



The State of New Hampshire  
**DEPARTMENT OF ENVIRONMENTAL SERVICES**

**Thomas S. Burack, Commissioner**



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April 18, 2013

Her Excellency, Governor Margaret Wood Hassan  
and The Honorable Council  
State House  
Concord, NH 03301

*Sole Source*

REQUESTED ACTION

Authorize the Department of Environmental Services to enter into a **sole source** Cooperative Project Agreement with the United States Geological Survey, Pembroke, NH (Vendor Code #175772), in the amount of \$19,000 to conduct detailed temperature measurements in ten deep bedrock wells as part of the New Hampshire Geothermal Energy Assessment project, effective upon Governor and Council approval through December 31, 2013. 100% Federal Funds.

Funding is available in the account as follows:

03-44-44-440010-5048-102-500731

FY 2013

\$19,000

Dept Environmental Services, NH Geothermal Assessment, Contracts for Program Services

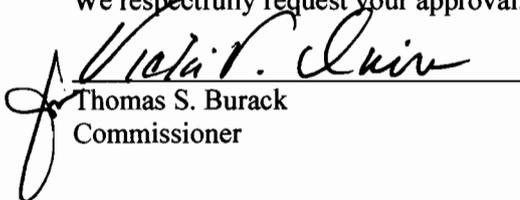
EXPLANATION

The New Hampshire Geological Survey (NHGS) is the sub-recipient of a United States Department of Energy grant to collect and compile data that characterize the potential to develop geothermal energy resources within the state and identify targets for further exploration. Downhole temperature profiles and other detailed measurements of borehole properties will be collected by the United States Geological Survey (USGS) in deep bedrock wells across the state, collaboratively with NHGS, to determine geothermal gradients with depth. The agreement is **sole source** because USGS possesses specialized equipment and expertise required for data collection and analysis and has previously demonstrated success in working with NHGS on a project that produced comparable deliverables. The resulting temperature profile data will become part of a national compilation, the National Geothermal Data System, to evaluate geothermal potential in each of the fifty states. These data will fill gaps in available information in order to assess the most promising rock formations in New Hampshire and create an opportunity for additional research.

The Joint Funding Agreement provides a detailed description of the work to be performed, the budget, and the workplan. The total cost of the project is \$32,758. DES will provide direct funding of \$19,000 towards the project. USGS will provide the balance of the total cost of the project (\$13,758).

This agreement has been approved by the Office of the Attorney General as to form, execution, and content. In the event that federal funds are no longer available, general funds will not be requested to support this program.

We respectfully request your approval.

  
Thomas S. Burack  
Commissioner



## Proposed Study

# **Logging of deep bedrock wells for geothermal characterization in New Hampshire**

In Cooperation between the NH Geological Survey and  
the US Geological Survey, NH-VT Office of the New England Water Science Center

February 2013

### **Introduction**

The NH Geological Survey (NHGS), through a grant from the US Department of Energy is characterizing deep groundwater wells for geothermal energy development potential in the state. As part of the scope of work, wells are to be logged for fluid temperature and bedrock properties and outcrop samples will be collected for analysis of mineralogy and heat conduction. These data will be part of a national inventory of data that will be used to evaluate geothermal potential across the United States. In 2012, the NHGS developed a cooperative project with the USGS to characterize similar properties on 10 wells (Degnan and others, 2012).

### **Objectives and scope**

The major objective of this study is to characterize geothermal gradients and bottom-of-hole temperature reflected in fluid temperature of groundwater in deep bedrock wells across the state of New Hampshire. Information obtained through this analysis will be used to further evaluate geothermal potential. Specific objectives include:

- Measure fluid temperature of groundwater in deep bedrock wells across the State
- Collect logs that can be used to characterize the bedrock in subsequent studies
- Include results in a USGS Digital Data Series (DDS) report that will compliment report DDS-728 (Degnan and others, 2012).

### **Approach**

Deep bedrock wells (between 500 and 800 feet in depth) will be identified and evaluated by the NHGS. Wells will be selected based on accessibility, lack of pumps and plumbing, and lack of intra-borehole flow potential. Data on fluid temperature will be collected at 10 wells using a Mt Sopris 2FPA-1000 probe with temperature resolution of 0.01 degrees Celsius. Data will be evaluated for accuracy and suitability in the field and in the office. All data will be entered into appropriate USGS data bases. Additional physical borehole properties, such as an oriented image of the bedrock borehole wall, borehole diameter, and natural gamma radiation data will be collected at the 10 wells. Should time and resources be available, fluid resistivity data will be collected at a subset of the 10 wells.

## Products

Results will be included in a USGS Digital Data Series Report (DDS) and will be available online through the USGS publications series web site. The report will document the methods used and provide the data in digital format and will be a compliment to DDS-728 (Degnan and others, 2012). All final data and geophysical surveys will be archived according the NH/VT Office archiving policies and will be made available to NHDES in electronic form.

