



THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION



111
Bent

CHRISTOPHER D. CLEMENT, SR.
COMMISSIONER

JEFF BRILLHART, P.E.
ASSISTANT COMMISSIONER

Bureau of Materials & Research
May 23, 2013

Her Excellency, Governor Margaret Wood Hassan
and the Honorable Council
State House
Concord, New Hampshire 03301

Sole Source

REQUESTED ACTION

Authorize the Department of Transportation to enter into a **sole-source** Joint Funding Agreement with the U.S. Geological Survey (Vendor 200815), Pembroke, NH, for a total fee not to exceed \$70,000.00, for a cooperative investigation on determining sources of nitrate in wells near blasting sites in New Hampshire, effective upon Governor and Council approval, through September 30, 2014. 100% Federal Funds.

Funding is contingent upon the availability and continued appropriation of funds in FY 2014, as follows:

04-96-96-962015-3036	<u>FY 2014</u>
SPR Research Funds	
046-500464 General Consultants Non-Benefit	\$70,000.00

EXPLANATION

The Department is collaborating with USGS to conduct a cooperative research study to determine the source of nitrates in drinking wells near blasting sites. The U.S. Geological Survey (USGS) is uniquely qualified to conduct this study because of their comprehensive knowledge of groundwater transport characteristics, unique isotope testing capabilities, and reputation for its unbiased, science-based approach to complex and sensitive issues. In addition, the Department's contribution of \$70,000 will be matched with \$42,000 of USGS funds through the Joint Funding Agreement. Finally, the Pembroke office has successfully performed other studies for the Department in the past, including research related to bridge scour, investigations of flood magnitude and frequency, and development of the web-based New Hampshire StreamStats tool.

There have been recent issues with respect to blasting operations that represent a potential liability for the Department. Blasting operations for bedrock excavation on construction projects such as the I-93 widening are potential sources for nitrate contamination of drinking water wells. However, other common sources of contamination frequently exist in close proximity to affected wells. Differentiating between blasting-related causes and other potential sources such as septic systems, animal wastes,

fertilizers, decomposing vegetation or landfill leachate would aid in determining, limiting, or managing the Department's liability in such matters.

Standard water quality analyses designed to determine the safety of drinking water are not sufficient to identify the source(s) of contamination. This investigation will use isotopes of nitrogen and oxygen in water sampled from private wells, monitoring wells and surface water locations, along with conventional hydrologic and geologic data, to indicate the source of contaminants near I93 blasting sites.

This Agreement has been approved by the Attorney General as to form and execution. The Department will verify the necessary funds are available pending enactment of the Fiscal Year 2014 and 2015 budget. Copies of the fully-executed Agreement are on file at the Secretary of State's Office and the Department of Administrative Services, and subsequent to Governor and Council approval will be on file at the Department of Transportation.

It is respectfully requested that authority be given to enter into a sole-source Agreement for consulting services as outlined above.

Sincerely,

A handwritten signature in black ink, appearing to read "C. D. Clement, Sr.", written in a cursive style.

Christopher D. Clement, Sr.
Commissioner

Attachments

Form 9-1366
(Oct. 2005)

**U.S. Department of the Interior
U.S. Geological Survey
Joint Funding Agreement**

Page 1 of 2
Customer #: 6000000093
Agreement #: 13ENNH000000025
Project #: LH00FA7
TIN #: 02-6000618
Fixed Cost Agreement Yes No

**FOR
WATER RESOURCES INVESTIGATIONS**

THIS AGREEMENT is entered into as of the 10th day of July, 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 TRANSPORTATION, 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 on determining sources of nitrates in wells near blasting sites in 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) \$42,000.00 by the party of the first part during the period
July 10, 2013 to September 30, 2014

(b) \$70,000.00 by the party of the second part during the period
July 10, 2013 to September 30, 2014

(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.
6. During the course of this program, all field and analytical work of either party pertaining to this program shall 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.

Form 9-1366
continued

U.S. Department of the Interior
U.S. Geological Survey
Joint Funding Agreement

Customer #: 6000000093
Agreement #: 13ENNH000000025
Project #: LH00FA7
TIN #: 02-6000618

- 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 Transportation

USGS Point of Contact

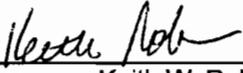
Customer Point of Contact

Name: James R. Degnan
Address: New England Water Science
Center/NH-VT Office
331 Commerce Way, Suite 2
Pembroke, NH 03275
Telephone: (603) 226-7826
Email: jrdegan@usgs.gov

Name: Krystle Pelham
Address: NHDOT, Bureau of Materials and
Research
5 Hazen Road, PO Box 0483
Concord, NH 03302-0483
Telephone: (603) 271-1657
Email: kpelham@DOT.state.nh.us

