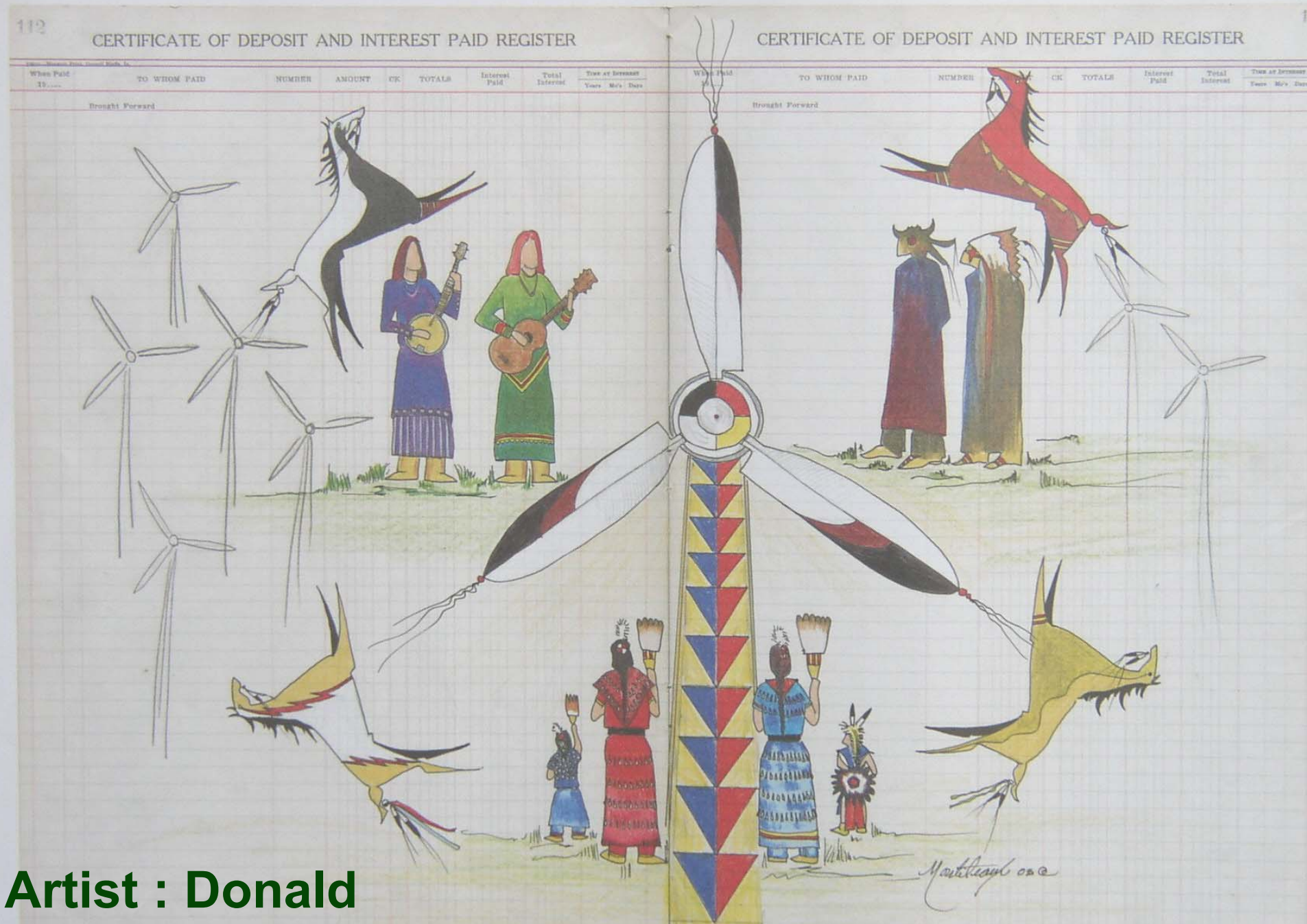
Honor The Earth



Artist : Donald

Hihan Sapa Wapaha Tate Woilagyapi
Owl Feather War Bonnet Wind Farm
Rosebud Sioux Tribe

Resource Development Office/Tribal Utilities Commission
Distributed Generation Systems, Inc. (Disgen)
Dept. of Energy Grant
DOE Funding $448,551.00
DISGEN Cost share/in-kind $78,750.00
RST/TUC Cost share/in-kind $27,272.00

The Participants:

Rosebud Sioux Tribe, Resource Development

- Phil Two Eagle, Resource Dev. Dir.
- Ken Haukaas, Wind Farm Coordinator
- Dr. Bill Akard, Sinte Gleska University, Cultural Resources

RST Tribal Utilities

- Tony Rogers, Director

Distributed Generation Systems, Inc (DISGEN)

- Dale Osborn, President
- Chris Bergen, Project Manager (NEPA)

