



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

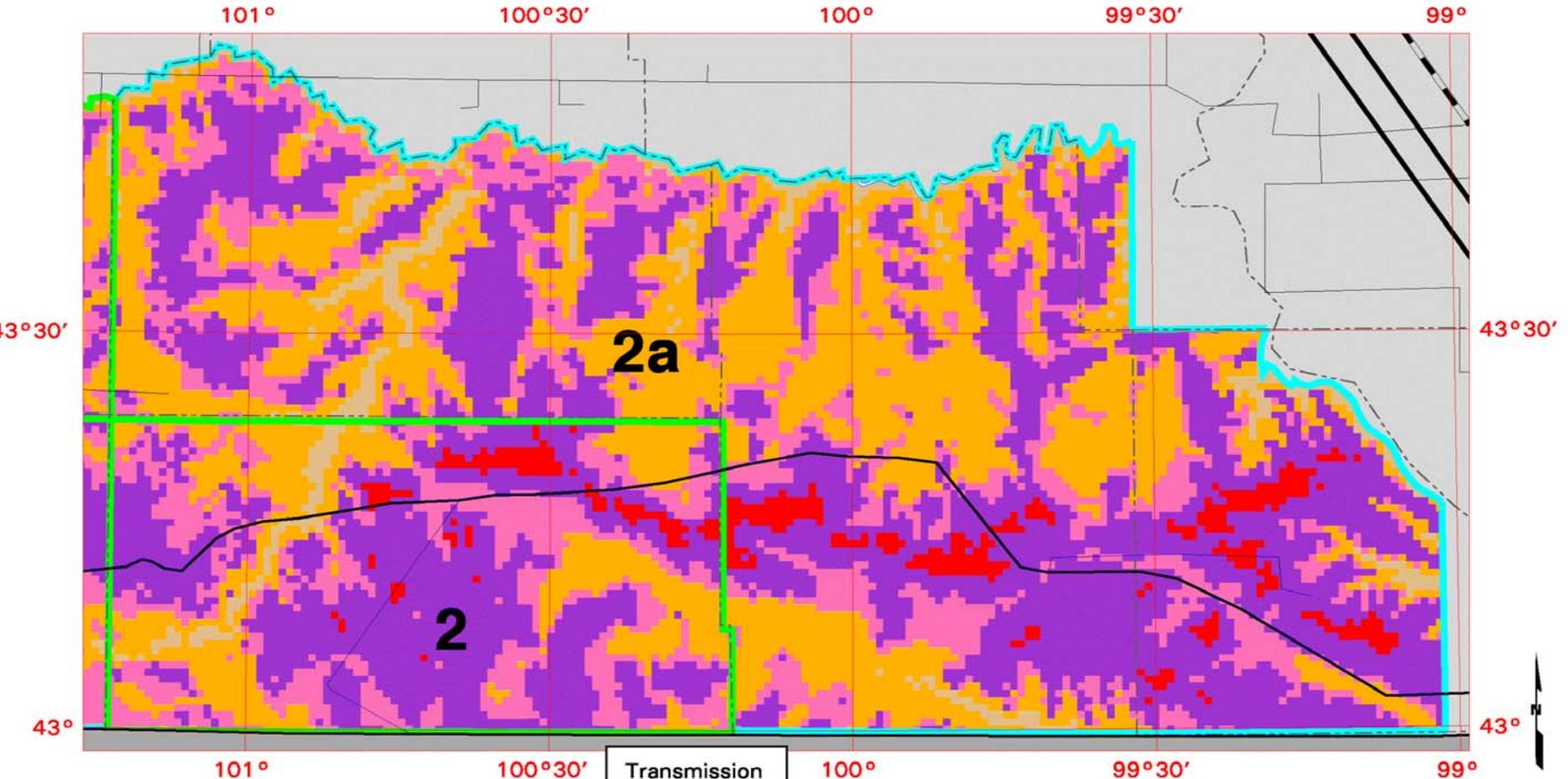
Wind Farm Site, looking East



Wind Farm Site, looking West



South Dakota - Rosebud Reservation Wind Resource Map and Capacity



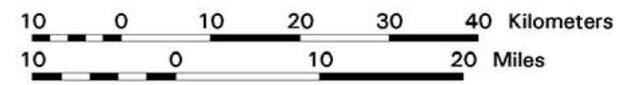
Wind Power Classification				
Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m ²	Wind Speed ^a at 50 m m/s	Wind Speed ^a at 50 m mph
2	Marginal	200 - 300	5.6 - 6.4	12.5 - 14.3
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	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

