

## **Distributed Geothermal Power**

**Contract No. R-021-030**

Quarterly Progress Report: **December 31, 2014**

Submitted by:

*Michael D. Mann*

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### **Accomplishments:**

The UND team has been working with Access Energy for four years under a contract with the US Department of Energy to design and construct the geothermal power plant that will be installed on Continental Resources site near Rhome, ND. Quarterly reports will reflect work that is being completed under the existing DOE contract in addition to the new work (system installation and data collection) that will occur under Contract No. R-021-030.

The UND team worked with Access Energy to finalize the design requirements for the data collection system. The base design that was proposed under the DOE was not set up to monitor and report all of the data that will be required to meet the specifications of the new award.

Access Energy continued construction of the system, with the goal of completing construction by March, 2015.

### **Issues/Concerns:**

Under UND's original contract with Access Energy, Access Energy was to serve as the project manager for the installation of the system. Access Energy had been working directly with Continental Resources and Olson Construction, the contractor hired for the site preparation and installation. Due to a restructure at Access Energy, they will no longer serve as the overall project manager and have relinquished that role to UND.

In working with the contractors who will be responsible for the installation, it was realized that the project is underfunded. UND will need to raise additional funding to allow the project to move forward.

### **Plan for Next Quarter:**

UND will seek additional partners to help fully fund the project.

Access Energy will complete construction of the system.

The team will develop a timeline for installation of the system.

**Expenditures:**

No funds from the North Dakota Department of Commerce were expended during this reporting period. All work was performed by Access Energy under their subcontract to the U.S. Department of Energy and by UND faculty under their normal academic contract.

## **Distributed Geothermal Power**

**Contract No. R-021-030**

Quarterly Progress Report **March 31, 2015**

Submitted by:

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### **Accomplishments:**

Construction of the system has been completed. Schematic drawings are attached.

UND secured additional partners to help cover the costs of the system installation. A request will be submitted to the ND Department of Commerce to match this additional funding to provide the funding that is required to complete the project.

### **Issues/Concerns:**

The project will require the ND Department of Commerce to match the funds raised by UND to provide the funding that is required to complete the project.

UND has not issued a contract to Olson Construction, the contractor who will be installing the system. The contract will not be set up until UND has secured all of the funding required for the project.

### **Plan for Next Quarter:**

Obtain required funding required to complete the project.