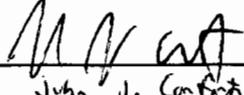
Signatures

Signatures

By  Date 4/21/13
Name: Keith W. Robinson
Title: Director

By  Date 6/24/13
Name: William J. Cass, P.E.
Title: Director of Project Development

By _____ Date _____
Name:
Title:

By  Date 6/24/13
Name: John J. Conforti
Title: Attorney, N.H. Dept. of Justice

By _____ Date _____
Name:
Title:

By _____ Date _____
Name:
Title:

Proposed Study

Determining sources of nitrate in wells near blasting sites in New Hampshire

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

April 2013

Introduction

Blasting operations have the potential to contaminate groundwater wells with nitrate; however, there are other common sources of nitrate contamination that can exist within close proximity to wells. Standard water quality analyses designed to determine the safety of drinking water may not be sufficient to identify sources of contaminants, and, therefore, additional analyses are warranted. When groundwater contamination of drinking water wells is reported during or after blasting operations, it is not always clear whether the blasting operation is the actual source of the contamination or if there is another source. Analysis of isotopes of nitrogen and oxygen (Böhlke and others, 2007) has been used to indicate sources of nitrate in groundwater (McMahon and others, 2008, Kendall, 1998). Ratios of other constituents, such as bromide and chloride can provide additional evidence of the sources of contamination (Mullaney, 2009).

Objectives

The ability to identify and differentiate contaminant sources in monitoring and drinking water wells will help determine if blasting operations influence groundwater quality. The main objective is differentiating between blasting-related nitrogen and nitrogen from other potential sources, such as septic systems, animal wastes, fertilizer, decomposing vegetation, or landfill leachate. Specific objectives include:

1. Identify sources of nitrate and ammonia in private domestic and monitoring wells by analyzing each for isotopes of nitrogen (and in nitrate, isotopes of the associated oxygen).
2. Corroborate and confirm the source(s) of nitrate with other information, such as geochemical, hydrologic, and geologic data.

Approach and Methods

1. Isotopes of oxygen and nitrogen in nitrate dissolved in groundwater from wells near blasting sites will be used, in conjunction with geologic, hydrologic, and geochemical data to indicate whether the source was fertilizer or waste sources.

Ratios of the isotopes correlate with sources of nitrogen compounds; sources can be identified by comparing these ratios to end-member ratios in the literature and those developed during this study. Dissolved gasses, bromide, and isotopes of nitrogen in ammonium and nitrogen and oxygen in nitrate will be analyzed at USGS laboratories. Information on collection procedures and methods of isotope analysis from the Reston Stable Isotope Laboratory is available at <http://isotopes.usgs.gov/>, dissolved gasses will be analyzed at the Reston Chlorofluorocarbon Laboratory, <http://water.usgs.gov/lab/> and bromide at the National Water Quality Laboratory, <http://nwql.usgs.gov/>.

2. Additional, commonly used, water quality constituents and field parameters, such as temperature, specific conductance, pH, and dissolved oxygen, will be analyzed to provide insight during comparisons with preexisting data and additional lines of evidence to support conclusions. The NHDOT will have analysis completed through their contract lab for volatile organic compounds (including benzene), major anions including nitrate, sulfate, and chloride and major cations including calcium, magnesium, boron, and sodium.
3. Approximately thirty samples will be analyzed for isotopic ratios. Nutrient data analyzed at the NHDOT contract lab will be used as a screening tool to decide which samples will be submitted for isotopic analysis. Ten percent of samples will be used for a quality control analysis including duplicate and equipment blank samples for each constituent. Septic systems and water softening systems may be a source of some major ions, the presence of these systems will be confirmed during sampling.
4. Samples will be collected prior to blasting in the areas of concern to establish a pre-blasting background condition. Also, samples that are believed to contain nitrate from blasting materials will be collected to identify the isotopic fingerprint of the ammonium nitrate used in those materials.
5. After blasting commences, wells will be monitored for indicator parameters, such as specific conductance and nitrate. If nitrate increases over time, samples for isotopes will be collected and analyzed to determine the sources related to the increase. Hydraulic information from previous studies and nitrate data from existing wells will be used to guide the sampling planning. Different wells, samples, and other information may be used as warranted by examination of initial findings.
6. If analysis shows that multiple sources of nitrate are present at some wells, it may be possible to apply simple mixing models to determine the relative contribution of each nitrogen source. A conceptual model of groundwater flow will be developed at the study sites using available data. Wells with persistent contamination that is suspected to be the result of blasting and new blasting sites will be targeted for groundwater sampling and analysis.

