

US EPA ARCHIVE DOCUMENT

**DRAFT
WORK PLAN
AMENDMENT No. 2**

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RI00558D

TECHNICAL ASSISTANCE

**CENTREDALE MANOR RESTORATION PROJECT SITE
NORTH PROVIDENCE, RHODE ISLAND**

RESPONSE ACTION CONTRACT (RAC), REGION I

**For
U.S. Environmental Protection Agency**

**By
Tetra Tech NUS, Inc.**

**EPA Contract No. 68-W6-0045
EPA Work Assignment No. 043-ANLA-016P
TtNUS Project No. N0400**

August 2000



TETRA TECH NUS, INC.

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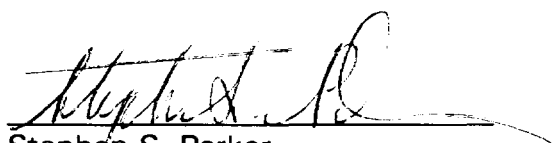
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Stephen S. Parker
Project Manager

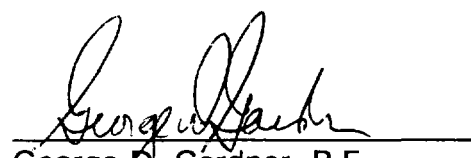

George D. Gardner, P.E.
Program Manager

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1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) Region I requested that Tetra Tech NUS, Inc. (TtNUS) continue to provide Technical Assistance (TA) support for the Centredale Manor Restoration Project Site located in North Providence, Rhode Island under Contract No. 68-W6-0045, Work Assignment No. 043-TATA-O16P.

This Work Plan Amendment (No. 2) describes the scope of work and proposed schedule for providing technical support activities for a source area and groundwater investigation at the site. This Work Plan Amendment was developed based on EPA Work Assignment Form (WAF), Revision No. 4 (dated June 2000) and the associated Statement of Work and results of the July 13, 2000 scoping meeting between EPA and TtNUS.

1.1 Work Assignment Objective

The objective of this work assignment is to perform field investigations and data assessment of the source area and conduct a groundwater investigation for the Centredale Manor and Brook Village properties at 2074 Smith Street In North Providence Rhode Island. This will include

- a hydrogeologic investigation of the Source Area
 - conceptual groundwater flow model, showing three-dimensional extent of contaminant plumes identified
 - identification of LNAPL or DNAPL layers if present
 - perform screening and laboratory analysis of samples collected
 - validate data
 - incorporate data into the site GIS data management system
 - submit results to EPA in a Technical Memorandum that will support the RI/FS for the site.
- Data may be used by the EPA for ecological and human health risk assessment and other engineering evaluations.

1.2 Work Plan Organization

This Draft Work Plan Amendment contains six sections: the Introduction is presented in Section 1.0; Section 2.0 identifies the site description and the environmental contamination problems; Section 3.0 presents the scope of work; Section 4.0 presents the detailed task descriptions; Section 5.0 presents a proposed project management approach and projected schedule; and Section 6.0 identifies the equipment and consumable supplies necessary to perform the activities identified in this Draft Work Plan Amendment No. 2.

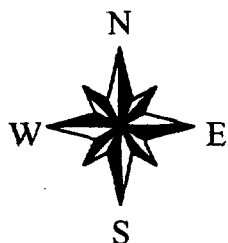
2.0 SITE DESCRIPTION

The Draft Final Work Plan for Technical Assistance (TtNUS, October 1999) presents a description and history of the site pertinent to this work assignment. As that work plan describes, the Centredale Manor and Brook Village properties are the former location of a chemical company and a drum reclamation company that operated between the 1940s and 1970s. Historic records indicate chemicals and chemical wastes were disposed of on the property and released into the Woonasquatucket River during this period. Figure 2-1 presents the source area of the Centredale Manor Restoration Project Site. The following items are recalled as pertinent to this amendment:

TtNUS conducted an investigation of the sediment of the Woonasquatucket River from the Centredale Manor property south to the Lymanville Dam. As a part of that investigation, one sample was collected on the flood plain area downstream of the Lymanville Dam. This sample contained dioxin at concentrations above 1 ppb (ug/kg), indicating that dioxin has migrated downstream of the Lymanville Dam. Therefore, the need to continue the sediment investigation to the next impoundments, contained by the Manton dam and Dyerville Dams in Providence has been identified. Figure 2-2 presents the Manton and Dyerville reaches of the Woonasquatucket River.