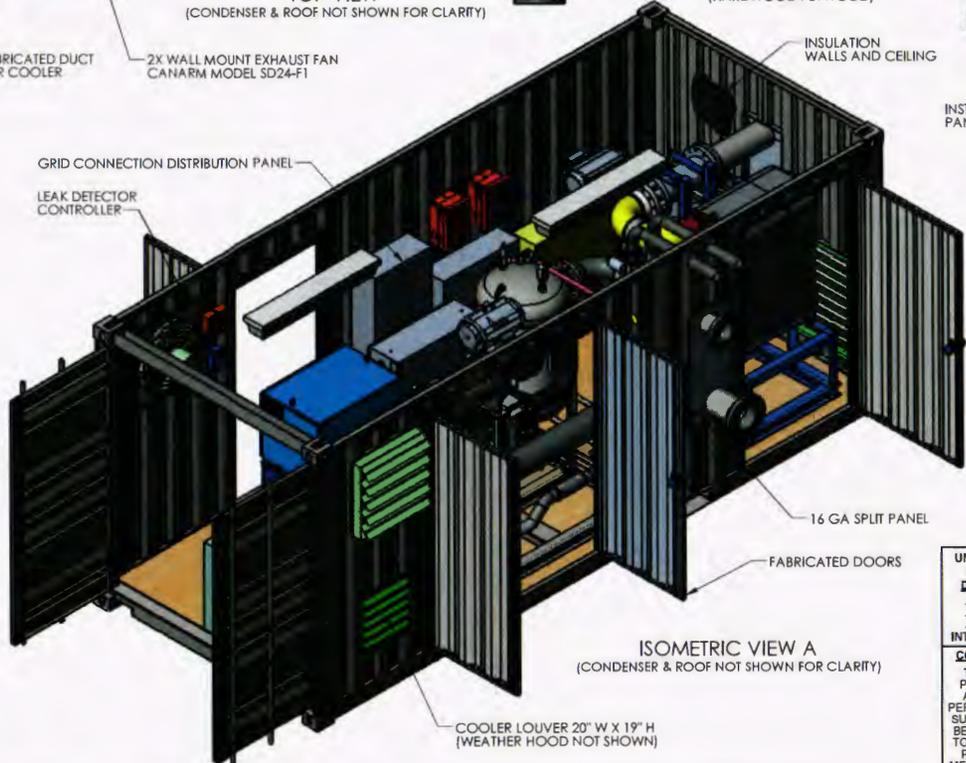
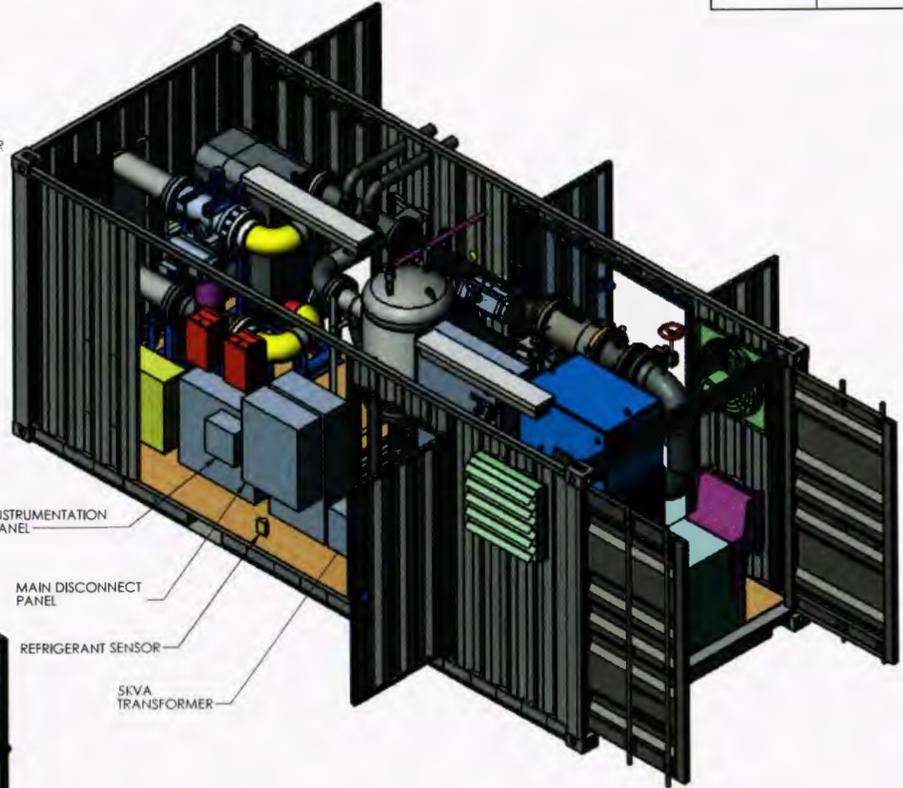
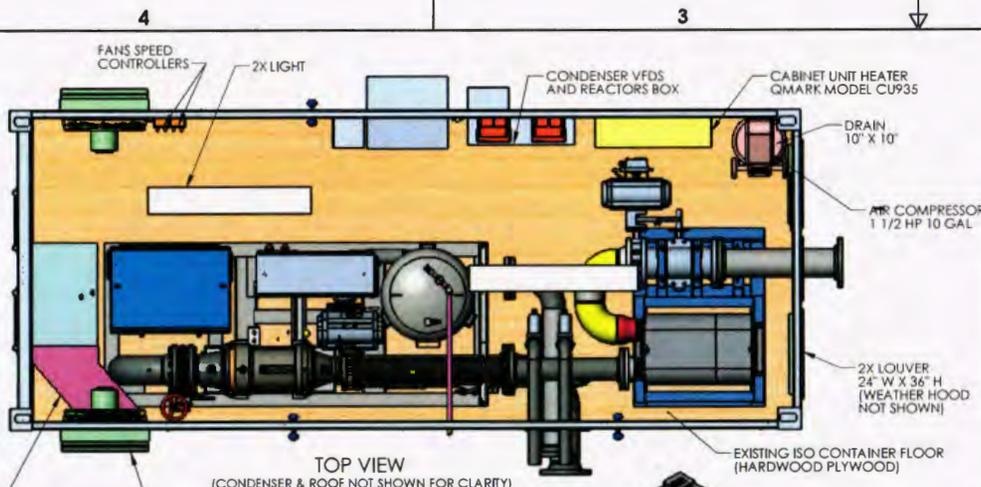
Initiate subcontract with Olson Construction.