Bureau of Indian Affairs: Lead Agency, Aberdeen Area Office

- Dianne Mann-Klager, Lead/Wildlife Biologist
- Dr. Carson Murdy, BIA Archaeologist

RST Game Fish and Parks/Natural Resources

- Stephanie Middlebrooks, Wildlife Biologist

U.S. Fish and Wildlife Service, Consulting Agency

Western EcoSystem Technology, Inc. (WEST)

- Rhett Good, Environmental Consultant

Photo Aerial of Project Area

Sections 32, 33, T37N R30W 680 acres

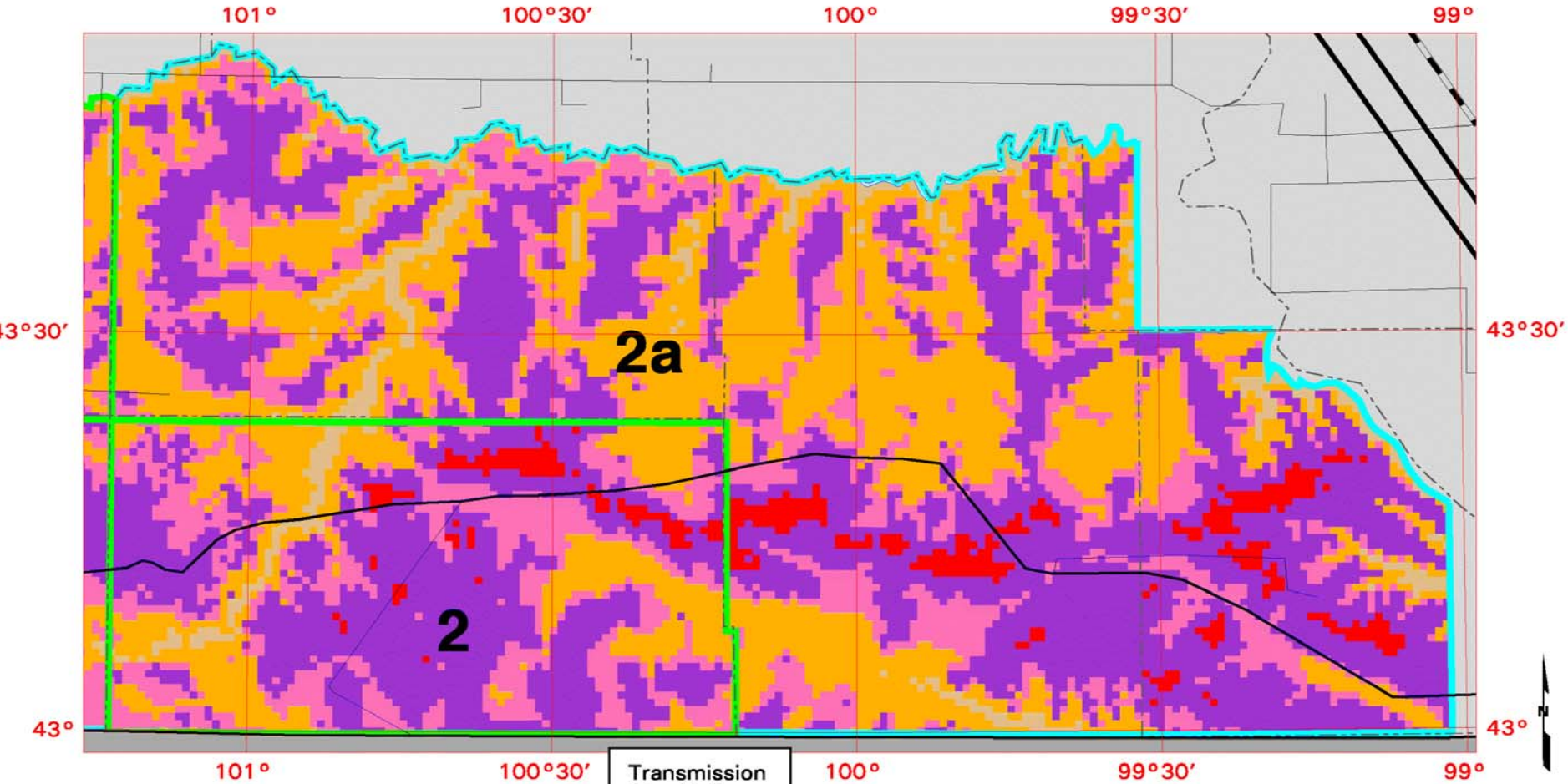
Source: Ken Haukaas RST Resource Development Office

DISGEN

Wind Farm Site, looking East

Wind Farm Site, looking West

South Dakota - Rosebud Reservation Wind Resource Map and Capacity



Transmission Line Voltage

- 69 Kilovolts
- 115 Kilovolts
- 230 Kilovolts
- 345 Kilovolts

★ Federal Facility
□ City or Town

10 0 10 20 30 40 Kilometers
10 0 10 20 Miles

Wind Power Classification

Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m^2	Wind Speed[a] at 50 m m/s	Wind Speed[a] at 50 m mph
2	Marginal	200 - 300	5.6 - 6.4	12.5 - 14.3
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	800 - 1600	8.8 - 11.1	19.7 - 24.8

