director, Great Plains Region

From: Chief, Division of Energy and Mineral Development

Subject: Review and Recommendations of the proposed Grant of Easement and Easement Agreement (Agreement) between the Rosebud Sioux Tribe, Rosebud Reservation, South Dakota and Owl Feather War Bonnet, LLC.

The Division of Energy and Mineral Development has reviewed the wind Agreement submitted by Owl Feather War Bonnet, LLC (OFWB). The attached report documents our review of the terms and conditions of the proposed agreement. The report also contains specific detailed recommendations that may be considered by the Region and Tribe.

The following are major recommendations that should be considered prior to the agreement being signed.

- Bonding requirements should be specified in the Agreement.
- Accounting and record keeping provision need to be added to the Agreement.

In general, the agreement appears to be fair; however, the Tribe may wish to negotiate some items as discussed in the attached report. The Division recommends that this agreement be approved. Questions concerning this review you may call me at 303-969-5270 extension 225 or Roger Knight, Petroleum Engineer, at 303-969-5270 extension 333.

Attachments: DEMD Review

cc: DEMD Mineral Agreement File

COPY FOR YOUR INFORMATION

Rosebud Sioux Tribe - Owl Feather War Bonnet, LLC **DEMD Review**
Grant of Easement and Easement Agreement

Summary
The Rosebud Tribe is entering into a Grant of Easement and Easement Agreement (Agreement) with Owl Feather War Bonnet, LLC (OFWB, Disgen is 100% owner) to develop their wind energy. Income is limited to the Tribe until there is a commitment to build the wind farm. The "Tribe is very much in favor of this IMDA and wants to get it approved soon" according to Ken Haukaus. The Tribe will benefit from this Agreement by revenue generated from the development of a wind farm.

Projected Income to the Tribe:
Rental income to Tribe:

First four year rental	$5,120
5th year rental	$5,000
6th year rental	$5,000
Total	$15,120

When construction initiated:
$ 30,000
After installation: 30 megawatt @ $4,000 per Mw/year
$750,000 per year (estimated)
$120,000 per year minimum

Missing components:
- There are no bond requirements.
- No accounting or record keeping provisions.
- No provisions for auditing OFWB.
- No construction time table. Only time restraints are for the initial six years that the lease is controlled by OFWB.
- There is no mention of a scholarship fund in this agreement that was proposed at previous meetings.

Other Concerns:
- Under Section 6, OFWB will have sole rights to the wind development for a period of 6 years while paying the Tribe a low rental.
- Under Section 7, *"Grantor, at the sole discretion of OFWB, may have an option to purchase the wind facility for a price agreed upon between the parties, but in no event shall this option be executable until the Production Tax Credit Availability has expired."* The project economic projections predict that there is negative cash flow after tax credits expire. OFWB is willing to sell during a projected five year negative cash flow period. Economic projects forecast that the cumulative cash flow after 11 years is only slightly lower than the cumulative cash flow after 25 years.
- Some provision could be included to cover the case that tax credits are extended.
- Under Section 12.1 – Assignees, *"OFWB and any Assignee shall have the right, without Grantor's consent, with respect to any or all of the Property, to do any of the following: finance Power Facilities; grant co-easements, subeasements, licenses or similar rights, to one or more Assignees; or sell,*

convey, lease, assign, mortgage, encumber or transfer to one or more Assignees the Easement, or any right in the Easement or in this Agreement, or any right of OFWB in the Property or in any of...." This section should have some limitations applied to OFWB for granting of co-easements, subeasements, licenses or similar rights, to one or more Assignees.