Develop a timeline for installation of the system.

### **Expenditures:**

No funds from the North Dakota Department of Commerce were expended during this reporting period.

REVISION	DATE

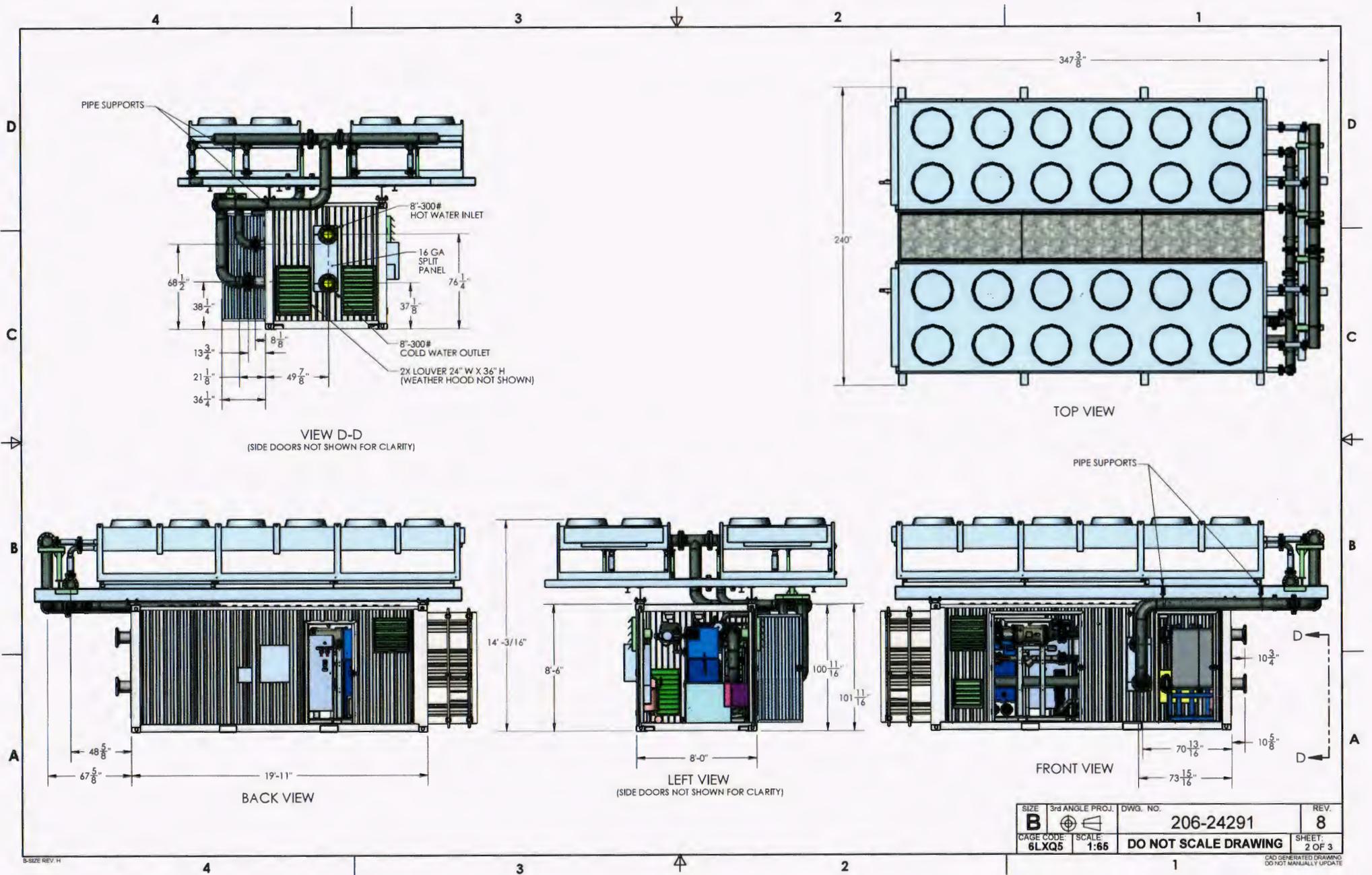


UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN INCHES  