^aWind speeds are based on a Weibull k value of 2.0

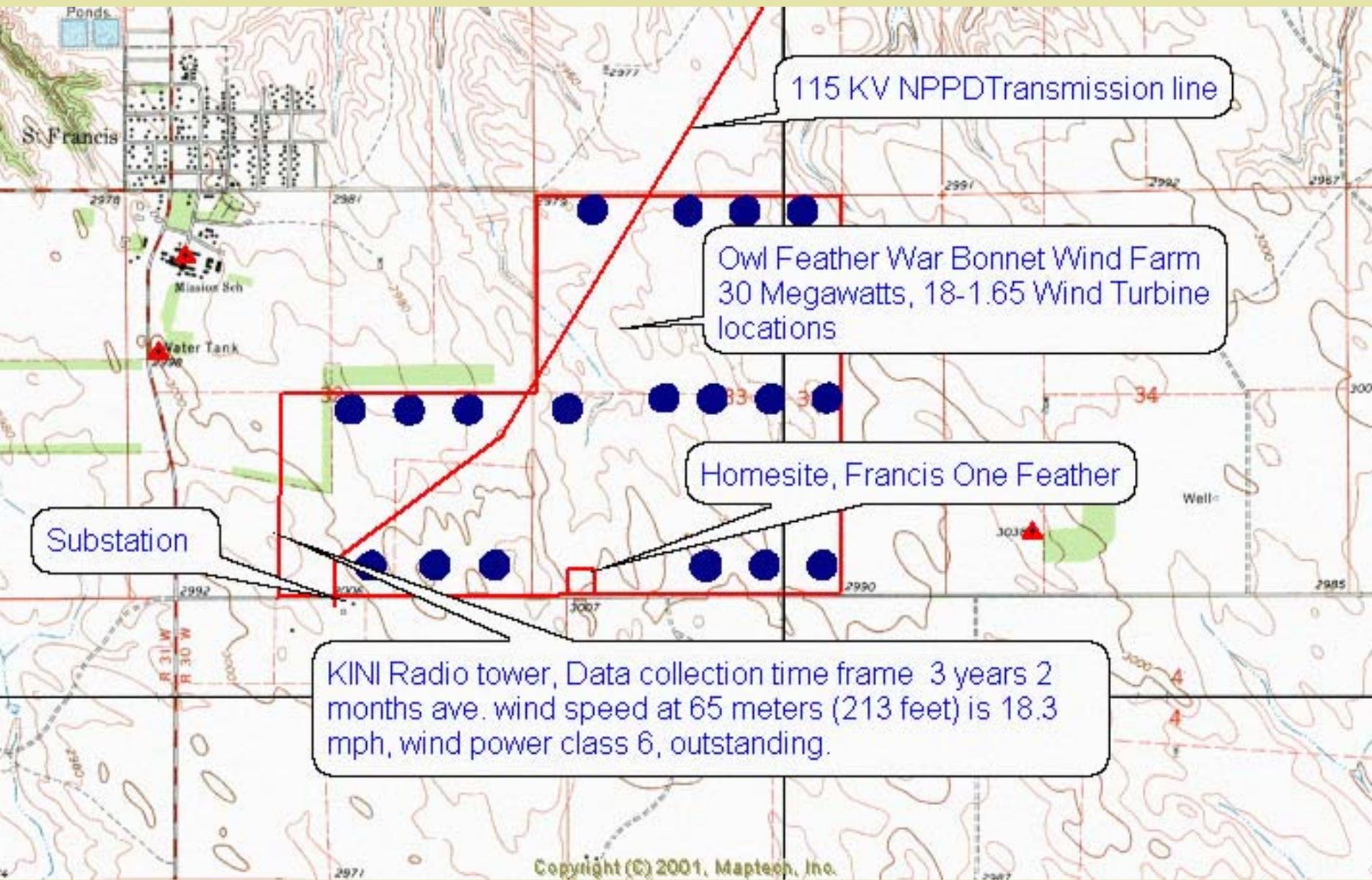
Transmission Line Voltage

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

★ Federal Facility
□ City or Town



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



115 KV NPPD Transmission line