Agreement Terms

Reservation	Rosebud		
Contractor	Disgen – Owl Feather War Bonnet		
Reviewer	Winter Jojola-Talburt/ Roger. Knight	Contract #	
Type of Agreement	Wind Farm – ROW – Township 37N, Range 30W, Sections 32 and 33, - 1280 ac (see attached map)		
Basic Terms	6.1 - $1/ac/yr until construction, = $1280 per yr to Tribe for 4 yr term. $5000 for 1 yr extension, & $5000 for 2nd yr extension. 6.2 - Start of construction - $1000 per megawatt = $30,000 6.3 - After construction : The greater of base amount $4,000/mgwh/yr ($120,000 est.) or 6.75% of gross revenue, but no payments to Tribe on upfront energy credits. 7. - Grantor, at the sole discretion of OFWB, may have an option to purchase the wind facility for a price agreed upon between the parties, but in no event shall this option be executable until the Production Tax Credit Availability has expired. The project economic projections predict that there is negative cash flow after tax credits expire. What happens if the tax credits are extended?		
Recommendation	The 6.75% of gross revenue is much better for the Tribe than the limit on the fixed $.027/KWH (with 1.5% escalation) that was presented. The Tribe can now realize a better income stream.		

Agreement Terms Review

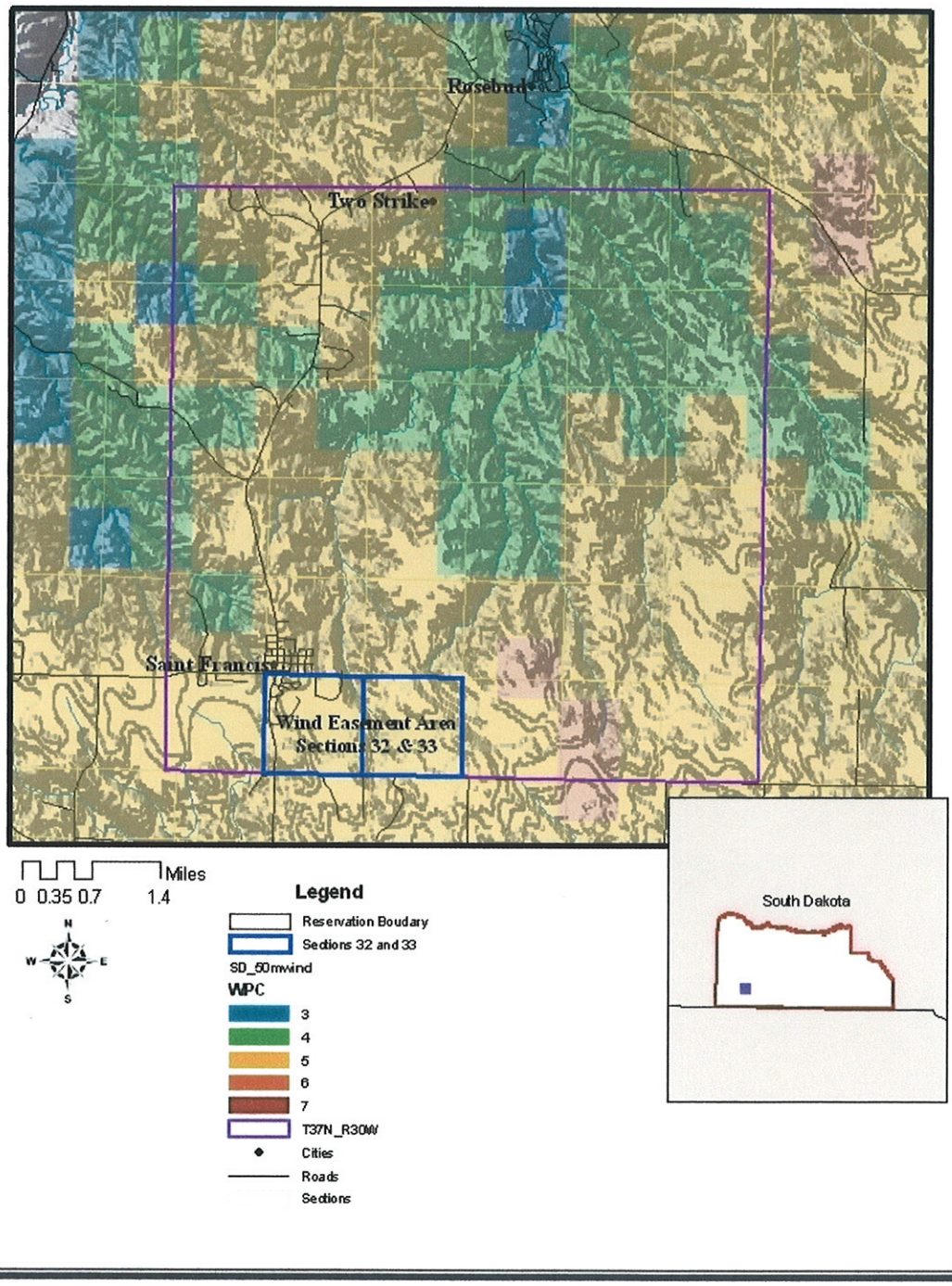
Part	Procedure	Contract Discussion – includes major points
1	Parties identified	Rosebud Sioux Tribe, Owl Feather War Bonnet LLC (Disgen)
2	Duration of contract	5 – 4 years from effective date, plus (optional for OFWB) two 1-year extensions. Then OFWB has optional for 35 years if during the first 4-6 years they execute a contract for a wind farm/power contract/electricity sales agreement. Section 5 **First Period**. This Easement shall be for a term beginning on the Effective Date and continuing (a) initially for four (4) years; plus