Previous geophysical investigations identified anomalies at the Brook Village and Centredale Manor properties. These anomalies may be old foundations or buried debris. Due to the nature of the property use, it has been determined that installation of test pits in the areas of the anomalies cannot be performed while guaranteeing the safety of the residents of the apartment buildings. Therefore, the physical characteristics of these anomalies will not be evaluated as a part of the source area investigation.

Limited groundwater investigations have been performed at the Site. Seven borings were installed in the overburden at the Brook Village property by GEC Environmental Consultants in 1999, and a subset of these were finished as monitoring wells. However, no evaluation of groundwater flow, vertical gradient, or confining layers has been performed, and no evaluations have been made as to contaminant transport through or with groundwater.



ROUTE 44 BRIDGE

BROOK VILLAGE

CAP AREA 2

CENTREDALE
MANOR

CAP AREA 1

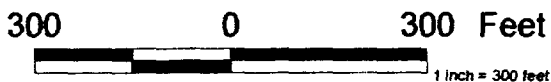
LEGEND

- Roads (Louis Fedeno & Associates Oct 1999)
- Fence Line (EPA, Dec. 1999)
- Parcels (Revised Jan 2000 with Title Search Performed by EPA)
- Town Boundaries (See note 3)
- Buildings (See note 3)
- Parking lots (See note 3)
- Limit of Existing Cap

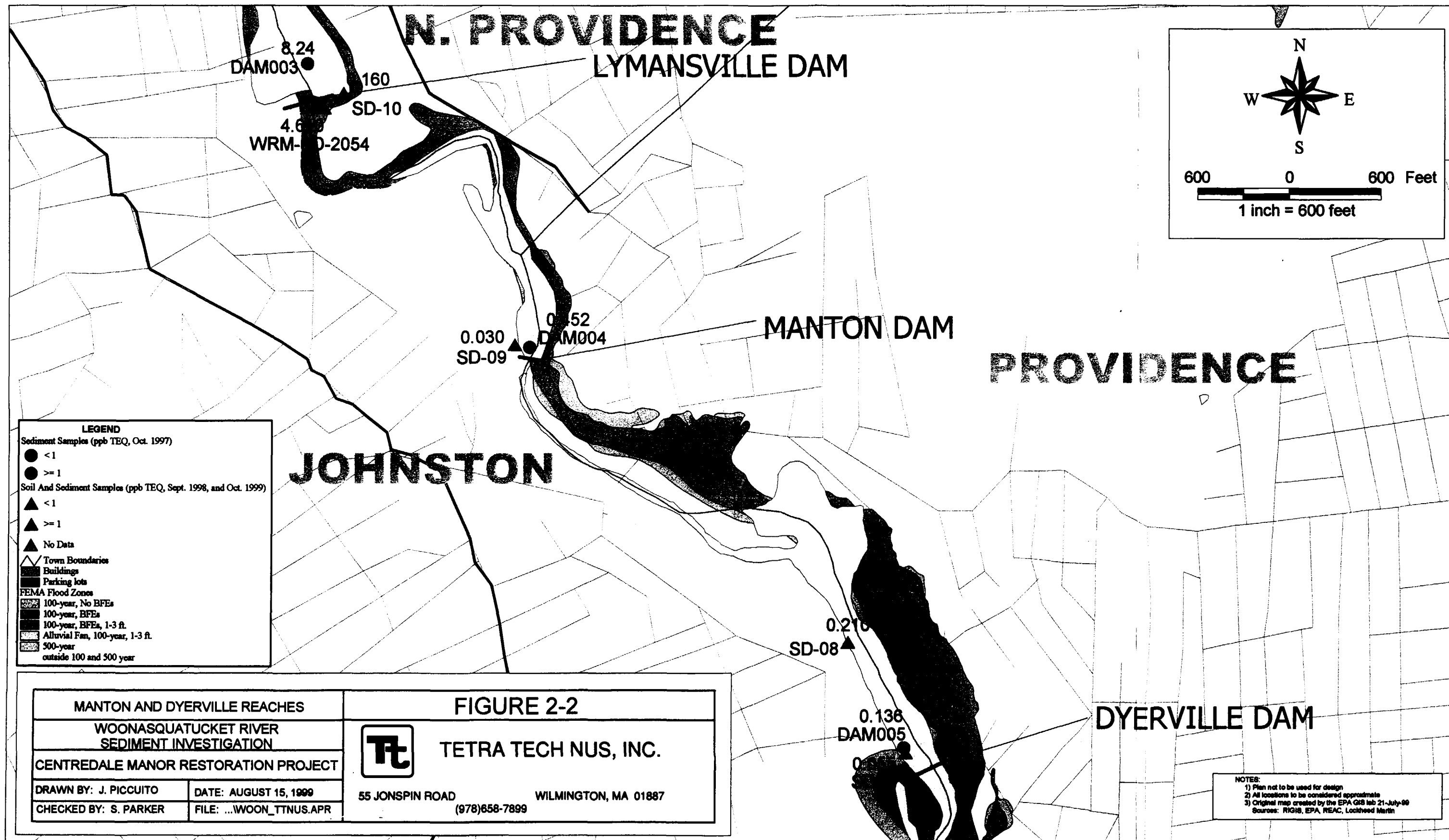
NOTES:

