



The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES



Thomas S. Burack, Commissioner

July 12, 2013

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

*Retroactive
Sole Source*

REQUESTED ACTION

Authorize the New Hampshire Department of Environmental Services (DES) to **retroactively** amend a **sole source** Joint Funding Agreement (PO# 1014792) with the U.S. Geological Survey (USGS), Pembroke, NH (VC# 175772), to provide technical assistance in assessing transport processes and potential geochemical reactions controlling arsenic concentrations in groundwater at the Auburn Road Landfill Superfund Site (the Site) in Londonderry, New Hampshire. The amendment increases the contract by the amount of \$9,960 (from \$166,985 to \$176,945), and will be effective as of July 1, 2013 through December 31, 2013, upon Governor and Council approval. The original contract was approved on March 17, 2011 (Item #72) and the first contract amendment was approved on March 7, 2012 (Item #53). Funding is 100% Federal.

Funding is available in the account as follows:

	<u>FY 2014</u>
03-44-44-444010-2590-102-500731	<u>\$9,960</u>
Dept. of Environmental Services, CERCLA programs, Contracts for Program Services	

EXPLANATION

The purpose of extending this **sole source** agreement and increasing the budget is to fund continuing USGS technical support services to DES and the U.S. Environmental Protection Agency (EPA) for the evaluation of the sources of arsenic contamination at the Auburn Road Landfill Superfund Site (Site) in Londonderry, NH. This is a sole source agreement because the expertise necessary to meet the project's objectives can best be provided by USGS, and they are matching with their own funds to facilitate the work. This contract amendment request is retroactive because the EPA Cooperative Agreement Amendment was not granted in time to meet the submittal deadlines for the June, 2013 G&C meeting. DES received the grant award via electronic mail on June 5, 2013. EPA, as part of a cooperative agreement with DES, is providing funding in the amount of \$9,960 for this work. USGS is providing \$9,960 in matching funds as part of this contract agreement.

Arsenic is the primary contaminant of concern remaining at the Site. There are a variety of mechanisms, both man-made and natural, that can cause naturally-occurring arsenic to become elevated in groundwater. Mechanisms affecting arsenic transport include groundwater flow paths, velocities, aquifer geochemistry and groundwater geochemical reactions. These mechanisms need to be understood to evaluate the potential impacts on the environment and to provide for efficient remediation activities in the future.

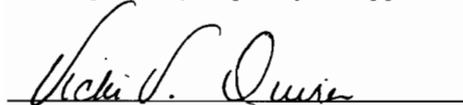
As a follow-up to recommendations noted in EPA's most recent Five Year Review of the Site, USGS has conducted work under this agreement that focused on identifying potential preferential groundwater flow paths for landfill leachate and assessing arsenic transport processes controlling arsenic concentrations at

and borehole geophysical surveys to evaluate potential contaminant transport pathways in relation to leachate source areas between the three capped landfills and down-gradient areas. The results of these studies have been compiled in a technical report that was published as USGS Scientific Investigations Report 2013-5123 on June 14, 2013.

Utilizing the results presented in the aforementioned report, DES and EPA plan to hold one or more technical meetings with the Responsible Parties Group (RP) for the Site to discuss potential improvements to the selected remedial action to accelerate Site closure. The funding provided by this contract amendment will be utilized to fund USGS participation as technical experts in support of DES and EPA at these meetings with the RP.

This contract amendment has been approved as to form, substance and execution by the Office of Attorney General. In the event that the Federal funds become no longer available, general funds will not be requested to support this project. US EPA supports the contract.

We respectfully request your approval.



Vicki V. Quiram
Assistant Commissioner

Attachment: U.S. Geological Survey Joint Funding Agreement dated July 1, 2013

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 #: 13ENNH000000027
Project #: GC13LH00EFQ1000
TIN #: 02-6000618
Fixed Cost Agreement Yes No

**FOR
WATER RESOURCES INVESTIGATIONS**

THIS AGREEMENT is entered into as of the 1st 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 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 to conduct additional investigations into the mobility and transport of landfill leachate and arsenic at the Auburn Landfill Superfund, 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) \$9,960.00 by the party of the first part during the period
July 1, 2013 to June 30, 2014

(b) \$9,960.00 by the party of the second part during the period
July 1, 2013 to June 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 #: 13ENNH000000027
Project #: GC13LH00EFQ1000
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 Environmental Services

USGS Point of Contact

Customer Point of Contact

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

Name: Kenneth A. Richards, P.G., P.E.
Address: NHDES, Waste Management Division
29 Hazen Drive
Concord, NH 03302
Telephone: (603) 271- 4060
Email: kenneth.richards@des.nh.gov

Signatures

Signatures

By  Date 5/22/13
Name: Keith W. Robinson
Title: Director, New England Water Science Center

By  Date 7/29/13
Name: Thomas S. Burack
Title: NHDES Commissioner

By _____ Date _____
Name:
Title:

By  Date 7-30-13
Name: Joseph Foster
Title: Department of Justice/Attorney General

By _____ Date _____
Name:
Title:

By _____ Date _____
Name:
Title:

CHARACTERIZATION OF THE HYDROGEOLOGIC FRAMEWORK AND ARSENIC MOBILITY AT THE AUBURN ROAD LANDFILL, LONDONDERRY, NEW HAMPSHIRE

In cooperation with the New Hampshire Department of Environmental Services and the U. S. Geological Survey, NH-VT Office of the New England Water Science Center and under the auspices of the U.S. Environmental Protection Agency

May, 2013

Introduction

The United States Geological Survey (USGS) has been working with the New Hampshire Department of Environmental Services (NHDES) and the United States Environmental Protection Agency (USEPA) to conduct additional investigations into the mobility and transport of landfill leachate and arsenic at the Auburn Road Landfill Superfund. The investigation included the characterization of the hydrogeologic framework of the overburden aquifer and the identification of potential controls on arsenic mobility. The study also included an assessment of data gaps which limit the understanding of the source of the arsenic and mechanisms of mobility. The USGS conducted this investigation in 2011 and 2012 and has prepared a report documenting the results.