Owl Feather War Bonnet Wind Farm
30 Megawatts, 18-1.65 Wind Turbine
locations

Homesite, Francis One Feather

Substation

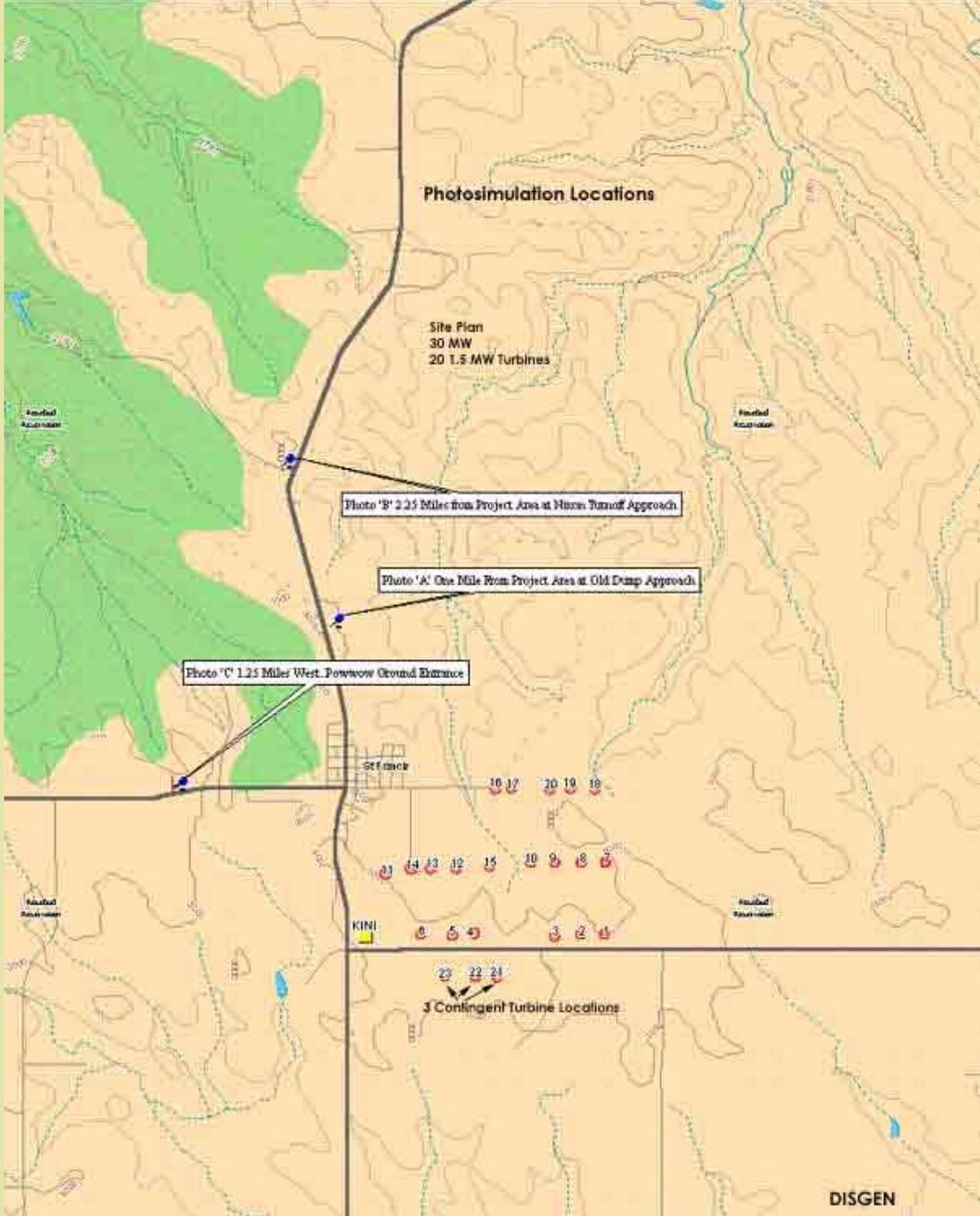
KINI Radio tower, Data collection time frame 3 years 2
months ave. wind speed at 65 meters (213 feet) is 18.3
mph, wind power class 6, outstanding.