**DECIMALS** ANGLES  
XXX ± .01 "X" ± .5"  
XXX ± .005  
XXXX ± .0005  
INTERPRET PER ASME Y14.5-2009

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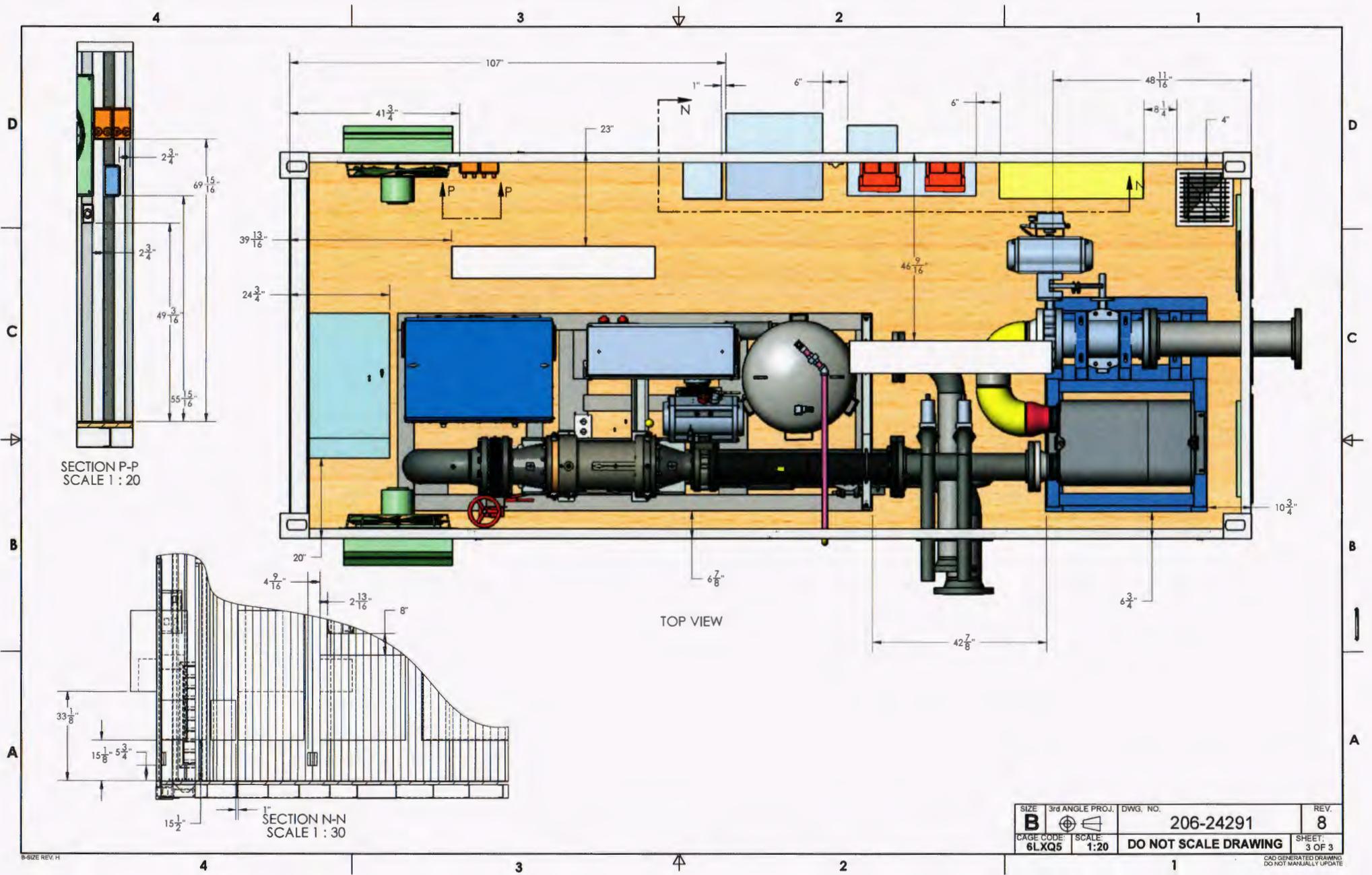
APPROVALS	DATE
DRAWN: KA	10/18/13
ENG CHECK: CZ/KA	05/07/14
PROJECT ENG:	
MFG ENG:	
QUALITY:	
PRODUCTION:	