Objectives and scope

The specific objectives of this proposed study extension are to have two USGS scientist who have worked on the investigations at the Auburn Rd. Landfill site prepare for and attend meetings with the NHDES, USEAP and the Auburn Road Performing Parties Group (ARPPG) to discuss a report prepared by the USGS titled Hydrogeologic Framework, Arsenic Distribution, and Groundwater Geochemistry of the Glacial-Sediment Aquifer at the Auburn Road Landfill Superfund Site, Londonderry, New Hampshire (USGS Report).

Approach

The USEPA will coordinate one to two meetings with the ARPPG the NHDES and the USGS to discuss plans for further study and/or proposed remedies by the ARPPG and the results of the USGS Report.

Relevance and Benefits

This project extension will provide an opportunity to convey information to and answer questions from decision makers on the nature and distribution of arsenic contamination, relative to the improved knowledge gained from hydrogeologic mapping and understanding of geochemical reactions and transport, at the Auburn Road Landfill site in Londonderry, NH. The interaction will aid in the development of long term prediction of arsenic under existing or proposed remedial conditions. Dissemination of the information will: (1) meet the broad USGS goal of furnishing data needed by other Federal and State agencies for management and remediation of contaminated sites; and (2) present valuable information for characterizing the impact of landfill leachate on the water quality of local surface and ground waters.

Timeline and Costs

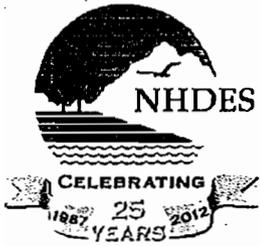
Meetings will occur between the Federal fiscal year (FY) 2013 and into FY2014. The project extension timeline and the additional extension costs are shown in tables 1 and 2.

Table 1. Proposed amended timeline for the study:

Work plan Element	Federal FY13	Federal FY14
	July-Sept	Oct-June
Meet with ARPPG	x	x

Table 2. Summary of additional amendment costs:

Element	Federal FY13	Federal FY14	FY13 and FY14 Total Project Cost
Total Direct	5,910	5,910	11,820
Total Indirect Costs	4,050	4,050	8,100
Total	9,960	9,960	19,920
Summary of Costs by Agency			
NH Department of Environmental Services		9,960	9,960
U.S. Geological Survey	9,960		9,960



The State of New Hampshire
Department of Environmental Services
Thomas S. Burack, Commissioner



*Celebrating 25 Years of Protecting
New Hampshire's Environment*

February 16, 2012

His Excellency, Governor John H. Lynch
and the Honorable Council
State House
Concord, New Hampshire 03301

APPROVED G & C

DATE 3/7/12

ITEM # 53

REQUESTED ACTION

Authorize the Department of Environmental Services (DES) to RETROACTIVELY amend the SOLE SOURCE Joint Funding Agreement (PO# 1014792) with the United States Geological Survey (USGS), Pembroke, New Hampshire, (VC# 175772) to provide technical assistance in assessing transport processes and potential geochemical reactions controlling arsenic concentrations in groundwater at the Auburn Road Landfill Superfund Site in Londonderry, New Hampshire. The amendment increases the contract by the amount of \$92,085 (from \$74,900 to \$166,985), and will be effective as of January 31, 2012 through March 31, 2013, upon Governor and Council approval. The original contract was approved on March 17, 2011 (Item #72). Funding is 100% Federal.

Funding is available in the account as follows:

	<u>FY 2012</u>
03-44-44-444010-2590-102-500731	\$92,085
Dept. of Environmental Services, CERCLA programs, Contracts for Program Services	

EXPLANATION

This contract amendment is to fund continuing technical support services to DES and the U.S. Environmental Protection Agency (EPA) for the evaluation of the sources of arsenic contamination at the Auburn Road Landfill Superfund Site (Site) in Londonderry, NH. This is a sole source agreement since the expertise necessary to meet the project's objectives can best be provided by USGS, and they are matching with their own funds to facilitate the work. This contract amendment request is retroactive because the US EPA Cooperative Agreement Amendment was not granted in time to meet the last January, 2012 G&C meeting. DES requested the USGS work scope and budget in August, 2011, but did not receive a finalized proposal until November 18, 2011. Upon receiving the finalized proposal from USGS, DES prepared and submitted the Cooperative Agreement Amendment application to US EPA on December 21, 2011 and received the grant award on January 18, 2012.

The remedy for the Site included installing a water line, capping three landfills, establishing institutional controls and performing monitoring natural attenuation (MNA) of arsenic-contaminated groundwater. Arsenic is the primary contaminant of concern remaining at the Site. Arsenic is a naturally-occurring mineral and is often found at elevated concentrations in the soil, bedrock and groundwater of New Hampshire. Previous investigations at the Site have revealed elevated arsenic in groundwater, above the drinking water standard of 10 parts per billion. Since the remedy was implemented, the arsenic standard was lowered from 50 parts per billion to 10 parts per billion at both federal and state levels. There are a variety of mechanisms, both man-made and natural, that can cause naturally-occurring arsenic to become elevated in groundwater. Mechanisms affecting arsenic transport include groundwater flow paths, velocities, aquifer geochemistry and groundwater

geochemical reactions. These mechanisms need to be understood to evaluate the potential impacts on the environment and to provide for efficient remediation activities in the future.

As a follow-up to recommendations noted in EPA's most recent Five Year Review of the Site, USGS will conduct work under this agreement that focuses on identifying potential preferential groundwater flow paths for landfill leachate and assessing arsenic transport processes controlling arsenic concentrations at the Site. The results from this project will provide information on the nature and distribution of arsenic contamination and will aid in updating and establishing more accurate timeframes for groundwater arsenic concentrations to reach cleanup goals under the MNA remedy for the Site. USGS will use information generated from surface and borehole geophysical surveys to evaluate potential contaminant transport pathways in relation to leachate source areas between the three capped landfills and down-gradient areas.