		(b) at the option of OFWB, two (2) additional one-year extensions (collectively, "First Period"). During the First Period, OFWB shall have the right to study the feasibility of a wind project on the Property and to seek permits from all applicable governmental authorities. Grantor, at no cost to Grantor, shall execute such applications and documents as the governmental authority may require. **Second Period.** If, during the First Period, OFWB executes a contract for the construction of the Wind Facility and/or executes a power contract or a sales agreement with a utility, power marketer, or wholesale electricity provider, for electricity to be generated by wind turbines on the Easement Area, then OFWB may extend the term of this Agreement for a second period of thirty-five (35) years (the "Second Period") by delivering written notice to Grantor. OFWB shall be entitled to install wind turbines on any portions of the Easement Area.
3	Indemnification	Grantor is indemnified against liability for property damage and physical injuries including death, to any person to the extent caused by OFWB's operations on the property, except those caused by the Grantor or its agents. Grantor will indemnify OFWB against claims arising from the breach of Grantor's representations in Section 11.
4	Obligations	Pay rental fees for 6 yr lease – Total $15,120.
5	Disposition of production	Sold on grid.
6	Method & amount of compensation	$5000/yr for each extension after the initial 4 year term. $1/yr/acre for the initial 4 year term up to the Commencement of Construction. Installation fee: $1,000/MW of turbines to be installed. Greater of: $4,000/MW/yr of wind turbines installed or 6.75% of gross revenue paid to OFWB for electricity and green energy certificates or renewable energy credits generated (but NOT any up front payments for renewable energy credits which are used for the capital cost buy down of the project).
7	Accounting & mineral value	Will be PPA agreement.
8	Operating & management procedures	None listed.
9	Limitations of assignments Incl. 1ST refusal	Sec. 4 - OFWB does not construct and continue to maintain the Wind Facility on the Property for a continuous operating period in excess of twenty-four (24) months, OFWB will have no right of ingress to and egress from and across the Property to neighboring properties. OFWB' rights hereunder shall be unaffected, even if the Wind Facility is not operating during such period. Discontinuation of operation due to maintenance, repair, replacement or re-powering shall not constitute a failure to generate. Other discontinuation shall