	16323 Shoemaker Ave., Cerritos, CA 90703 (562)293-1680 Main (562)293-1689 Fax www.access-energy.com	
	DESCRIPTION: <b>ORGANIC RANKING CYCLE (ORC) CONTAINERIZATION GENERAL ARRANGEMENT</b>	
SIZE: <b>B</b> CAGE CODE: <b>6LXQ5</b>	3rd ANGLE PROJ. SCALE: <b>1:36</b>	DWG. NO.: <b>206-24291</b> REV.: <b>8</b> DO NOT SCALE DRAWING SHEET: <b>1 OF 3</b>



SIZE <b>B</b>	3rd ANGLE PROJ.	DWG. NO. <b>206-24291</b>	REV. <b>8</b>
CAGE CODE <b>6LXQ5</b>	SCALE <b>1:66</b>	<b>DO NOT SCALE DRAWING</b>	SHEET: <b>2 OF 3</b>

CAD GENERATED DRAWING  
DO NOT MANUALLY UPDATE



SECTION P-P  
SCALE 1 : 20

TOP VIEW

SECTION N-N  
SCALE 1 : 30

SIZE <b>B</b>	3rd ANGLE PROJ.	DWG. NO. 206-24291	REV. 8
CAGE CODE 6LXQ5	SCALE 1:20	DO NOT SCALE DRAWING	SHEET 3 OF 3

CAD GENERATED DRAWING  
DO NOT MANUALLY UPDATE

## **Distributed Geothermal Power**

**Contract No. R-021-030**

Quarterly Progress Report June 30, 2015

Submitted by:

*Michael D. Mann*

Michael D. Mann  
Institute for Energy Studies  
University of North Dakota

### **Accomplishments:**

Access Energy has tested the system components at the factory. All systems have passed inspection. The system is being packaged for shipment. Access Energy and Olson Construction are coordinating schedules to ensure a crane is available to off-load the equipment once it arrives on site and that the system components are not sitting exposed to the elements as they await installation. The photos below show the containerized ORC engine and the system with the condenser installed.

Contracts have been put in place with Olson Construction for the installation of the system. These contracts are "Not to exceed" as required by the terms of UND's contract with the NDIC.

### **Issues/Concerns:**

There are not current issues or concerns.

### **Plan for Next Quarter:**

Finalize the timeline for installation of the system.

Install and commission the system.

Begin full operation of the system.

Plan a ribbon cutting ceremony.

### **Expenditures:**

\$3,899 was expended from North Dakota Department of Commerce funds during this reporting period. \$97,000 was expended from the US Department of Energy as a part of the required match.