There are two general tasks to be completed by the USGS in this study: providing technical assistance to DES with an understanding of the mechanisms for arsenic mobility and transport pathways and the development of a technical report describing the nature and distribution of arsenic contamination at the Site.

This contract amendment has been approved by the Office of the Attorney General as to form, content and execution. US EPA supports the contract.

We respectfully request your approval.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas S. Burack". The signature is written in a cursive style with some loops and flourishes.

Thomas S. Burack
Commissioner

Attachment: U.S. Geological Survey Joint Funding Agreement

Customer #: 600000093
Agreement #: 11E4NHLH000013

UNITED STATES DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY
AMENDMENT OF JOINT FUNDING AGREEMENT
FOR
WATER RESOURCES INVESTIGATIONS

TIN #: 02-6000618

This amendment is for the agreement dated April 1, 2011

1. The parties hereto agree that subject to the availability of appropriations and in accordance with their respective authorities there shall be maintained in cooperation the project
"Characterization of the Hydrologic Framework and Arsenic Mobility at the Auburn Road Landfill, Londonderry, NH",
herein called the program.

2. Paragraph 2a of the agreement is hereby X increased/ decreased by \$ 92,085.00
to read as follows:

(a) \$ 166,985.00 by the party of the first part during the period
April 1, 2011 to March 31, 2013

Paragraph 2b of the agreement is hereby X increased/ decreased by \$ 92,085.00
to read as follows:

(b) \$ 166,985.00 by the party of the second part during the period
April 1, 2011 to March 31, 2013

Billing for this agreement will be rendered quarterly. Payments of bills are due within 60 days after 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.)
The USGS legal authority is 43 USC 36c; 43 USC 50; 43 USC 50b. USGS DUN's #048601645

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

STATE OF NEW HAMPSHIRE
DEPT OF ENVIRONMENTAL
SERVICES

by Keith W. Robinson

Keith W. Robinson

Director

by Thomas J. Burch

Commissioner

Date _____
by [Signature]

Department of Justice/ Attorney General

Reviewed and approved as to form and content
2-16-12

Date 12/1/2011

**Auburn Road Landfill Superfund Site
ARSENIC CHARACTERIZATION WORK PLAN
January 31, 2012 to June 30, 2013**

I. Introduction

The New Hampshire Department of Environmental Services (NHDES) requests a revision to the existing Cooperative Agreement with the Environmental Protection Agency (EPA) for the Auburn Road Landfill Superfund Site (Site) to provide funds for USGS to complete the on-going Arsenic Characterization Study. The proposed budget for the period January 31, 2012 through June 30, 2013 is \$92,177 (see Attachment I), and will carry the study through completion. NHDES will continue to provide support in the implementation of the requirements of the September 29, 1989 Superfund Record of Decision (ROD), the August 4, 2009 Explanation of Significant Differences (ESD) and this Cooperative Agreement.

The scope of additional work will include all data reduction and report preparation activities that were initially proposed for Year 2, as well as a limited scope of additional sampling and analysis activity designed to further characterize arsenic concentrations, redox conditions, geochemical signatures of leachate from landfills, and natural and anthropogenic carbon input.

Spatial sampling and geochemical data gaps have been identified through the analysis of existing data and characterization of the hydrogeologic framework at the Auburn Rd. Landfill site in Londonderry New Hampshire. Additional geochemical, hydrogeologic and hydraulic data are needed for an improved understanding of arsenic mobility.

II. Work Plan

The major objectives of the additional sampling and analysis activity are to characterize geochemical and redox signatures down gradient of the landfills near the frontal part of the plume and at locations of groundwater seeps and springs in and on the south shoreline of Whispering Pines Pond (Figure 1). Information obtained through hydrogeologic framework analysis will be used to select locations for sampling. Specific objectives include:

- Use water-quality data (up to 8 detailed analyses) collected from up to eight new drivepoints and selected existing wells to characterize the leachate plumes, redox processes, and zones of oxidation and reduction in the overburden, between the landfills and Whispering Pines Pond.
- Use topographic data and existing and new water level data from new drive point wells in the location of springs and seeps that are discharging to surface water located down gradient of the landfills to further refine the groundwater potentiometric surface and flow directions
- Include results in the planned USGS Report documenting the study.

Field water quality parameters will be measured for all samples including: pH, specific conductance, dissolved oxygen, turbidity, temperature and oxidation reduction potential. Lab water quality analysis anticipated to be provided by USEPA include: major ion and trace elements, arsenic speciation, total organic carbon, volatile organic compounds and alkalinity. USGS laboratory analysis will include constituent species (Fe(3) Fe(2), stable isotopes, methane, nitrogen and other gases, and dissolved, total Carbon, organic and inorganic carbon (DOC and DIC). All water chemistry and water level data will be stored in the USGS National Water Information System (NWIS).

An analysis of existing and new water level measurements, detailed topography, and water levels from Whispering Pines Pond, and nearby marshes are needed to identify groundwater flow direction. Beaver dams in the pond, just north of the town dump, in the middle of Whispering Pines Pond and between the town dump and the solid waste landfill hold the water at a higher elevation than that of the pond near the dam and outlet.

The results from this study will provide information on the nature and distribution of arsenic contamination, relative to the improved knowledge gained from hydrogeologic mapping and understanding of geochemical reactions and transport, at the Auburn Road Landfill site in Londonderry, NH. The information will aid in the development of long term prediction of arsenic under existing remedial conditions by the USEPA and NHDES for the site. Collection and dissemination of the information will: (1) meet the broad USGS goal of furnishing data needed by other Federal and State agencies for management and remediation of contaminated sites; (2) provide valuable information for characterizing the impact of landfill leachate on the water quality of local surface and ground waters; and (3) provide methods and procedures for assessment of arsenic contamination at other sites in a similar hydrogeologic setting.

Table 1 summarizes the work planned for this grant period, and how it relates to EPA's strategic plan.