## Relevance and Benefits

The results from this study will provide information on the nature and distribution of temperature gradients in deep bedrock aquifer wells for further evaluation in a geothermal energy context. The information will aid in the development of additional evaluation and research opportunities through NHDES. Collection and dissemination of the information will meet the broad USGS goal of providing information needed by other Federal and State agencies for research on groundwater resources of the Nation.

## Timeline and Costs

Field work would be conducted and completed in the third and fourth quarter of the federal fiscal year (FY) 2013 and a study report would be targeted for completion by November 1<sup>st</sup> during the first quarter of FY2014. Log ascii standard (LAS) files will be available by November 1<sup>st</sup>, 2013. An update of progress and preliminary results will be provided to the NHGS in project meetings. The project timeline and the costs of the study is shown in tables 1 and 2.

**Table 1.** Proposed timeline for the study:

Work plan Element	FY13			FY14
	Jan-Mar	Apr-June	July-Sept	Oct-Dec
Project Planning		x		
Data collection/analysis		x	x	
Report generation/publication				x

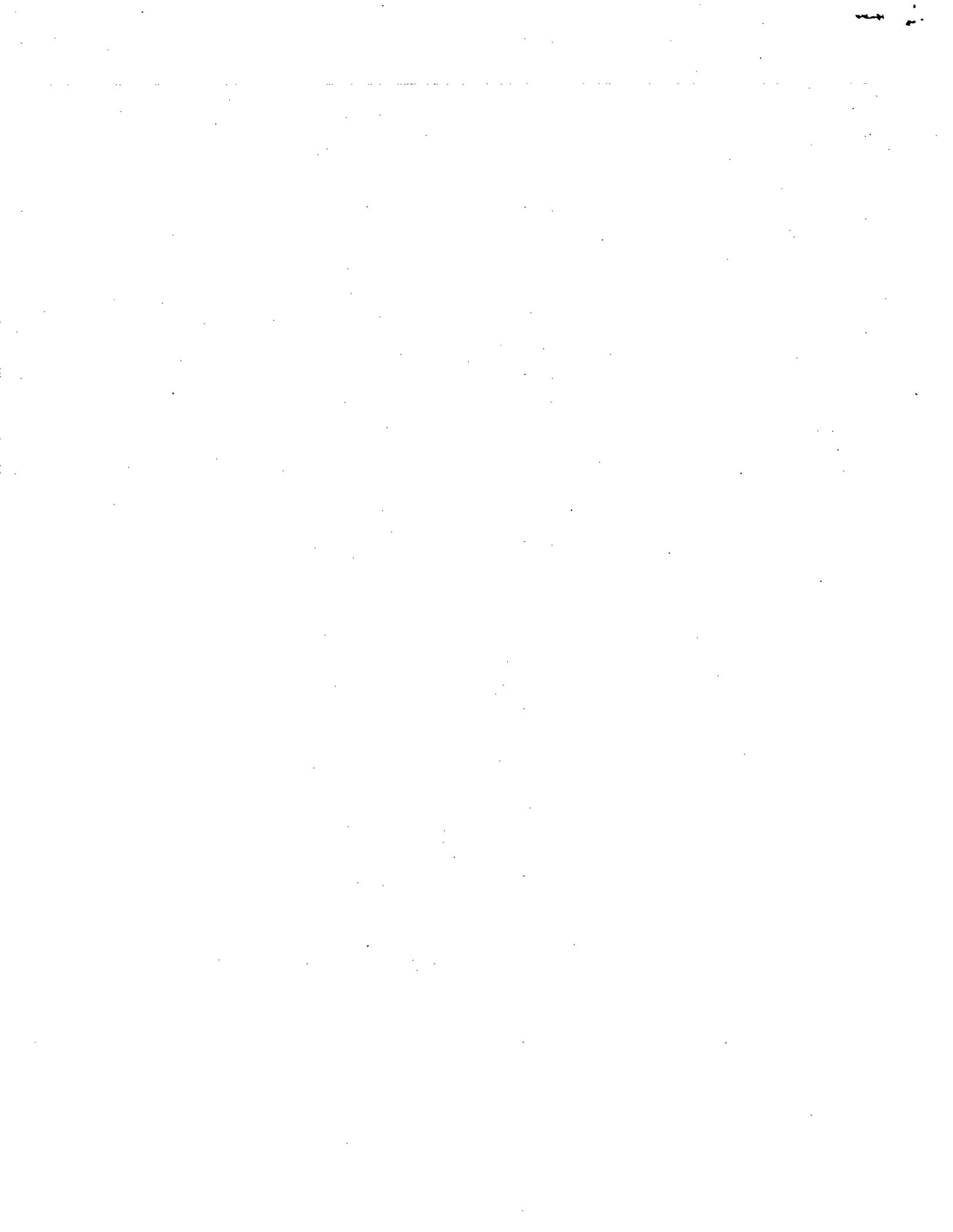
**Table 2.** Summary of costs:

Element	FY13	FY14	Total Project Cost
Total Direct	14,085	8,945	23,030
Total Indirect Costs	5,950	3,778	9,726
<b>Total</b>	<b>20,035</b>	<b>12,723</b>	<b>32,758</b>
<b>Summary of Costs by Agency</b>			
NH Department of Environmental Services	11,620	7,380	19,000
U.S. Geological Survey	8,414	5,344	13,758

## Reference

Degnan, J.R., Barker, Gregory, Olson, Neil, and Wilder, Leland, 2012, Temperature logging of groundwater in bedrock wells for geothermal gradient

characterization in New Hampshire, 2012: U.S. Geological Survey Data Series  
728, 19 p., available only at <http://pubs.usgs.gov/ds/728/>.