		also not constitute a failure to generate so long as the sums due under this Easement are paid.
10	Bond Requirements	No bond requirements.
11	Insurance requirements	10.1 OFWB will provide proof of liability insurance (at least $1 million/occurrence) to the tribe.
12	Audit procedures	No provision for auditing OFWB.
13	Resolving disputes	Any party that intends to litigate must first give notice of breach or default and notify the other party that litigation is anticipated, and shall offer to negotiate a resolution directly through non-binding mediation. No action will be filed until 30 days after the offer of negotiation has been sent to the other party.
14	Force majeure	In event of Force Majeure, the affected party will give notice to the other party and is excused from the performance of the Easement or obligation for the duration of the Force Majeure. The affected party will make reasonable efforts to avoid or remove such causes of non-performance and will continue performance whenever the causes are removed.
15 a	Rights to terminate or suspend	OFWB has right to terminate at any time, effective upon written notice to the tribe. Tribe has right to terminate if: 1) In a material default in the performance of OFWB's obligations or OFWB has failed to construct/maintain the Wind Facility for a continuous period greater than 24 months, or OFWB has failed to generate electricity for a continuous period greater than 24 months following the Commercial Operations Date. 2) The tribe notifies simultaneously the OFWB and all Assignees in writing of the default which will define the facts of default and the method of cure. 3) The default was not remedied within 60 days after the written notice, or if the cure will take longer than 60 days, the OFWB or Assignee has not begun to undertake the cure within the 60 days and completes the cure within 180 days of the end of the 60 day time period.
15 b	Procedures to follow if terminated or suspended	Upon termination of either part or all of the property, OFWB will execute and record a Quitclaim deed to the Grantor of all OFWB's rights, titles and interest in the property (all or part) upon written request of the Grantor. As soon as practical OFWB will remove all above ground power facilities and re-seed the property if requested by the Grantor. If in 18 months OFWB fails to remove the power facilities, the Grantor may do so and will be reimbursed by OFWB for reasonable costs. Grantor may sell all the equipment to recover its costs of disassembly and reclamation.
16	Nature & schedule of activities	No schedule included.
17	Proposed manner & time of performance of	All equipment removed by OFWB within 180 days of termination. Land will be reclaimed, other than roads, by removing all traces of construction, foundations and hard standings will be covered by at

	abandonment, restoration, reclamation	least 12 inches of soil or gravel, and all disturbed areas will be seeded and mulched.
18	Reporting production & sales	No provision for accounting.
19	Unitizing or communitizing lands	NA
20	Protect minerals from being drained/stolen	NA
21	Record keeping	No Provision for accounting.

Rosebud Reservation
Proposed Wind Farm Area
Township 37N Range 30W, Sections 32 & 33



Owl Feather War Bonnet Wind Farm
Rosebud Sioux Tribe
DOE Grant DE-FC36-030GO13122

Attachment I

Grant of Easement

Draft for Discussion Only

GRANT OF EASEMENT
AND EASEMENT AGREEMENT

Grantor: **Rosebud Sioux Tribe**

Grantee: **Owl Feather War Bonnet, LLC**

Location: **Todd County, South Dakota**

Date: **November 3, 2006**

This Grant of Easement and Easement Agreement (this "Agreement") is made, dated and effective as of November 30 __, 2006 (the "Effective Date"), between **The Rosebud Sioux Tribe**("Grantor"), **of PO Box 517, Rosebud, SD 57570** and **Owl Feather War Bonnet, LLC** ("OFWB"), a Delaware Limited Liability Company.

1. **Grant of Easement.**

2. **Purposes of Easement.** The Easement is granted for the purpose of wind access, wind monitoring, wind energy conversion and the collection of and transmission of electric power over the Property.

2.1 **Wind Monitoring, Wind Access and Transmission Activities.** In the exercise of its rights under this Agreement, OFWB may conduct all of the following activities on the Property.