Table 1. Work Plan and Environmental Results

EPA Strategic Plan Objectives	2012- 2013 Grant Funding	Work Plan Activities 1/31/2012 to 6/30/2013	Results of Activities (Outputs)	Projected Environmental Improvement (Outcome)
<p>Goal 1: Continue maintenance of landfill caps, fencing, and drainage swales.</p> <p>1.2: Evaluate surface water/groundwater interaction in vicinity of Whispering Pines Pond.</p> <p>1.2.2: Follow up on previous arsenic investigations to obtain current observations and results and report findings.</p>	<p>\$92,177 Federal</p>	<p>Within the grant period DES' contractor will:</p> <ul style="list-style-type: none"> > Complete characterization of the hydrogeologic framework of the overburden, between the landfills and Whispering Pond, and identify potential preferential groundwater flow paths in relation to leachate source areas. > Identify potential reduction and oxidation controls on arsenic mobility, including landfill leachate and other sources. > Complete additional well installation, water sampling and analysis. > Prepare a USGS Open-File Report documenting the results of the study. > Perform all reporting requirements of this CA. 	<ul style="list-style-type: none"> > The landfill cover will remain functional and in good repair and prevent contact with potentially contaminated soils. > Provide data and valuable information for characterizing the impact of landfill leachate on the water quality of local surface and groundwaters. > Provide methods and procedures for assessment of other sites with arsenic contaminants. > Participation in technical meetings and conference calls. 	<ul style="list-style-type: none"> > Meaningful and substantial involvement by the State in the remediation of the Site. > Implementation of the ROD and ESD. > Restrictions on site will no longer be needed. > Site delisted from NPL.

III. Budget Assumptions

The only cost line item for the proposed work is Contractual, as all activities will be conducted by USGS under contract to DES.

Funding Requirements for the new Budget Period

The Department estimates that \$92,177 in additional funding will be required for remedial response oversight and reporting activities through June 30, 2013. Table 2 illustrates the rubric used for determining the additional Federal funding that will be required to conduct this work.

Table 2. Estimated of Future Funding Requirements

Object Class Categories	Award to date	Expenses through 9/30/11	Estimated Expenses 10/1/11 - 1/30/12	Estimated Balance 1/30/12	Projected Costs 1/31/12 - 6/30/13	Needed funding (rounded)
Personnel	\$0	\$0	\$0	\$0	\$0	\$0
Fringe Benefits	\$0	\$0	\$0	\$0	\$0	\$0
Travel	\$0	\$0	\$0	\$0	\$0	\$0
Equipment	\$0	\$0	\$0	\$0	\$0	\$0
Supplies	\$0	\$0	\$0	\$0	\$0	\$0
Contractual	\$74,825	\$0	\$74,825	\$0	\$92,085	\$92,085
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Other	\$75	\$0	\$75	\$0	\$92	\$92
Total Direct	\$0	\$0	\$0	\$0	\$0	\$0
Indirect	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$74,900	\$0	\$74,900	\$0	\$92,177	\$92,177



The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES



Thomas S. Burack, Commissioner

March 3, 2011

PO 1014792

His Excellency, Governor John H. Lynch
and the Honorable Council
State House
Concord, New Hampshire 03301

APPROVED TO CLERK
DATE 3/30/11
ITEM # 63

REQUESTED ACTION

Authorize the New Hampshire Department of Environmental Services (DES) to enter into a **SOLE SOURCE** Joint Funding Agreement with the United States Geological Survey (USGS), Pembroke, New Hampshire, (VC# 175772) in the amount of \$74,900 to provide technical assistance in assessing transport processes and potential geochemical reactions controlling arsenic concentrations in groundwater at the Auburn Road Landfill Superfund Site in Londonderry, New Hampshire, effective as of April 1, 2011 through January 30, 2012, upon Governor and Council approval. Funding is 100% Federal.

Funding is available in the account as follows:

RQ 118491
WU 1119525
FY 2011
\$74,900

03-44-44-444010-2590-0102-500731

Dept of Environmental Services, CERCLA programs, Contracts for Program Services

907
7500

EXPLANATION

This agreement is a 50% State/50% USGS match that will allow USGS to provide a total of \$149,800 of technical support services to DES and the U.S. Environmental Protection Agency (EPA) for the evaluation of the sources of arsenic contamination at the Auburn Road Landfill Superfund Site (Site) in Londonderry, NH. This is a sole source agreement because the expertise necessary to meet the project's objectives can best be provided by USGS, and they are matching with their own funds to facilitate the work. Under the agreement, USGS will provide technical assistance to DES to further understand the mechanisms for arsenic mobility and transport pathways and prepare a technical report describing the nature and distribution of arsenic contamination at the Site.

The remedy for the Site included installing a water line, capping three landfills, establishing institutional controls and performing monitored natural attenuation (MNA) of arsenic-contaminated groundwater. Arsenic is the primary contaminant of concern at the Site. It is a naturally-occurring mineral and is often found at elevated concentrations in the soil, bedrock and groundwater of New Hampshire. Leachate from landfills can alter groundwater chemistry, causing mobilization of arsenic from soil and bedrock. Previous investigations at the Site have revealed elevated arsenic in groundwater, above the drinking water standard of 10 parts per billion. The mechanisms controlling

DES Web Site: www.des.nh.gov

P.O. Box 95, 29 Hazen Drive, Concord, New Hampshire 03302-0095

Telephone: (603) 271-2908 Fax: (603) 271-2181 TDD Access: Relay NH 1-800-735-2964

His Excellency, Governor John H. Lynch
and the Honorable Council

Page 2

arsenic mobilization and transport at the Site need to be understood to evaluate the potential impacts on the environment and to provide for efficient remediation activities in the future.

As a follow-up to recommendations noted in EPA's most recent Five Year Review of the Site, USGS will conduct work under this agreement that focuses on identifying potential preferential groundwater flow paths for landfill leachate and assessing arsenic transport processes controlling arsenic concentrations at the Site. USGS will use surface and borehole geophysics to evaluate potential contaminant transport pathways in relation to leachate source areas between the three capped landfills and down-gradient areas. The results from this project will provide information on the nature and distribution of arsenic contamination and will aid in updating and establishing more accurate timeframes for groundwater arsenic concentrations to reach cleanup goals under the MNA remedy for the Site.