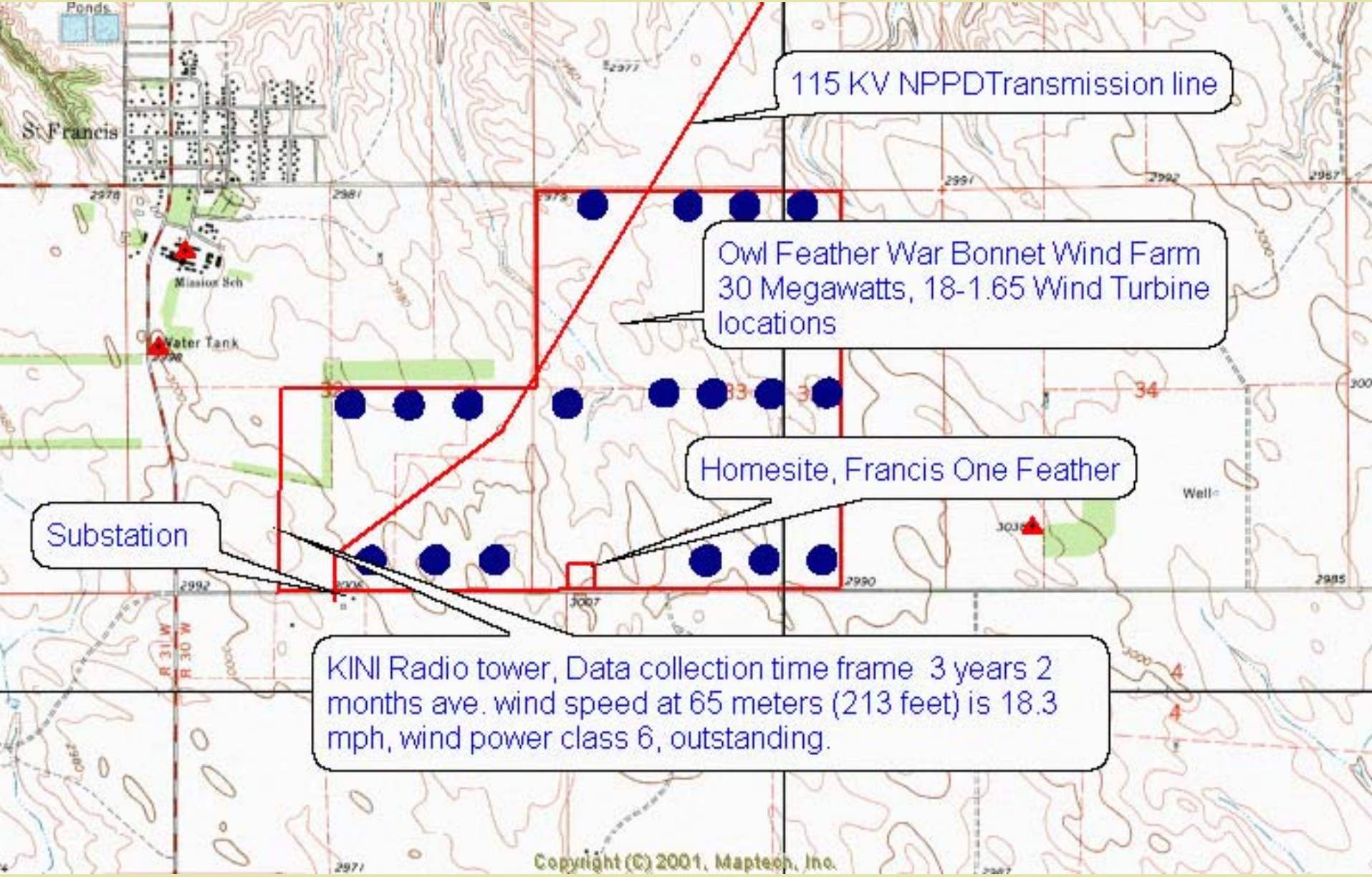
[a] Wind speeds are based on a Weibull k value of 2.0

Indian Reservations	Wind Electric Potential (MW) Class 4 - 6	Class 2 - 6
2 Rosebud	17,400 - 34,800	25,750 - 51,500
2a -Original Boundary	30,280 - 60,560	48,975 - 97,950