- 1) Plan not to be used for design
- 2) All locations to be considered approximate
- 3) Original map created by the EPA GIS lab 21-July-99

Sources: RIGIS, EPA, REAC, Lockheed Martin



SOURCE AREA, CENTREDALE MANOR RESTORATION PROJECT SITE		FIGURE 2-1	
SOURCE AREA INVESTIGATION		TETRA TECH NUS, INC.	
CENTREDALE		55 JOSEPH ROAD (878) 666-7888	
DRAWN BY: J. R. MCCARTHY	DATE: AUGUST 15, 1996	WILMINGTON, MA 01897	
CHECKED BY: S. PARKER	FILE: CENTREDALE 2P1		



3.0 SCOPE OF WORK

The Scope of Work for Work Plan Amendment No. 2 is to perform groundwater, sediment, and soil sampling at the source area and in the Woonasquatucket River for contaminants associated with the Site.

The Scope of Work for this Work Plan includes the following activities and is based on the EPA Scope of Work (June 2000), and the scoping meeting held July 13, 2000:

- Attend scoping meeting and develop project goals and objectives.
- Conduct a site visit with the EPA Remedial Project Manager (RPM).
- Prepare a work plan and cost estimate.
- Review available information.
- Prepare Quality Assurance Project Plan (QAPP) Field Sampling Plan and update Health and Safety Plan.
- Conduct project procurement activities.
- Perform project management and monthly reporting activities.
- Attend technical and project meetings at EPA offices.
- Procure and oversee drilling, surveying, and geophysical subcontractors.
- Mobilize and demobilize staff and equipment to site.
- Collect limited aquatic and flood plain sediment samples in the Manton and Dyerville reaches of the Woonasquatucket River.

- Collect soil samples to profile vertical extent of soil contamination.
- Install a network of groundwater monitoring wells that can be used to establish a conceptual groundwater flow model, showing three-dimensional extent of contaminant plumes identified.
- Collect groundwater samples to characterize nature and extent of groundwater contamination and identify LNAPL or DNAPL layers, if present.
- Perform field screening and laboratory analysis of samples collected.
- Incorporate data into the site GIS data management system.
- Perform global positioning survey of sediment sample stations.
- Perform land survey of groundwater monitoring wells and borings installed.
- Dispose of investigation-derived waste.
- Validate data.
- Organize, reduce, and tabulate existing analytical data; develop appropriate databases.
- Compile new data into database, provide revisions to EPA as necessary.
- Prepare Technical Memorandum describing the sampling activities and the data collected for the source area investigation.

