ASSINIBOINE & SIOUX TRIBES OF THE FORT PECK INDIAN RESERVATION

Office of Energy/Economic Development

November 13-16, 2012
MISSOURI RIVER - BOARDERS THE SOUTH END OF THE RESERVATION
EECBG

- Train 6 installers of GSHP’s at the IGSHPA
- Install 8 GSHP on Tribal houses
- Monitor savings via electric bills
GROUND SOURCE HEAT PUMP INSTALLER TRAINING

- International Ground Source Heat Pump Association (IGSHPA)
- August 23rd thru August 26th, 2011
- Stillwater, Oklahoma
- Certified GSHP Installers
- Certified in Socket and Butt Fusion
ENERGY DYNAMICS & RED STONE LLC

• James Schink- Energy Dynamics
• Mike McKeever- Red Stone LLC
• Provided Technical Assistance
• Ground Source Heat Pump Equipment
• Hands on Training
• Certified Tribal Installers as GSHP Dealers for Fort Peck Reservation
RESIDENTIAL WARRANTY

• *Lifetime* Cabinet, Heat Exchanger and Compressor Warranty

• 10-Year Refrigerant System

• Component Warranty

• 10-Year Geothermal System Warranty

• 10-Year Parts Warranty

• 10-Year Labor Allowance Warranty
GSHP SITE LOCATIONS

Fort Peck Reservation
GROUND SOURCE HEAT PUMP SITES

• Installed 6 GSHP last fall 2011
• Selected 2 Additional GSHP locations
• Analyzed electric bills
February 2011
- Heated Natural Gas- $105/month
- Electricity- $65.47/Month
- Total $175.47/Month
- $.04816 KWH

February 2012
- Heated GSHP -$103
- Water Heater Natural gas- $17.46
ACKERMAN RESIDENCE

February 2010
- Heated Propane - $180/month
- Electricity - $146.80/Month
- Wood - $100/cord
- Total $426.80/Month
- $.09 KWH

February 2012
- Heated GSHP - $184/month
- Water Heater Electric - $ included
ELECTRICITY GENERATION FROM GEOTHERMAL RESOURCES ON THE FORT PECK RESERVATION IN NORTHEAST MONTANA

• The geothermal feasibility analysis will be performed to better define the geothermal resource underlying the Fort Peck Reservation

• Compiling historical research as well as conducting original research using the latest geophysical, geochemical, and geological sampling methods.

• In addition, the business feasibility analysis will examine the economic, technical, environmental, and cultural/social issues involved in developing the Tribes geothermal water for electrical generation.

• A business plan will also be developed to give Fort peck’s Assiniboine and Sioux Tribal leaders clear direction on how to proceed with commercial development of the geothermal resource.

• Tribal energy issues, including power purchase agreements and potential project financing mechanisms, will be assessed and will also feed into the final business plan design.
Gradient Geophysics’ Color Contour Map of Oil Well Bottom Hole Temperatures in East Poplar Field, Fort Peck Reservation, Northeast Montana

Top Reasons to Focus on East Poplar Field
- High Bottom Hole Temperatures
- Suggested High Water Flow Rates
- Close proximity to town of Poplar
- High density of existing oil wells
- Close proximity to cooling water

Top 10 Bottom Hole Temps in East Poplar Field
- EPU 1 : T deg = 275 F
- WELLIN> 1-29-3A : T deg = 271 F
- HUBER 5-D : T deg = 270 F
- ZIMMERMAN EPU 114 : T deg = 261 F
- SWANSON 8-16 : T deg = 249 F
- LOCKMAN 3-34 : T deg = 248 F
- OGLE 1 : T deg = 243 F
- FED. UNIT #63 : T deg = 242 F
- EPU 116 : T deg = 237 F
- MCGOWAN 23-1 : T deg = 230 F

Desirable Temperature Range for Geothermal
Top Oil Well Picks

1. EPU 1
2. EPU 6
3. Robbins 22-15

Top Water Producing Oil Wells in East Poplar Field with Bottom Hole Temperatures above 200 deg F

Robbins 22-15 : Temp = 219 F
Goings 27-3 : Temp = 218 F
EPU 110 : Temp = 227 F
EPU 83 : Temp = 230 F
EPU 1 : Temp = 275 F
Huber 2 : Temp = 224 F
EPU 6 : Temp = 209 F

Color Contour Map of Oil Well Water Flow Rates in East Poplar Field, Fort Peck Reservation, Northeast Montana
Air-Cooled Binary Geothermal Power Plant

Generator
Vaporizer
Turbine
Preheater
Motive Fluid Pump
Condenser

The organic vapor is condensed through cooling by air or water

Production Well
Hot Geothermal Fluid
Cooled Geothermal Fluid
Thermapower™ Medium Temperature Organic Rankine Cycle Module

Programmable Logic Controller (PLC) and Magnetic Bearing Controller (MBC)
Carefree™ Integrated Power Module (IPM)
Power Electronics
Receiver
Vapor from Evaporator to Expander
Liquid from Condenser to Reservoir
Liquid from Pump to Evaporator
Vapor from Expander to Condenser
Economizer
Variable Speed Fluid Pump
GEOTHERMAL GREEN HOUSES
TASHINA TIBBITTS

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