U.S. Department of Energy
National Renewable Energy Laboratory

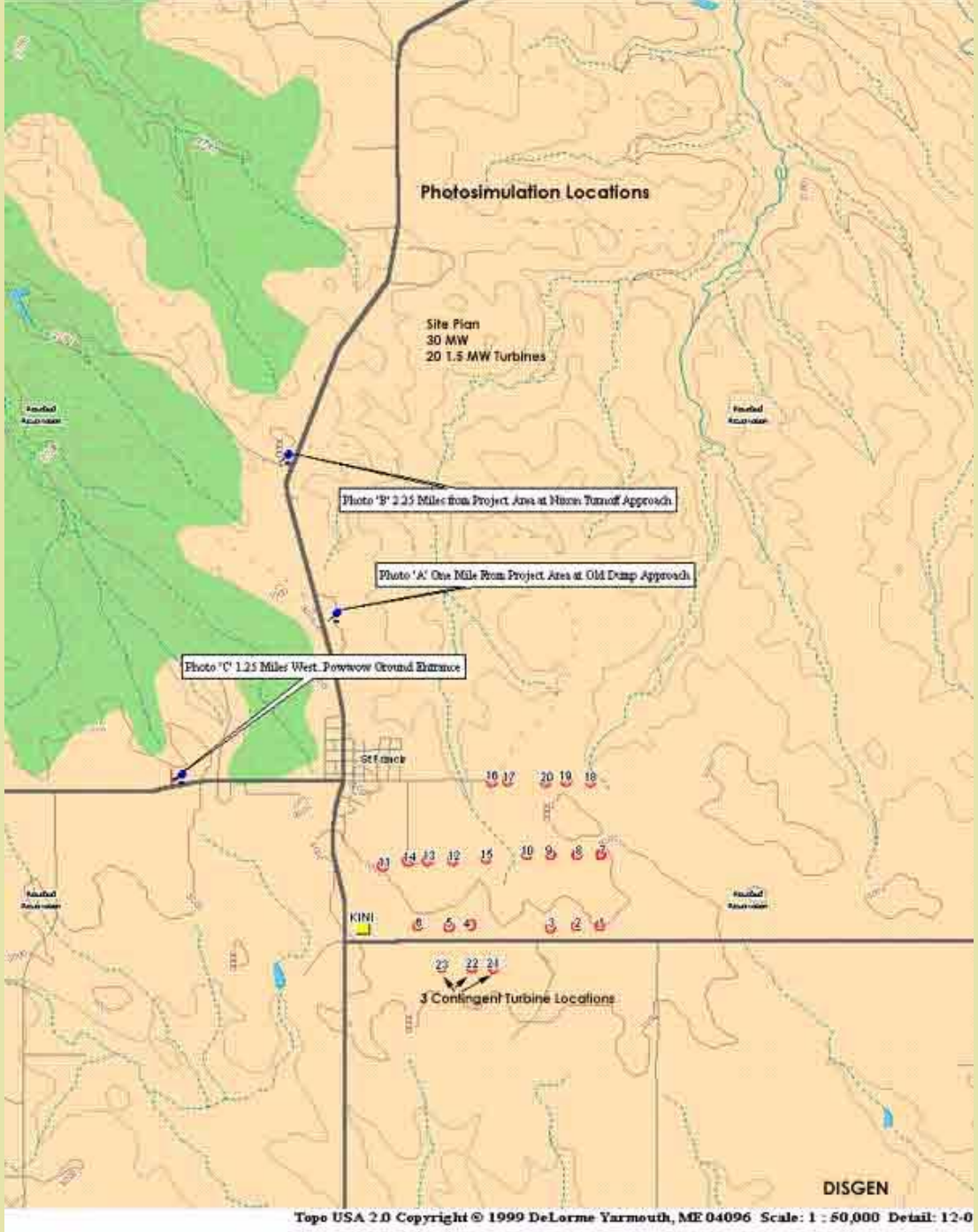
NREL

20-APR-2000 5.1.1


115 KV NPPDTransmission line
Owl Feather War Bonnet Wind Farm
30 Megawatts, 18-1.65 Wind Turbine
locations
Homesite, Francis One Feather
Substation
KINI Radio tower, Data collection time frame 3 years 2
months ave. wind speed at 65 meters (213 feet) is 18.3
mph, wind power class 6, outstanding.
St Francis
Ponds
Mission Sch
Water Tank
Well
Copyright (C) 2001, Maptech, Inc.

Turbine Selection

- Wind Farm will incorporate NEG MICON 82 (1650KW) 18 units
- Hub Height 80 meters (262 feet)
- Rotor diameter of 82 meters (269 feet)
- Cut in wind speed 3.5 m/s or 8 mph
- Cut out-1 min, 24 m/s or 54 mph



3 photo simulation locations

DISGEN

Photo from 1 Mile North of Project Area and St. Francis, at Old Dump Approach; Facing South by Southeast

Photo from 2.25 miles North of Project Area and St. Francis, at Eric Nixon turn off Approach; Facing South by South East