4.0 TASK PLAN DESCRIPTION

This section provides the details of the tasks to be performed by Tetra Tech NUS, Inc. (TtNUS) to meet the requirements of the EPA Statement of Work and as discussed with the EPA RPM.

4.1 Task 0100 - Project Planning and Support

This task encompasses all necessary activities to plan, execute, and manage the tasks specified in the EPA Statement of Work. Five subtasks comprise project planning and are presented below.

4.1.1 Subtask 0111 - Attend Scoping Meeting

A Conference call was held on July 13, 2000 between the EPA Contracting Officer, the WAM, and TtNUS Deputy Program Manager, and TtNUS Project Manager. During this conference call, certain tasks were clarified as are described in this work plan amendment.

On July 27, 2000 a scoping meeting was held at in EPA Boston to discuss technical aspects of the work to be performed. Additional information was provided by EPA during the meeting to clarify the activities to be performed.

4.1.2 Subtask 0112 - Conduct Site Visit

Brief site visits were held July 7 and July 26, 2000. The first visit was made to provide orientation for the project senior hydrogeologist. At this site visit, the site and surrounding areas were inspected to determine the probable geology of the area. Nearby bedrock outcrops were identified, and existing conditions of the capped areas, the river and river beds, the right of way on the west side of the river and the pond were all evaluated. In addition, the source area and surrounding properties were evaluated for possible access during drilling and other investigative activities.

The second visit was made to the Manton and Dyerville areas of the Woonasquatucket River. During this visit, possible sample stations and access points were evaluated to identify properties for which access may be required for sampling in these reaches.

4.1.3 Subtask 0113 - Evaluate Existing Information

TtNUS has reviewed information available for the project site as a part of portions of this and other work assignments. TtNUS staff who have worked on the Centredale work assignment 048 and previously on this assignment will be used to the extent possible to minimize the need for project orientation and familiarization, however, hydrogeologists and other field staff will need to review documentation for effective participation in the project.

4.1.4 Subtask 0114 - Develop Project Goals and Objectives

During the development of this work plan, data needs and data quality objectives for analytical sampling to be performed have been assessed for the purposes of the development of this work plan amendment. This is based on the information provided to TtNUS at the scoping meetings and based on anticipated project needs. It is currently anticipated that the end use of the data collected under this work plan amendment will include the following:

- Determination of the nature and extent of contamination in groundwater and support risk assessment
- Determination of the nature of contamination in soils and support risk assessment
- Modeling of groundwater flow direction
- Determine presence of dioxins and airborne VOCs inside Centredale Manor building, to support risk assessment
- Perform ambient air monitoring to determine protective equipment required for occupied areas during the subsurface explorations

These end uses of the data will be considered to develop the data quality objectives and to define the analytical methods, and reporting levels appropriate to meet these objectives and satisfy EPA Region I guidelines. The data quality objectives will be described in the Quality Assurance Project Plan for the source area investigation.

In addition, the sediment investigation for the Woonasquatucket River performed under the original scope of work for this work assignment found dioxin concentrations above 1 ppb present downstream of the Lymansville Dam. Therefore, a second goal of the work performed under this work plan amendment is to determine presence of dioxin greater than 1 ppb in the next reaches downstream (Manton and Dyerville).

4.1.5 Subtask 0115 - Develop Work Plan

TtNUS will prepare and submit a Draft Work Plan Amendment No. 2 and if required, a Draft Final Work Plan. The Draft Work Plan includes a description of project tasks, the procedures to accomplish them, and a proposed project schedule. Specifically, the Work Plan will include the following:

- A detailed identification of project elements and associated tasks (and subtasks) that conform to the Work Breakdown Structure (WBS) tasks and sequence specified in the SOW.
- TtNUS' technical approach to perform each task, including a description of each task, the assumptions used, the information needed for each task, any information to be produced during and at the conclusion of each task, and a description of the work products that will be submitted to EPA.
- A schedule providing specific dates (or assumed if this information is unavailable) for completion of each required activity and submission of each deliverable required by this SOW.