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



Topo USA 2.0 Copyright © 1999 DeLorme Yarmouth, ME 04096 Scale: 1 : 50,000 Detail: 12-0

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

Note: 3 extra turbines

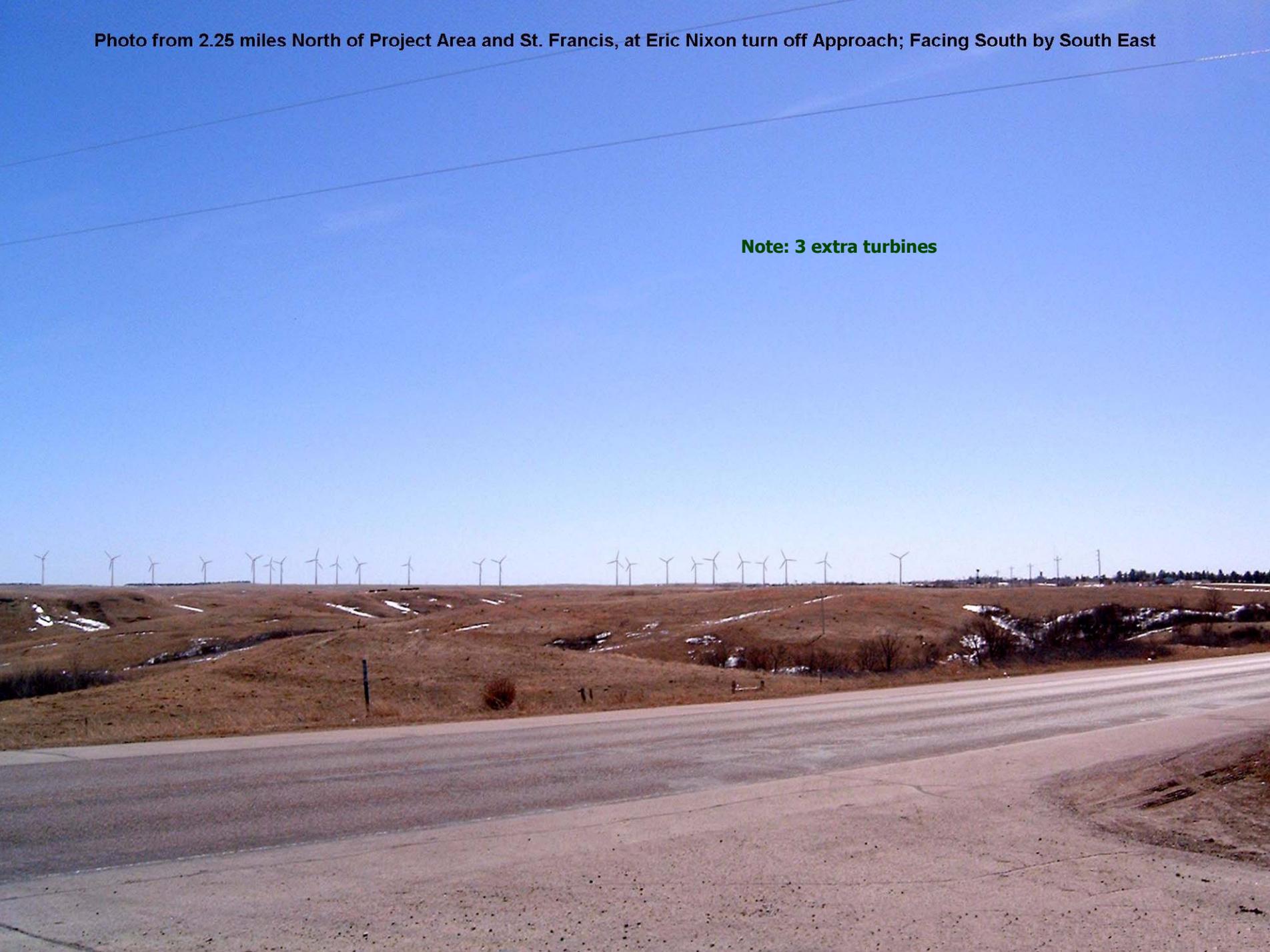


Photo from 1.25 Miles West of Project Area at Powwow Grounds Entrance Approach, Facing East by Southeast. St. Francis in Foreground.