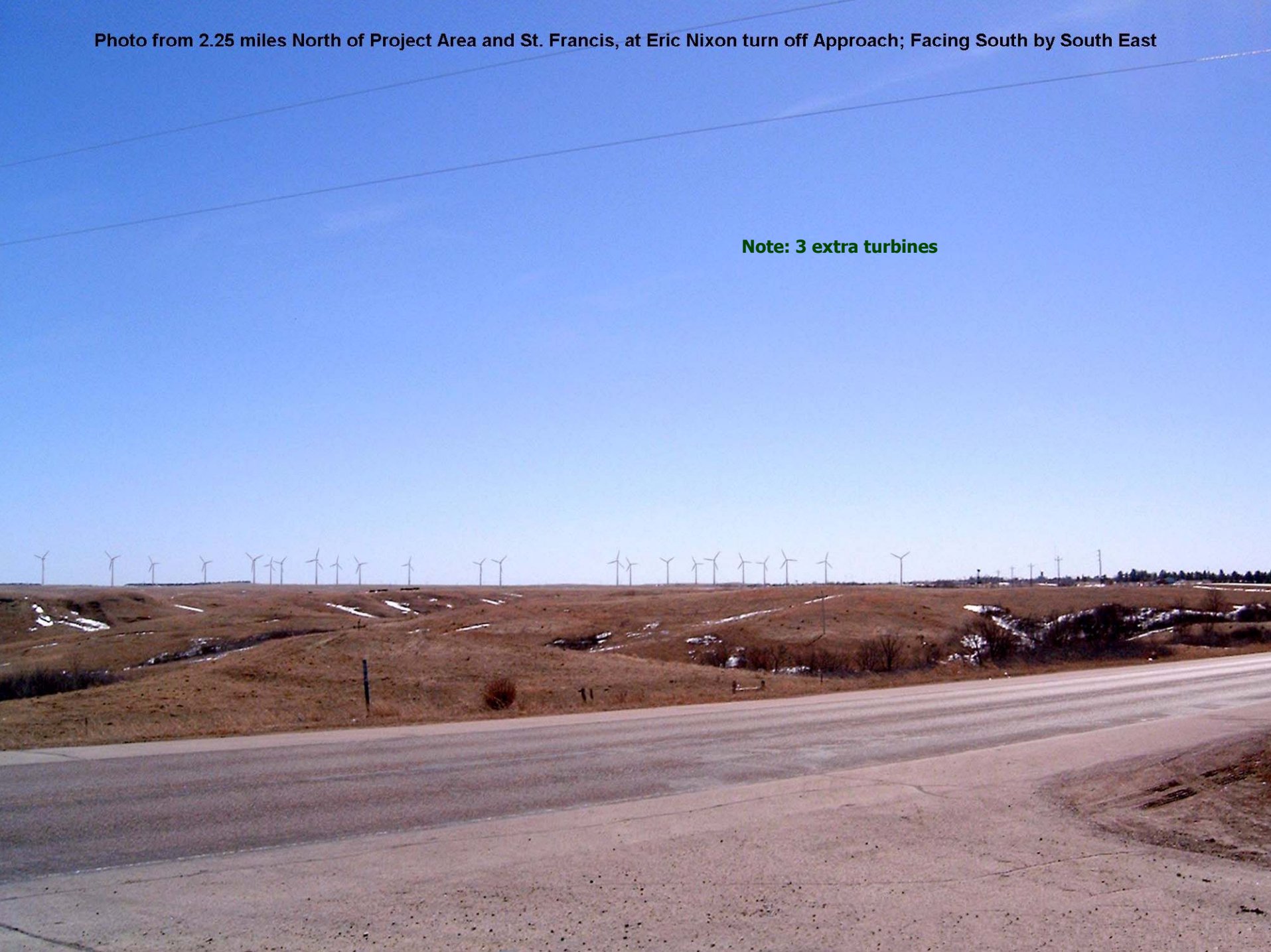


Photo from 1.25 Miles West of Project Area at Powwow Grounds Entrance Approach, Facing East by Southeast. St. Francis in Foreground.

Ecological Baseline study
Western EcoSystems Technology Inc.

1. A detailed avian study
   7 of 12 months complete
2. Mapping of prairie dog towns
   Complete
3. Grasslands bird survey
   Complete
4. American Burying Beetle survey
   Complete
5. Greater Prairie Chicken Lek Monitoring
   Complete
6. Raptor nest Search
   Complete
7. General wildlife observations
   7 of 12 months complete
8. Bat survey
   Complete
9. Flora survey
   Complete

A Detailed Cultural Assessment

- Class I. File and literature search

  (NEPA Requirement)

  Requires a review of any and all records on the site through research of state and local records concerning investigations gathered in the past. *Conducted and completed by Dr. Carson Murdy BIA Archaeologist.*

Cultural Assessment Cont:

- Class III, Site Review

(NEPA Requirement)

A 100% intensive site surface review, which consists of walking over the whole 680 acres of area foot by foot.