A Cost Estimate will be prepared as a separate document, including the estimated cost to complete the work by Level of Effort (by P levels) and dollar cost for each task of the WBS.

Under this effort, TtNUS will attend a negotiation meeting, at which additional information will (if necessary) be provided to describe the basis of the cost estimates.

TtNUS will prepare a Draft Final Work Plan after receipt of EPA comments. This Draft Final version will incorporate comments on the draft version as directed by EPA and will reflect revisions as agreed to at the negotiations meeting.

4.1.6 Subtask 0120 - Site Management Plans and QAPP

This subtask includes preparing the site management documents using the most recent version of the equivalent plans for the site prepared by TtNUS under this and other work assignments, as well as those prepared by IT Corp, R.F. Weston, and others, as appropriate. These documents will include an Addendum 2 to the existing Tetra Tech NUS, Inc. Sampling and Analysis Plan for sediment sampling (TtNUS October, 1999), and a Quality Assurance Project Plan for source area investigations. In addition, the Health and Safety Plan (HASP) prepared in September 1999 will be revised to accommodate new anticipated tasks and provided as a separately bound document.

Addendum 2 to the Sampling and Analysis Plan (TtNUS Inc., October 1999)

An Addendum to the Sampling and Analysis Plan for Woonasquatucket River Sediment Investigation, Revision 1, (Tetra Tech NUS, Inc., October, 1999) will be developed to accommodate additional sediment samples to be collected from the Manton and Dyerville areas of the Woonasquatucket River. The Addendum 2 will include a map of sample locations, and tables showing sample depths, analytes, and preservative requirements.

Quality Assurance Project Plan (QAPP)

TtNUS will develop a Quality Assurance Project Plan (QAPP) that will be used to direct and control the chemical data acquisition, the field investigation activities, and hydrogeologic

evaluations. To the extent practical, the existing Sampling and Analysis Plans (SAPs) for W.A. No. 043-TATA-016P will be used to develop the QAPP. The QAPP incorporates a Field Sampling Plan (FSP), a Data Management Plan, and the quality assurance/quality control (QA/QC) parameters formerly described in the SAP.

TtNUS will prepare a QAPP in accordance with EPA QA/R-5 (latest draft) and the Region I, EPA New England's Compendium of Quality Assurance Project Plan Guidance (October 1999). The QAPP will describe the project objectives and organization, functional activities, and QA/QC protocols that will be used to achieve the desired Data Quality Objectives (DQOs). The DQOs shall, at a minimum, reflect the use of analytical methods for identifying contamination and addressing contamination consistent with the levels for remedial action objectives identified in the National Contingency Plan.

The measuring and data acquisition elements of the QAPP, Sections 8 through 12 include the information frequently described in the Field Sampling Plan (FSP). The sampling objectives, sample location and frequency, sampling equipment and procedures, sample handling and analysis, and a breakdown of samples to be analyzed through the Contract Laboratory Program (CLP) and through other sources will be described. Available existing data will be incorporated.

Elements formerly described in the Data Management Plan will be incorporated in Section 15 of the QAPP. The requirements for the project management systems including tracking, storing, and retrieving data will be provided. The software to be used, minimum data requirements, data format, and backup data management will be identified.

Revision 1 to the Site - Specific Health and Safety Plan (HASP)

The Health and Safety Plan prepared for the site in September 1999 will be revised to accommodate the additional tasks to be performed under the new scope of work. The HASP prepared in 1999 details site-specific health and safety information, including a hazard assessment, personnel training, health and safety equipment requirements, site operations monitoring procedures, and safe operating procedures. The purpose of the HASP is to provide adequate health and safety protection for all TtNUS and subcontractor personnel

working on site. The revision will include procedures for use and supervision of heavy drilling equipment on site, the possibility for encountering high concentrations of volatile organic compounds, and other activities anticipated for the source area investigation.