2.1.1 **Wind Monitoring.** Monitor and assess wind conditions on the Property, including the installation of meteorological equipment and other activities incident thereto; and

2.1.2 **Wind Access.**

2.1.3 **Transmission.** below) and all necessary fixtures and appliances for use in connection with the poles, wires and cables; and

2.1.4 **Transmission Across Property.** Transmission of electricity from neighboring properties through the Transmission Facilities if the Wind Facility is extended to such neighboring properties; and

2.1.5 **Ingress/Egress.** Ingress to and egress from the Property, including over existing roads or newly constructed roads, and all activities incident to the rights of ingress to and egress from the Power Facilities; and

2.1.6 **Road Construction and Improvements.** Improving existing roads and constructing new roads on the Property.

2.2 **Wind Facility Construction Activities.**

2.2.1 **Wind Facility Construction, Etc.**

2.2.2 **Interconnection Construction.**

2.2.3 **Control Building Construction.**

2.2.4 **Wind Facility.**

2.3 **Access to Other Properties.**

3. **Exclusive Conversion Right;**

4. **Requirement of Continuous Operation.**

5. **Term.**

6. **Payments.**

7. **Ownership of Power Facilities.**

8. **Taxes and Conservation Programs.**

9. **Site Plan and Construction**

9.4 **Changes to Site Plan after Commercial Operation.**

9.5 **Commercial Microwave Communications.**

9.6 **Lighting.**

9.7 **Site Cleanliness.**

9.8 **Wind Assessment Equipment.**

10. **OFWB' Representations.** OFWB represents, warrants and covenants to Grantor that:

10.1 **Insurance.**

10.2 **Requirements of Government Agencies.** .

10.3 **Construction Liens.** OF

10.4 **Hazardous Material.** OFWB shall not violate any federal, state or tribal law related to materials classified as hazardous or toxic.

10.5 **Reclamation.**

10.6 **Tribal Employment Preference:** OFWB shall use reasonable efforts to employ and train Tribal Members in the construction and operations and maintenance of the Wind Facility

11. **Grantor's Representations.** Grantor represents warrants and covenants as follows:

11.1 **Grantor's Authority.**

11.2 **No Interference.**

11.3 **Liens and Tenants.**

11.4 **Requirements of Governmental Agencies.** G

11.5 **Environmental Contamination.**

11.6 **Quiet Enjoyment.**

12. **Assignment and Cure.**

12.1 **Assignees.**

12.2 **Assignee Obligations.**

12.3 **Right to Cure Defaults.**

12.4 **New Easement.**

12.5 **Certificates.**

13. **Mortgagee Rights.**

13.1 **Mortgagee Right to Cure.**

If to Grantor:

Department of Resource Development
PO Box 517
Mission, SD 57570

If to OFWB:

OFWB, LLC
c/o Distributed Generation Systems
200 Union Blvd., Ste 304
Lakewood, CO 80228
Attention: Dale Osborn

If to any Assignee:

At the address indicated in the notice.

Any party may change its address for purposes of this Section by giving written notice of such change to the other parties.

15.7 **Entire Agreement: Amendments.** This Agreement constitutes the entire agreement between Grantor and OFWB respecting its subject matter.

15.8 **Governing Law: Interpretation; Forum Selection.**

15.9 **Partial Invalidity.**

15.10 **Tax Credits.**

15.11 **No Partnership.**

15.12 **Costs and Fees**

15.13 **Counterparts.** .

IN WITNESS WHEREOF, Grantor and OFWB have caused this Agreement to be executed and delivered by their duly authorized representatives as of the Effective Date.

"OFWB"

OFWB, LLC.

By_____

Name: Dale Osborn
Title: Manager

"Grantor"

_____(Seal)

Name: Rosebud Sioux Tribe
Title: Owner

_____(Seal)

Name: _____
Title: Owner

Acknowledgments

_____

On this ____ day of ____, 2006 before me, _____, a Notary Public for the State of South Dakota, personally appeared _____ personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument, and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Exhibit A-1

Legal Description of the Property

Exhibit A-2

Legal Description of Easement Area

Exhibit B

Site Plan