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

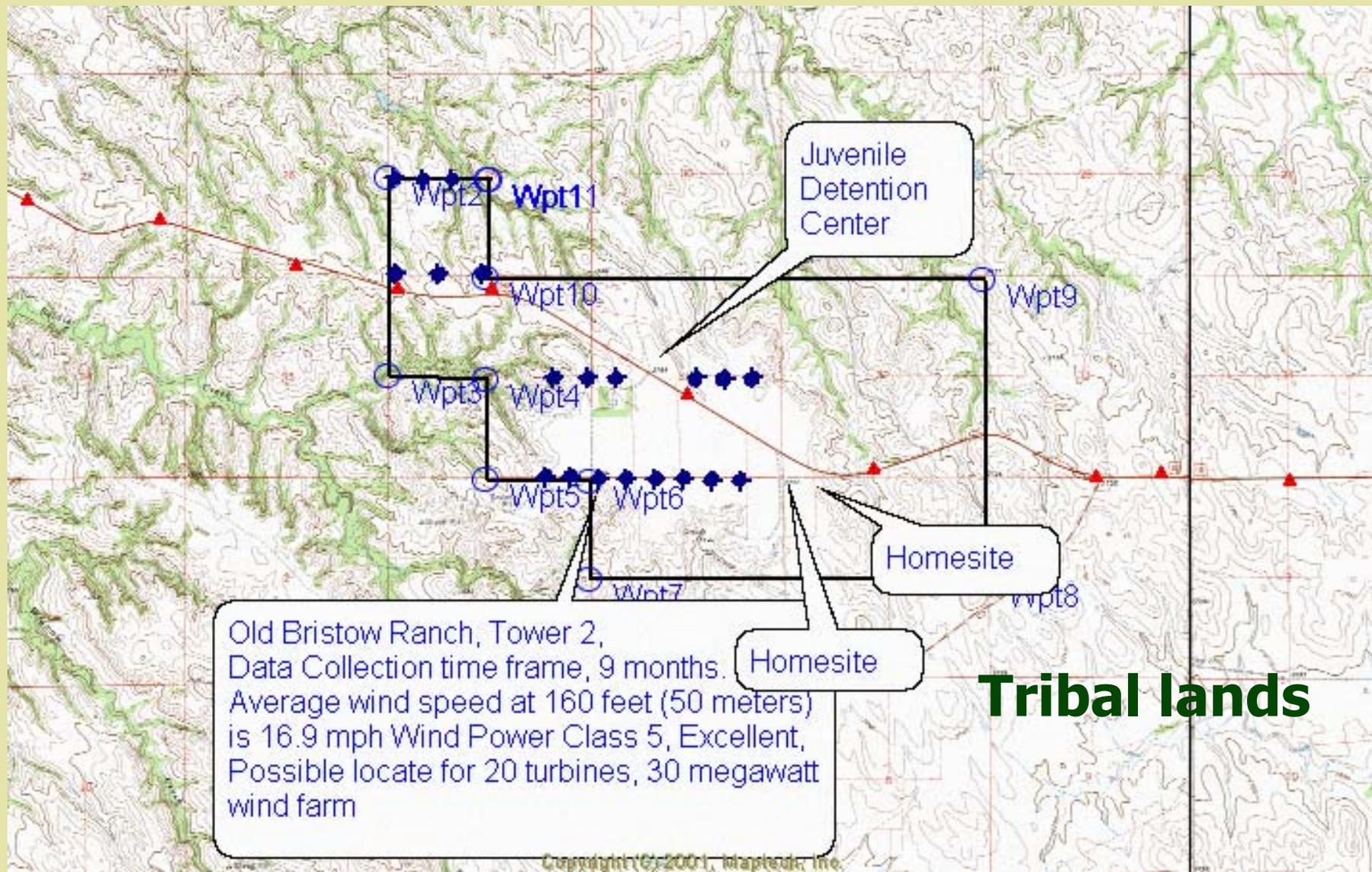
North Antelope Meteorological Tower

These 2 sections have the capacity to hold 7 turbines, at 1.5 megawatts each. 10.5 megawatt. Very rough country.