This agreement has been approved as to form, content, and execution by the Office of the Attorney General. EPA supports the contract.

We respectfully request your approval.

 Thomas Burack, Commissioner
Department of Environmental Services

Attachments: U.S. Geological Survey Joint Funding Agreement

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

Customer #: NH001
Agreement #: 11E4NHLH000013
Project #: LH00EFQ
TIN #: 02-6000618
Fixed Cost Agreement Yes No

FOR
WATER RESOURCES INVESTIGATIONS

THIS AGREEMENT is entered into as of the 1st day of April, 2011, 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 of the water resources of the State of New Hampshire, specifically, the project "Characterization of the Hydrogeologic Framework and Arsenic Mobility at the Auburn Road Landfill, Londonderry, NH: Phase 1", 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) \$74,900.00 by the party of the first part during the period
April 1, 2011 to January 30, 2012

(b) \$74,900.00 by the party of the second part during the period
April 1, 2011 to January 30, 2012

(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.

CHARACTERIZATION OF THE HYDROGEOLOGIC FRAMEWORK AND ARSENIC MOBILITY AT THE AUBURN ROAD LANDFILL, LONDONDERRY, NEW HAMPSHIRE

In Cooperation with the
New Hampshire Department of Environmental Services
and
U.S Environmental Protection Agency

U. S. Geological Survey
New Hampshire – Vermont Water Science Center

April, 2011

INTRODUCTION

Previous investigations at the Auburn Road Landfill site have revealed elevated arsenic (As) dissolved in groundwater, above the 10 µg/L U.S. Environmental Protection Agency (USEPA) drinking water standard (Weston Solutions, 2008). The source of the elevated arsenic needs to be identified and transport, potential receptors and persistence should be defined.

The Auburn Road Landfill consisted of a 100 acre parcel of which 13 acres had been used as a town dump (figure 1). The site was closed and capped in 1980. Despite efforts to reduce landfill leachate, problems persist in occurrence of several contaminants in groundwater. For example, elevated arsenic (greater than 10 µg/L) continues to be present in groundwater from the stratified-drift aquifer underneath and downgradient of the landfill (U.S. Environmental Protection Agency, 2007), and elevated arsenic has been estimated to persist for another 25 to 50 years under current remedial conditions (Weston, 2009b). Additionally, elevated arsenic concentrations have been detected down gradient of the landfill to the north (far side) of Whispering Pines Pond. Presently, it is not known whether elevated arsenic levels found in the aquifer on the north side of the pond are naturally occurring or if preferential groundwater flow paths from the landfill area affect groundwater north of the pond.

Arsenic is known to occur naturally in the bedrock, sediment, and groundwater in the region where the landfill is located (Ayotte and others, 2003; Montgomery and others, 2003; Robinson and Ayotte, 2006). However, increased arsenic mobility can occur down gradient of waste sites due to landfill leachate mixing with natural groundwater and providing reducing conditions that enhance dissolution of oxides containing solid-phase arsenic (Whitlock and Kelly, 2010; Hounslow, 1980). Arsenic mobilization from aquifer sediments induced by landfill leachate have been documented in Maine and New Hampshire (Stollenwerk and Colman, 2004; deLemos and others, 2006), and have been shown to be related to long-term persistence of arsenic. The USGS NH-VT Water Science Center is currently involved in an arsenic mobility study at the Mottolo waste site in New Hampshire.

The New Hampshire Department of Environmental Service (NHDES) and USEPA are concerned with understanding arsenic mobility and transport at the Auburn Road Landfill site, and surrounding area, to help determine the source of the arsenic, mechanisms for its mobility, and transport pathways. Factors affecting arsenic transport include groundwater flow paths, directions, and velocities; aquifer geochemistry; and groundwater geochemical reactions. These factors need to be understood to evaluate the potential impacts on the environment or to provide for efficient remediation activities in the future. This proposal would provide for characterization of the hydrogeologic framework of the site and an assessment of the potential for arsenic mobility from natural and anthropogenic sources. These efforts are expected to provide an improved map of arsenic concentrations (plume map), new hydrogeologic framework information, and a revised interpretation of arsenic mobility and estimation of arsenic attenuation rates and trends. Based on the results, subsequent assessments may be proposed and may include installation of additional wells and piezometers, sediment and geochemical sampling, and vertical water-quality profiling.

OBJECTIVES AND SCOPE

The major objectives of this study are to characterize the hydrogeologic framework, and identify potential preferential groundwater flow paths for landfill leachate; and assess arsenic transport processes and potential geochemical reactions controlling arsenic concentrations at the Auburn Road Landfill site. Specific objectives include:

- Characterize the hydrogeologic framework of the overburden, between the landfills and Whispering Pond, and identify potential preferential groundwater flow paths in relation to leachate source areas;
- Identify potential reduction and oxidation controls on arsenic mobility, including landfill leachate and other sources;
- Propose target locations for additional sediment sampling, well installation, and vertical water-quality profiling; and potential modifications to water-quality sampling constituents, for subsequent remediation and assessment efforts;
- Prepare a USGS Open-File Report documenting the results of the study.

APPROACH

This study will consist of two main tasks: 1) an assessment of existing data and 2) a characterization of the hydrogeologic framework. The Auburn Road Landfill site has been the subject of investigations since 1981 and there is considerable data to build upon in evaluating the hydrologic framework and arsenic contamination analysis. The data assessment will include a review of existing geochemical data to assess controlling factors in geochemical reactions which may affect arsenic occurrence, mobility, and transport. Simple geochemical models will be used to assess existing data and chemical reactions. The hydrogeologic framework will be characterized using surface and borehole geophysical surveys in areas downgradient, and surrounding the landfills, including surface water bodies. Zones of anomalous high specific conductance in areas immediately down gradient of the landfill (figure 1) in Whispering Pines Pond and along the north shore of the pond will be mapped and evaluated in relation to transport of contaminants from landfills. Analysis of existing data and the hydrologic framework assessment from this study will be used to design and propose a subsequent data collection and monitoring program. Development of a detailed geochemical model using new data will be evaluated for use to refine remedial arsenic attenuation rates and uncertainties.