Form 9-1366

U.S. DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

JOINT FUNDING AGREEMENT

Customer #: 6000000093  
Agreement #: 13ENNH000000012  
Project #: LH00F8C  
TIN #: 02-6000618  
Fixed Cost YES  
Agreement

FOR

THIS AGREEMENT is entered into as of the, 1st day of April , 2013 by the U.S. GEOLOGICAL SURVEY, UNITED STATES DEPARTMENT OF THE INTERIOR, party of the first part, and the STATE OF NEW HAMPSHIRE, DEPARTMENT OF ENVIRONMENTAL SERVICES, party of the second part.

1. The parties hereto agree that subject to availability of appropriations and in accordance with their respective authorities there shall be maintained in cooperation an investigation to characterize geothermal gradients and bottom-of-the-hole temperature reflected in fluid temperature of groundwater in deep bedrock wells across the state of New Hampshire. herein called the program. The USGS legal authority is 43 USC 36C; 43 USC 50; and 43 USC 50b.

2. The following amounts shall be contributed to cover all of the cost of the necessary field and analytical work directly related to this program. 2(b) includes In-Kind Services in the amount of \$0.00

(a) by the party of the first part during the period

Amount	Date	to	Date
\$13,758.00	April 1, 2013		December 31, <del>2014</del>

(b) by the party of the second part during the period

Amount	Date	to	Date
\$19,000.00	April 1, 2013		December 31, <del>2014</del>

*2013 1/10/13 WE*

*2013 1/10/13 WE*

(c) Additional or reduced amounts by each party during the above period or succeeding periods as may be determined by mutual agreement and set forth in an exchange of letters between the parties.

(d) The performance period may be changed by mutual agreement and set forth in an exchange of letters between the parties.

3. The costs of this program may be paid by either party in conformity with the laws and regulations respectively governing each party.

4. The field and analytical work pertaining to this program shall be under the direction of or subject to periodic review by an authorized representative of the party of the first part.

5. The areas to be included in the program shall be determined by mutual agreement between the parties hereto or their authorized representatives. The methods employed in the field and office shall be those adopted by the party of the first part to insure the required standards of accuracy subject to modification by mutual agreement.

JOINT FUNDING AGREEMENT (CONTINUATION)

Customer Number	Agreement Number	Project Number
6000000093	13ENNH000000012	LH00F8C

be open to the inspection of the other party, and if the work is not being carried on in a mutually satisfactory manner, either party may terminate this agreement upon 60 days written notice to the other party.

- 7. The original records resulting from this program will be deposited in the office of origin of those records. Upon request, copies of the original records will be provided to the office of the other party.
- 8. The maps, records, or reports resulting from this program shall be made available to the public as promptly as possible. The maps, records, or reports normally will be published by the party of the first part. However, the party of the second part reserves the right to publish the results of this program and, if already published by the party of the first part shall, upon request, be furnished by the party of the first part, at costs, impressions suitable for purposes of reproduction similar to that for which the original copy was prepared. The maps, records, or reports published by either party shall contain a statement of the cooperative relations between the parties.
- 9. USGS will issue billings utilizing Department of the Interior Bill for Collection (form DI-1040). Billing documents are to be rendered Quarterly. Payments of bills are due within 60 days after the billing date. If not paid by the due date, interest will be charged at the current Treasury rate for each 30 day period, or portion thereof, that the payment is delayed beyond the due date. (31 USC 3717; Comptroller General File B-212222, August 23, 1983).

**U.S. GEOLOGICAL SURVEY  
UNITED STATES  
DEPARTMENT OF THE INTERIOR**

**STATE OF NEW HAMPSHIRE  
DEPARTMENT OF ENVIRONMENTAL  
SERVICES**

**USGS POINT OF CONTACT**

**CUSTOMER POINT OF CONTACT**

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Name: Frederick Chormann  
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 Email: frederick.chormann@des.nh.gov

**SIGNATURE AND DATE**

**SIGNATURE AND DATE**

Signature:   
 Date: 4/10/13  
 Name: Keith W. Robinson  
 Title: Director, New England Water Science Center

Signature:   
 Date: \_\_\_\_\_  
 Name: Thomas Burack  
 Title: NHDES Commissioner

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Signature: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 Name: \_\_\_\_\_  
 Title: \_\_\_\_\_

Signature:   
 Date: 4-16-13  
 Name: Evan Mulholland  
 Title: NH Department of Justice/Assistant Attorney General