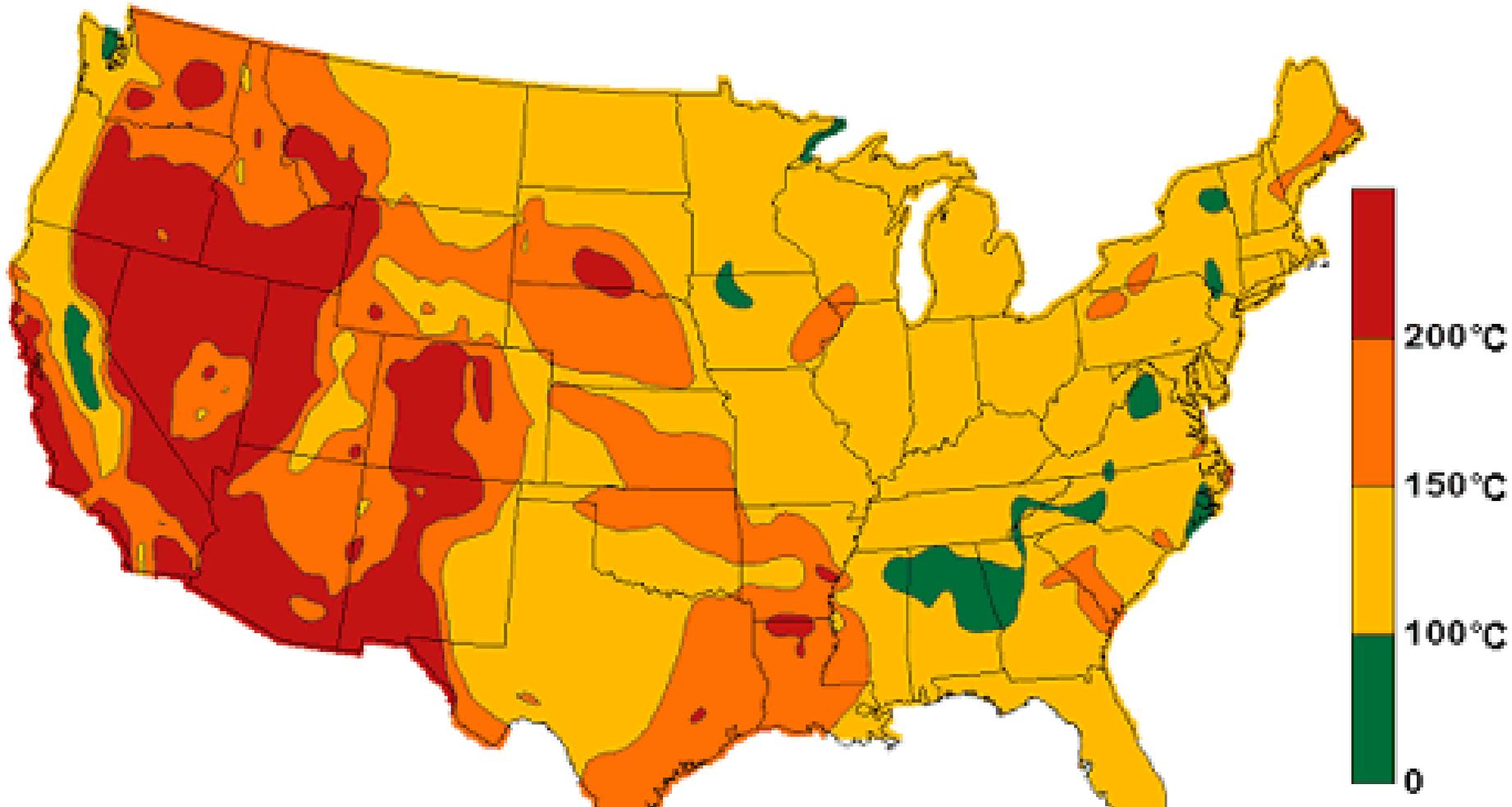
North Antelope Tower Position Data collection time frame, 9 months, Average wind speed at 160 feet (50 meters) is 19.25 mph, Wind Power Class 6, Outstanding, capacity to hold 10 turbines at 1.5 each, 15 megawatts.

Tribal Lands

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*