I. Assessment of Existing Data

The site has been under investigation since 1981; as a result, there is extensive information and data regarding site conditions. Although a series of five-year review documents have been published (the last in 2007), a comprehensive assessment of existing data will help to determine geochemical processes effecting arsenic mobility and identify existing data gaps. The data assessment task will consist of reviewing existing geochemical data to formulate a plan that will be proposed and fully instituted in a subsequent study phase. However, as part of this phase of the study, geochemical reactions will be highlighted through the development and testing of a simple geochemical model using existing geochemical software codes such as PHREEQC (Parkhurst and Appelo, 1999) and available site geochemical data. This effort will result in the formulation of a data collection and analysis plan, which will include:

- Identify needed geochemical, isotopic, and potentially age dating data to refine our knowledge of arsenic mobility and geochemical reaction rates;
- Identify potentially important geochemical processes;
- Integration of the assessment of existing data with hydrologic framework characterization to identify general locations for the installation of monitoring wells and push-technology sampling points to refine the data collection network and site understanding.

II. Hydrogeologic Framework Characterization

The hydrogeologic framework of the site overburden will be characterized using surface and borehole geophysical surveys as outlined in table 1 and shown in figure 1. The surveys will help identify preferential flow paths, associated with zones of higher hydraulic conductivity, between the three capped landfills and downgradient areas. In addition, it is important to understand spatial relationships between high and low hydraulic conductivity formations to assess alternate sources of leachate and redox controlling processes from back diffusion. The site will initially be mapped with surface electromagnetic (EM), ground penetrating radar (GPR) and borehole geophysical surveys. Surface Direct Current (DC) resistivity survey locations will be refined based on preliminary interpretations of the EM and GPR surveys. Geophysical surveys on Whispering Pines Pond will aid in the investigation of high arsenic concentrations on the north side of the pond. Due to the varying nature of the site's physical conditions, including cultural effects (power line and buried utility noise) and site access limitations, the detail and confidence in the interpreted geophysical results will vary with location. All geophysical surveys will be linked by high-accuracy GPS for geospatial (GIS) referencing.

An integrated analysis of the geophysical surveys with existing data will provide the basis for a preliminary hydrogeologic characterization. Additional data collected during a subsequent study phase will be used to produce a final hydrogeologic framework characterization. The geophysical techniques to be used in this study include:

1. Ground-Penetrating Radar: Ground penetrating radar (GPR) methods can be used to map the extent and type of sediment on land and water (Beres and Haeni, 1991; Olimpio, 2000). GPR surveys are particularly useful in coarse-grained sediment, such as sand and gravel and were found to be very helpful in characterizing the thickness of organic lake-bottom sediments near a hazardous waste site in New Hampshire (Ayotte and others, 1999).

2. Electromagnetic Induction: The electromagnetic induction (EM) method measures the electrical conductivity of sediments and water, related to grain size and composition, and can be processed to provide interpretations with depth (Abraham and others, 2006). The EM technique also may indicate the presence of electrically conductive contaminants and has been used to identify a contaminant plume beneath a pond in New Hampshire (Ayotte and others, 1999). A multi-frequency EM profiler will be used analyze zones of interest with respect to the GPR surveys.

3. Borehole Characterization: Standard borehole geophysical logs (Keys, 1990) will be collected in PVC cased wells and include: natural gamma radiation, EM-induction, and fluid temperature and conductance. EM borehole logs can be used to differentiate fine versus coarse-grained sediment and, by combining with natural-gamma radiation, logs can be used to delineate even very low-level contaminant plumes (Mack, 1993). Neutron porosity borehole surveys provide aquifer porosity data with depth (Keys, 1990).

4. Direct-Current Resistivity Surveys: DC-resistivity surveys measure the electrical resistivity of the subsurface to characterize lithology and water quality (Degnan and Brayton, 2010). DC-resistivity surveys will be located over the deeper aquifer areas and in areas free of cultural interference.

PRODUCTS

A USGS Open-File Report will be produced to document the methods used in the geophysical surveys, provide analysis and interpretations of the nature and extent of the hydrogeologic framework and conceptual representation of arsenic transport in the form of maps and cross sections. Interim presentations of the study results and a data analysis will be presented during routine project reviews

and reports of the study progress will be submitted to NHDES and USEPA. Provisional data and interpretations will be provided to NHDES and USEPA in an electronic format, as it becomes available. All final data and geophysical surveys will be archived according to the NH/VT Water Science Center archiving policies and made available to NHDES and USEPA.

RELEVANCE AND BENEFITS

The results from this study will provide information on the nature and distribution of arsenic contamination, relative to the improved knowledge gained from hydrogeologic mapping and understanding of geochemical reactions and transport, at the Auburn Road Landfill site in Londonderry, NH. The information will aid in the development of long term prediction of arsenic under existing remedial conditions by the USEPA and NHDES for the site. Collection and dissemination of the information will: (1) meet the broad USGS goal of furnishing data needed by other Federal and State agencies for management and remediation of contaminated sites; (2) provide valuable information for characterizing the impact of landfill leachate on the water quality of local surface and ground waters; and (3) provide methods and procedures for assessment of other sites with arsenic contaminants.

TIMELINE AND COSTS

Field work would be initiated in the second quarter of the federal fiscal year (FY) 2011 and a study report would be targeted for completion by the fourth quarter of FY2012, pending funding in year 2. An update of progress and preliminary results will be provided in triennial project meetings. The project timeline and the costs of the study for the two year period are shown in tables 1 and 2.