140 acres completed by Dr. Carson Murdy BIA Arch., the other 540 acres, has been completed by Dr. Bill Akard along with staff and students of Sinte Gleska University 100% Complete

Cultural Assessment Cont: **Ethnographic Interviews**

- Interview elderly familiar with the area
- Gather oral history relevant on the site
- Insure to all that no culturally significant area was disturbed
- Conducted by Lakota speakers with cultural resource management degrees and conducted in a confidential manner
- Not required by NEPA, but was felt it was quite appropriate and necessary to insure success

Ethnographic Findings & Recommendations

- Native language use area by school children
- Recommend 100% intensive survey of all 680 acres
- Identify, map and classify all medicinal plants and replant/reseed as much as possible those plants affected during construction
- Hire a qualified Cultural Resource Management specialist during all excavation work

Systems Impact and Interconnection Study

- Examines the local system to determine if the proposed project can be physically interconnected technically and if the local infrastructure can absorb the energy and capacity being proposed.

  Develop the substation requirements for upgrading of the substation.

Conducted by Nebraska Public Power District, green light has been given to continue on process for interconnection, study now needs to know where power will be purchased. Power Purchase Agreement.

Power Purchase Agreement

- Will be proposed on a best effort basis to several potential markets:
  1. Nebraska Public Power District
  2. Basin Electric
  3. Western Area Power Administration
  4. Omaha Public Power District
  5. Lincoln Electric System
  6. Xcel Energy

  Dale Osborn/DISGEN has been discussing this PPA in an ongoing effort with the above utilities.