Products

Results will be included in a journal article or USGS series report. The report will document the methods used and results from the multiple-lines-of-evidence approach to identification of nitrate sources. All water quality and well data will be stored in the USGS

National Water Information System database. It is anticipated that USGS and NHDOT scientists will co-author the report.

Relevance and Benefits

The ability to identify and differentiate contaminant sources in drinking water wells will help determine if blasting operations affect groundwater quality. The information will aid the NHDOT by identifying sources of nitrate contamination near blasting sites. Collection and dissemination of the information will meet the broad USGS goal of providing information needed by State agencies for research on groundwater resources of the Nation.

Timeline and Costs

Field work will be conducted and completed in the third quarter of the federal fiscal year (FY) 2013 and a report would be targeted for completion in FY2014. An update of progress and preliminary results will be provided to the NHDOT in project meetings. The project timeline and the estimated costs of the study are shown in tables 1 and 2.

Table 1. Proposed timeline for the study:

Work plan Element	FY13		FY14			
	Apr-June	July-Sept	Oct-Dec	Jan-Mar	Apr-June	July-Sept
Project planning	x	x				
Data collection		x	x			
Database construction		x	x			
Data analysis			x	x	x	
Report					x	x

Table 2. Estimated summary of costs:

Element	Project Cost Federal FY13	Project Cost Federal FY14	Total Project Cost
Sample Collection (Direct)	\$8,000	\$3,100	\$11,100
Shipping and Lab Analysis (Direct)	\$16,810	\$7,590	\$24,400
Data handling, analysis, and reporting	\$11,000	\$32,400	\$43,400
Total Direct	\$35,810	\$43,090	\$78,900
Total Indirect Costs	\$12,180	\$20,920	\$33,100
Total Project	\$47,990	\$64,010	\$112,000
USGS share	\$18,000	\$24,000	\$42,000
NHDOT share	\$29,990	\$40,010	\$70,000

References

Böhlke, J.K., Smith, R.L., and Hannon, J.E., 2007, Isotopic analysis of N and O in nitrite and nitrate by sequential selective bacterial reduction to N₂O. *Analytical Chemistry*, v. 79, p. 5888-5895.

Kendall, C. and McDonnell, J. J. (Eds.), (1998). *Isotope Tracers in Catchment Hydrology*, Elsevier Science, Amsterdam, 839 p.

McMahon, P.B., Böhlke, J.K., Kauffman, L.J., Kipp, K.L., Landon, M.K., Crandall, C.A., Burow, K.R., and Brown, C.J., 2008, Source and transport controls on the movement of nitrate to public supply wells in

selected principal aquifers of the United States. Water Resources Research, v. 44, W04401, doi:10.1029/2007WR006252, p. 1-17.

Mullaney, J.R., Lorenz, D.L., and Arntson, A.D., 2009, Chloride in groundwater and surface water in areas underlain by the glacial aquifer system, northern United States: U.S. Geological Survey Scientific Investigations Report 2009-5086, <http://pubs.usgs.gov/sir/2009/5086/> 41 p.



United States Department of the Interior

U.S. GEOLOGICAL SURVEY
New Hampshire - Vermont
Water Science Center
361 Commerce Way
Pembroke, NH 03275

RECEIVED

March 22, 2007

MAR 26 2007

By: [Signature]
[Title]

Mr. Denis M. Boisvert, P.E.
NH Department of Transportation
Materials & Research Bureau
Box 483, 5 Hazen Drive
Concord NH 03302-0483

Dear Mr. Boisvert:

This letter is in response to your request for information concerning the United State Government and specifically, the US Geological Survey, being self insured. The following rules are equally applicable to any official governmental activity:

1. The Government is a self-insurer with respect to loss or damage to government property and the liability of government employees. In the absence of express statutory authority, appropriated funds are not available to purchase such insurance coverage. (Rule summarized in GAO B-158766, Feb. 3, 1977.)
2. The Federal Tort Claims Act (28 USC 2671 et seq.) provides the exclusive remedy for tort claims against the United States. Under it, the Government agrees to assume responsibility for negligent acts or omissions of USGS employees acting within the scope of their employment.
3. The Government may not accept "hold harmless" or "indemnification" clauses in its agreements because the law prohibits the Government from entering into agreements where the Government's liability is indefinite, indeterminate, or potentially unlimited. Such agreements violate both the Antideficiency Act, 31 USC 1341 and the Adequacy of Appropriations Act, 41 USC 11, the latter because it can never be said that sufficient funds have been appropriated to cover the contingency.

Please give me a call at 226-7807 if you need further information on this subject, but I hope this satisfies your needs regarding the USGS being self-insured.

Sincerely,

Keith W. Robinson
Director