Table 1. Proposed timeline for the study:

Work plan Element	FY11				FY12			
	Oct-Dec	Jan-Mar	Apr-June	July-Sept	Oct-Dec	Jan-Mar	Apr-June	July-Sept
Project Planning	x							
Data review and evaluation		x	x	x				
Geophysical surveys		x	x	x				
Data processing and analysis			x	x	x			
Report writing; technical reviews				x	x	x		
Report publication							x	x

Table 2. Summary of costs:

Element	FY11	FY12 (estimated)
Geophysical surveys and data evaluation	\$64,910	
Data analysis and report writing		\$72,300
USGS Equipment rental, supplies, software (reduced indirect costs)	7,000	6,000
Non-USGS equipment and supplies	4,500	
Travel	4,500	
Printing costs (online only)		
Total Direct	80,910	78,300
Total Indirect Costs	68,890	70,860
Total	149,800	149,160
Summary of Costs by Agency		
NH Department of Environmental Services	74,900	74,580
U.S. Geological Survey	74,900	74,580

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Figure 1. Proposed geophysical survey locations, Auburn Road Landfill, Londonderry, New Hampshire

STATE OF N.H. CONTRACT CHECKLIST Attorney

1. Department of Environmental Services
 2. Primary Agency Contact (for contract questions/discussion): Kenneth Richards
 3. Primary Agency Contact Email: Kenneth.Richards@des.nh.gov
 4. Secondary Agency Contact: [Redacted] Phone Number: [Redacted]
 5. Secondary Agency Contact Phone Number: [Redacted]
 6. Price Limitation: \$9,960
 7. Targeted G & C Meeting Date: August 14, 2013
 8. Targeted G & C Closing Date: [Redacted]
 9. Requested Rush Return Date from DOJ: [Redacted]
 10. Requested Rush Return Date is less than two weeks from Targeted G & C Closing Date, please explain: [Redacted]

PART 1: CONTRACT CHECKLIST FOR DEPARTMENT OF JUSTICE REVIEW - TO BE COMPLETED BY AGENCY

Item	Verify	Comments
12. Execution	Fully and properly executed, all blocks on P-37 fully completed. <input checked="" type="checkbox"/>	P-37 form not applicable
13. Exhibit A Scope of Services (P-37)	Scope of Services described in detail. <input checked="" type="checkbox"/>	
14. Exhibit B Payment Terms (P-37)	Contract price, method and terms of payment described in detail. <input checked="" type="checkbox"/>	P-37 not applicable
5. Exhibit C Special Provisions (P-37)	Modifications, additions and/or deletions to Form P-37, General Provisions, described in detail. <input checked="" type="checkbox"/>	NA