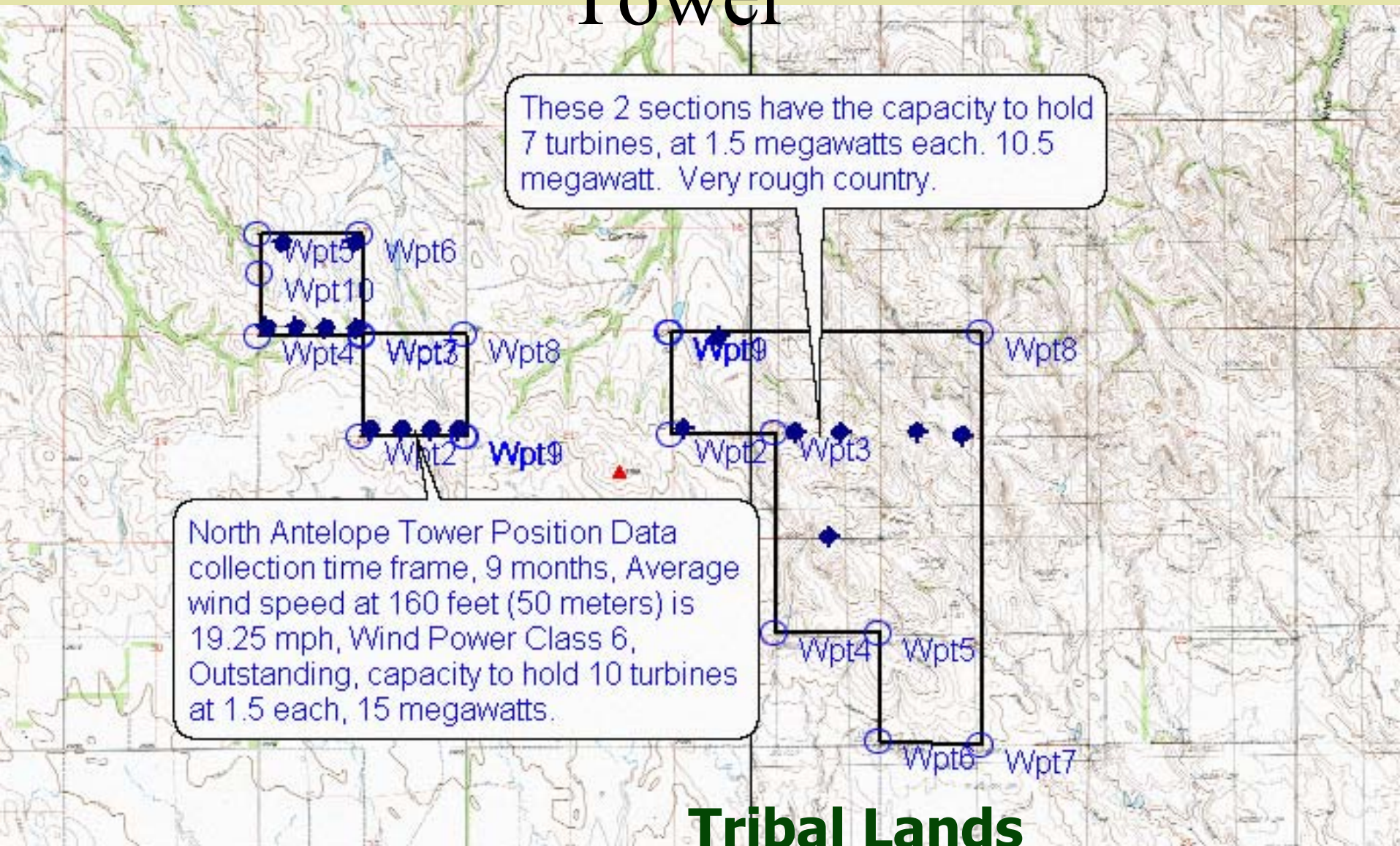
Anticipated Time Lines

- Nov. 2004, Complete Geo-tech report
- Dec. 2004, Complete NEPA and Submit to BIA
- Jan. 2005 Obtain Power Purchase Agreement
- Feb. 2005, BIA issues FONSI
- Feb/March 2005, Engage Investors/Rural Utilities Service, USDA, Secure Loan
- April 2005 advertise project for bid
- June 2005 Award bid for construction
- July 2005 Construction underway
- Dec 2005 Wind farm on line

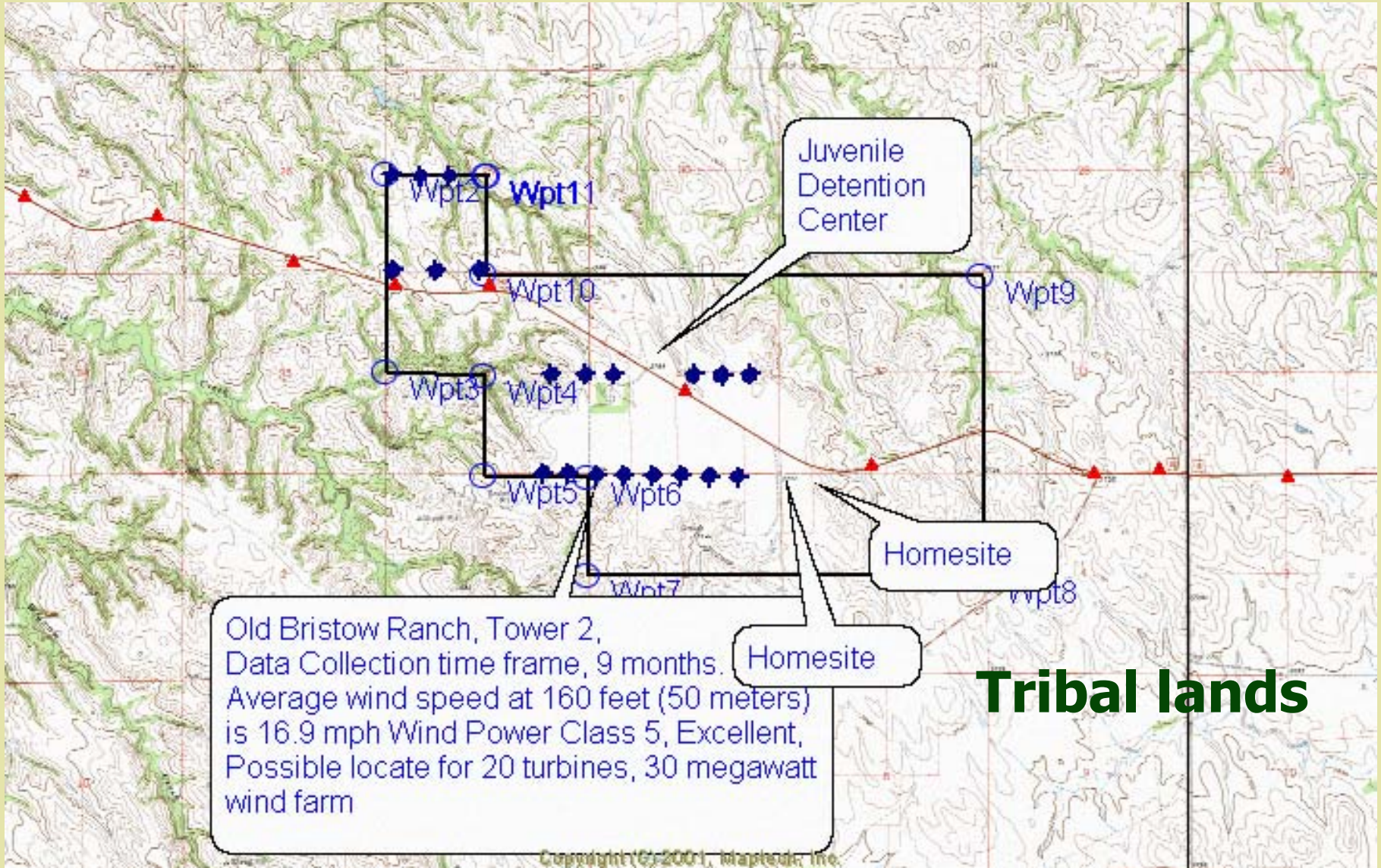
New Projects

- Meteorological Towers
- Geothermal Resource Potential
- SGU Wind Resource Mapping project