Containerized ORC Engine



ORC engine is housed in the container. The condenser is located on the top of the container.

## **Distributed Geothermal Power**

**Contract No. R-021-030**

Quarterly Progress Report September 31, 2015

Submitted by:

*Michael D. Mann*

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University of North Dakota

### **Accomplishments:**

Construction of the ORC system at Access Energy was completed. System checks were performed to verify system operation. The ORC was disassembled and shipped to the site. Olson Construction completed all of the site preparation work, received the ORC, and has begun assembly. The anticipated completion date for assembly of the ORC at the Continental site is November 1, 2105.

One issue that came up during the site preparation work was Continental Resource's desire for a separate cistern for the collection of water from the ORC in the event of a system shutdown. A cistern with the volume to handle at least two times the system volume was requested. A design was completed, added to the work scope of Olson Construction, and installation has been completed. This delayed the project and pushed the startup date into November.

### **Issues/Concerns:**

There are no current issues or concerns.

### **Plan for Next Quarter:**

Commission and begin full operation of the system.

Plan a ribbon cutting ceremony.

### **Expenditures:**

\$10,177 was expended from North Dakota Department of Commerce funds during this reporting period. \$97,000 was expended from the US Department of Energy as a part of the required match.

## **Distributed Geothermal Power**

**Contract No. R-021-030**

Quarterly Progress Report **March 31, 2016**

Submitted by:

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### **Accomplishments:**

Due to the cold weather, there were no activities on the site during this reporting period.

### **Issues/Concerns:**

There are no current issues or concerns.

### **Plan for Next Quarter:**

Commission and begin full operation of the system – currently scheduled for the week of April 18<sup>th</sup>.

Plan a ribbon cutting ceremony.

### **Expenditures:**

\$81,655 was expended from North Dakota Department of Commerce funds during this reporting period to cover the cost of installation expenses accrued during the previous quarter (\$250,298 cumulative since the start of the award).

No funds were expended from the US Department of Energy during this reporting period. \$97,000 has been spent as a part of the required match.

\$55,000 from Basin Electric has been expended during this reporting period to cover installation expenses accrued during the previous quarter. A total of \$55,000 has been spent as a part of the required match.

Access Energy has been accruing expenses towards this effort. We have not received a formal cost report at this time documenting their matching expenses.

## **Distributed Geothermal Power**

**Contract No. R-021-030**

Quarterly Progress Report June 30, 2016

Submitted by:

*Michael D. Mann*

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### **Accomplishments:**

Access Energy was on-site for commissioning and start-up of the units. While the units were brought up briefly, there were a number of issues identified that required corrective actions. Access Energy worked with personnel at Continental Resources to identify the main issues and order and install the inoperative parts. One of the parts required a 6 week lead time, which will push back the potential repair and startup until later in the summer.

The Geothermal Energy Association awarded The University of North Dakota/U.S. Department of Energy the 2016 Technology Advancement Award for launching the first commercial project coproducing geothermal power from an oil and gas well. The site was recognized as the first demonstration site to use low-temperature water produced in the conjunction with oil extraction. The U.S. Department of Energy estimates that "25 billion barrels of hot water are produced annually from oil and gas wells in the United States." The award was presented at the June 2016 Baseload Renewable Energy Summit.

### **Issues/Concerns:**

There were a number of issues identified during start-up of the systems. One of the repair items has a 6 week lead time which will push back the next attempt for start-up until August or later.

### **Plan for Next Quarter:**

Get all essential parts ordered.

Schedule the next commission site visit by Access Energy.

### **Expenditures:**

No funds were expended from North Dakota Department of Commerce funds during this reporting period (\$250,298 cumulative since the start of the award).

No funds were expended from the US Department of Energy during this reporting period. \$97,000 has been spent as a part of the required match.

No new funds have been expended from Basin Electric during this reporting period. A total of \$55,000 has been spent as a part of the required match.

Access Energy has been occurring expenses towards this effort. We have not received a formal cost report at this time documenting their matching expenses.