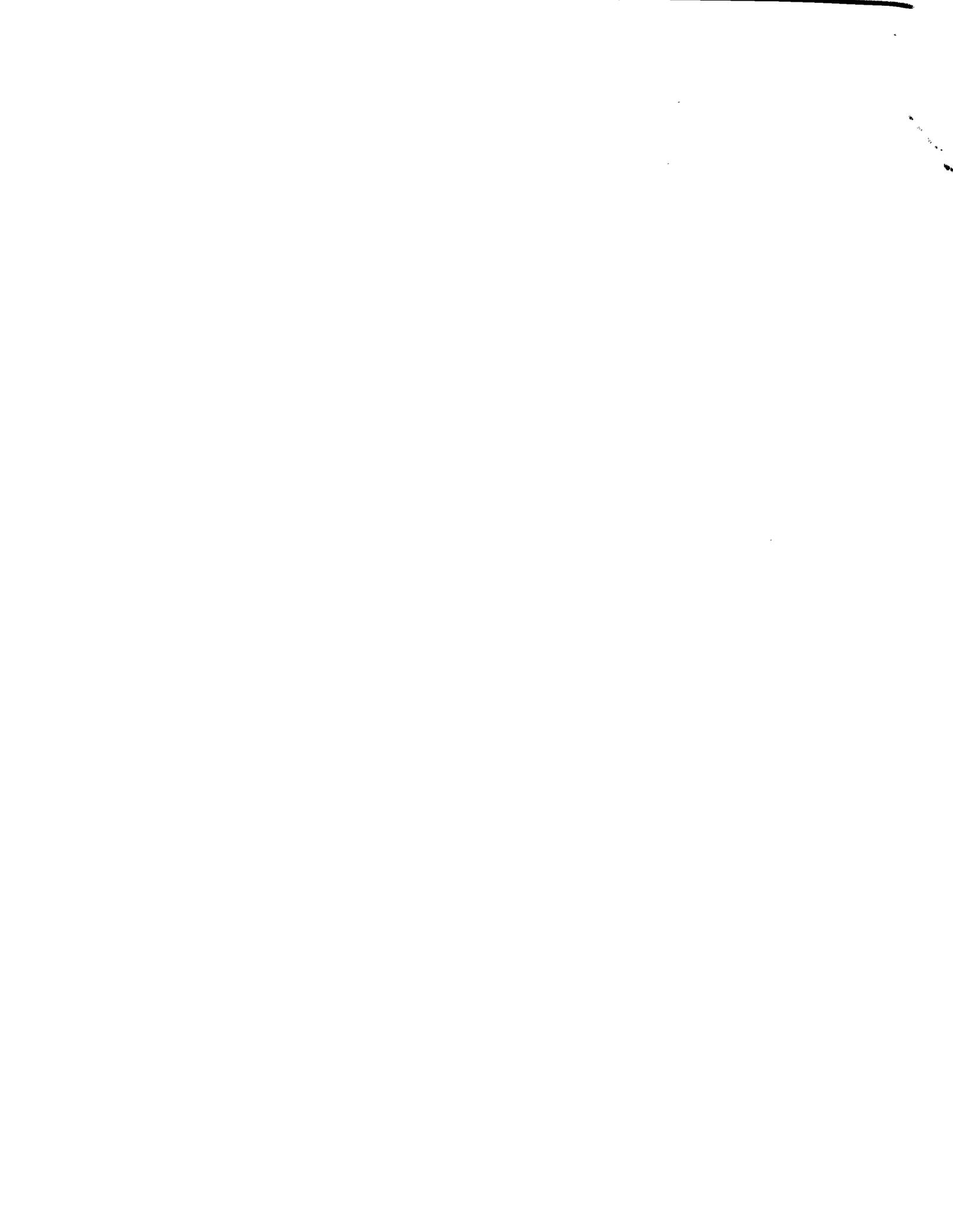
Attorney Client Privileged

STATE OF N.H. CONTRACT CHECKLIST

1. Agency: Department of Environmental Services	2. Primary Agency Contact (for contract questions/discussion): Kenneth Richards
3. Primary Agency Contact Phone Number: 271-7378	4. Primary Agency Contact Email: Kenneth.Richards@des.nh.gov
5. Secondary Agency Contact (for contract return): Richard Pease	6. Secondary Agency Contact Phone Number: 271-4060
7. Contractor Name: United States Geological Survey	8. Price Limitation: \$9,960
9. Targeted G & C Closing Date: August 1, 2013	10. Targeted G & C Meeting Date: August 14, 2013
11. RUSH? <input type="checkbox"/> REQUESTED RUSH RETURN DATE FROM DOJ <input type="checkbox"/> (If requested return date is less than two weeks from Targeted G & C Closing Date, please explain.)	

PART 1: CONTRACT CHECKLIST FOR DEPARTMENT OF JUSTICE REVIEW -TO BE COMPLETED BY AGENCY

Item	Verify	<input checked="" type="checkbox"/>	Comments
12. Execution	Fully and properly executed; all blocks on P-37 fully completed.	<input checked="" type="checkbox"/>	P-37 form not applicable
13. Exhibit A Scope of Services (P-37)	Scope of Services described in detail.	<input checked="" type="checkbox"/>	
14. Exhibit B Payment Terms (P-37)	Contract price, method and terms of payment described in detail.	<input checked="" type="checkbox"/>	P-37 form not applicable
15. Exhibit C Special Provisions (P-37)	Modifications, additions and/or deletions to Form P-37, General Provisions, described in detail.	<input type="checkbox"/>	NA
16. Secretary of State's Office Certificate of Good Standing ("CGS")	Individuals contracting in <u>their own name</u> do not need a CGS. Business organizations and trade names need a CGS, except for nonresident non-profit corporations.	<input type="checkbox"/>	NA
17. Certificate of Vote / Authority ("CVA")	Individuals contracting in <u>their own name</u> do not need a CVA. Business entities and trade names need a CVA.	<input type="checkbox"/>	NA
18. Certificate of Insurance	Certificate of Insurance form attached with insurance coverage required under the contract. Modifications of insurance coverage required under the contract specified in	<input type="checkbox"/>	NA



STATE OF N.H. CONTRACT CHECKLIST

PART 2: CONTRACT CHECKLIST FOR DEPARTMENT OF ADMINISTRATIVE SERVICES REVIEW – TO BE COMPLETED BY AGENCY

Item	Verify	✓	Comments
23. Request Letter – Requested Action	Requesting Party; purpose (to enter into a contract); contractor name/address; cost; services; timing; funding source.	<input checked="" type="checkbox"/>	
24. Request Letter – Funding & Funding Statement	Verify that funding is available; contingent upon future budgets; allocated by fiscal year; proper account numbers used.	<input checked="" type="checkbox"/>	
25. Request Letter – Explanation	Description of services; reason for retroactive or sole source; details of bidding process; proper statewide approvals obtained.	<input checked="" type="checkbox"/>	
26. DoIT Approval (if applicable)	Dept. of Information Technology Approval Letter attached.	<input type="checkbox"/>	NA
27. Personnel Approval (if applicable)	Director’s signature on P-37 or approval letter attached.	<input type="checkbox"/>	NA
28. Lease Approval	Review/Approval by DAS/Bureau of Planning & Management, if applicable.	<input type="checkbox"/>	NA
29. Bid Evaluation/ Summary	Criteria & scoring; evaluation team members & qualifications included; bid-opening minutes.	<input type="checkbox"/>	NA
30. Central Services – Is a Statewide contract available?	Limit contract to period for which a statewide contract is not available.	<input type="checkbox"/>	NA
31. Memorandum of Understanding	One request for both agencies with all required information/approvals.	<input checked="" type="checkbox"/>	
32. Authorized Signor	Agency signatory must have legal authority (via statute or power of attorney) to contract on behalf of the State.	<input checked="" type="checkbox"/>	
33. Social Service Contracts	Provide latest F/S; list of BOD; key personnel & salaries; resumes of those involved in the project.	<input type="checkbox"/>	NA
34. Format	Pages double-sided; ¼ inch margins; font is 10 Pica or larger; all pages	<input checked="" type="checkbox"/>	









United States Department of the Interior

U.S. GEOLOGICAL SURVEY
New England Water Science Center
New Hampshire – Vermont Office
331 Commerce Way, Suite 2
Pembroke, NH 03275

May 22, 2013

Mr. Kenneth A. Richards, P.E.
NH Department of Environmental Services
Waste Management Division
29 Hazen Drive
Concord, NH 03302

Dear Mr. Richards:

Enclosed please find three copies of an agreement to U.S. Geological Survey (USGS) Joint Funding Agreement, dated July 1, 2013, for extended work on project “Characterization of the Hydrogeologic Framework and Arsenic Mobility at the Auburn Road Landfill, Londonderry, NH.” The amount of the agreement is \$19,920.00 with \$9,960.00 comprising the State share.

Work performed under this agreement will be conducted on a reimbursable basis. The State will be billed quarterly during the period of the agreement. When the amendment is signed, please return two copies with original signatures. Do not hesitate to give me a call at (603) 226-7808 (or email at ktoppin@usgs.gov) or James Degnan at (603) 226-7826 if you wish to discuss any aspect of this agreement. We appreciate your cooperation and look forward to working with you on this continuing study.

Sincerely,

Kenneth W. Toppin
New Hampshire -- Vermont Office Chief

Enclosures