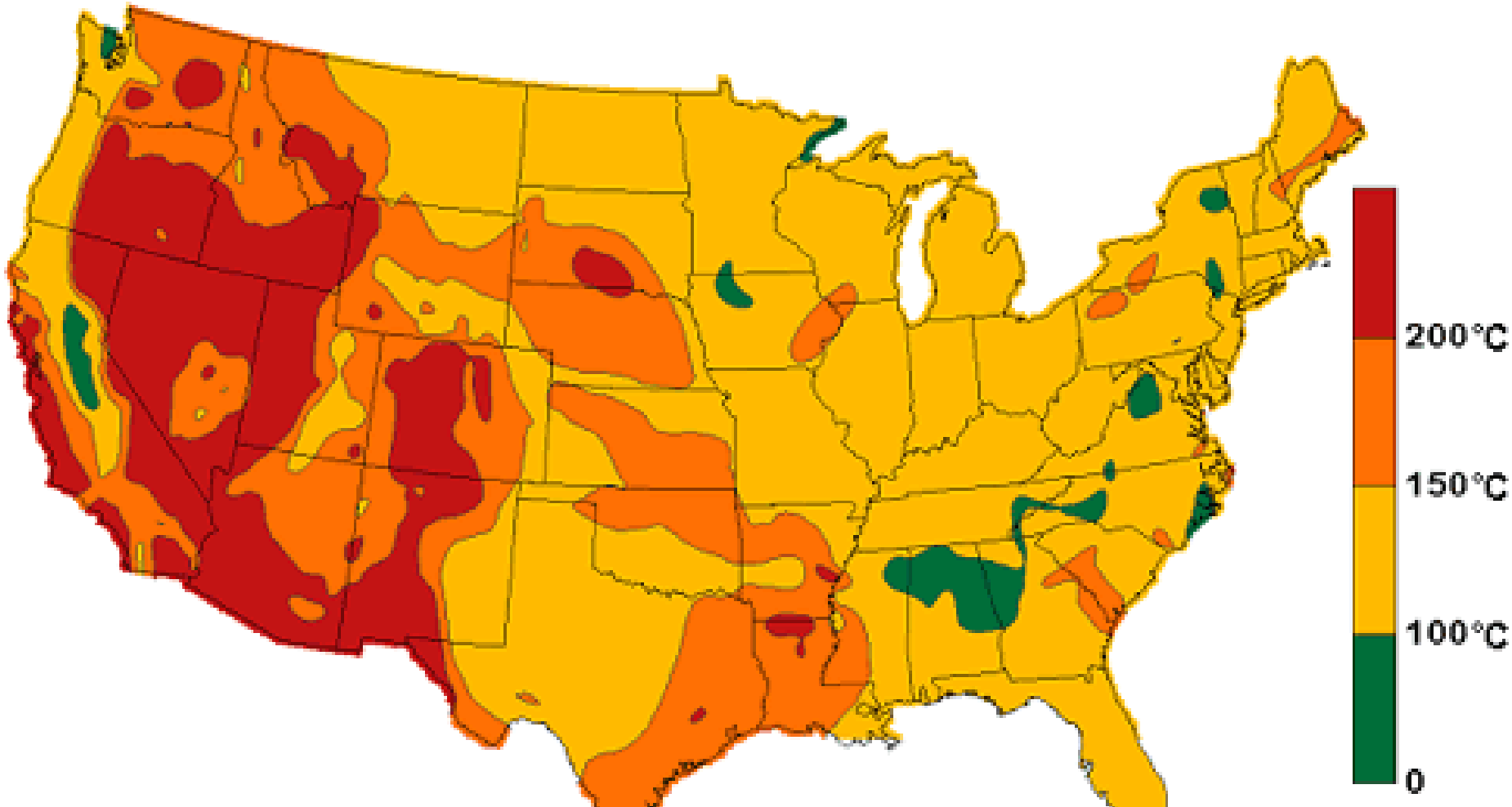
North Antelope Meteorological Tower



Old Bristow Ranch Meteorological Tower



Geothermal Resource



Geothermal Data

- Gather deep well information across the 5 county area.
- Investigate the potential of Direct Heat for communities, schools, offices, etc.

http://geoheat.oit.edu/bulletin/bull18-4/art54.htm

http://geoheat.oit.edu/sdakota.htm#todd

http://geoheat.oit.edu/sdakota.htm#mell

Sinte Gleska University
Wind Mapping Project, GIS/GPS

- *Development of a site characterization application for potential wind energy sites on on tribal lands within a 5 county area*
- *Integrate high resolution image data and available wind models for the region optimizing maps for potential wind site characteristics*
- *Map exclusion areas ie: Cultural resources, environmental and wildlife zones etc.*
- *Real world test and training example for data collection using GIS/GPS.*
- *Joint project endeavor, SGU, USGS, RST Resource Development*