4.1.7 Subtask 0130 - Project Management

TtNUS shall prepare monthly progress reports for a 18-month duration (July 2000 through December 2001) documenting cost and technical performance status for each task during the reporting period in accordance with contract requirements. TtNUS shall report costs and level of effort (by P level) as well as cumulative amounts expended to date. Monthly invoices shall be prepared and submitted in accordance with the level of detail specified in the contract.

TtNUS shall attend an estimated three technical project meetings in addition to those held in the scoping stages of this amendment (Tasks 0112 and 0115). For each meeting, TtNUS shall provide documentation of meeting results. It is assumed that these meetings will be held at the EPA offices in Boston. In addition, TtNUS will communicate weekly with the WAM or, as appropriate, to report project status and to discuss ongoing activities.

4.1.8 Subtask 0140 — Subcontract Procurement and Support

This subtask includes activities required to procure, administer, monitor, and close-out up to four subcontracts:

- Drive and Wash Drilling, Bedrock Coring, / Semi-Permanent Well installation
- Geophysical Survey of Boreholes
- Investigation-Derived Waste (IDW) characterization, transport, and disposal
- Professional Land Survey of Wells and Borings.

Technical specifications will be developed based on EPA requirements and TtNUS standard operating procedures. Field oversight and monitoring of subcontractor performance will be conducted under appropriate field tasks.

Technical specifications and subcontract procurement for the DAS analyses will be performed under the DAS work assignment.

One pre-bid meeting is anticipated for the drilling and well installation subcontract. TtNUS will evaluate the performance of subcontractors based on the technical specifications, cost, and the overall contract terms and conditions.

4.2 Task 0200 - Environmental Sampling

The objective of this task is to collect environmental data from the source area augmenting existing data to determine groundwater flow and contaminant loading into the Woonasquatucket River system. A phased approach to the environmental sampling subtasks is anticipated to assure appropriate data collection and location of monitoring wells. Subtasks for each phase are anticipated as follows:

- Phase 1 (Fall 2000) - mobilization/demobilization, bank soil and aquatic sediment sampling in Manton and Dyerville, bedrock outcrop inspection, perimeter drilling and monitoring well installation, hydrogeologic evaluation, groundwater sample collection, survey, and downhole geophysics for bedrock fracture orientation.
- Phase 2 (Winter/Spring 2001) - mobilization/demobilization, temporary well installation, hydrogeologic evaluation, groundwater sample collection, survey.

The plan for sample collection and the basis for the design of that plan will be provided in the SAP Addendum and QAPP. The sections that follow describe the proposed subtasks.

4.2.1 Subtask 0211 - Mobilization/Demobilization

This subtask involves providing the necessary personnel, equipment, and materials for mobilization and demobilization from the study area to conduct the field investigation. Included in this subtask are identifying and obtaining/returning field equipment, supplies, etc. Also included in this subtask is the one year lease of a work trailer (10' x 20'), already located at the

site. It is anticipated that the hydrogeologic investigation of the source area will be conducted in two phases, requiring two separate subcontract or mobilization/demobilization efforts.

A 1-day field orientation meeting for all TtNUS Team members, including discussion of the health and safety protocols, will be held in the office by TtNUS prior to initiation of each phase of work. An on-site field orientation meeting will also be conducted by TtNUS with subcontractors prior to initiation of each phase of the field work.

This subtask also includes developing field forms that will be used during the investigations, completing up-front field tracking systems, and performing other similar field investigation support tasks.

4.2.2 Subtask 0210 - Field Screening

Field screening will be conducted during drilling and subsurface explorations under Subtasks 0221 and 0222. Headspace PID or FID screening of soil samples collected from the target intervals described for each group of borings or cores will be performed for qualitative measurements of total VOCs. In addition, soil samples and cores will be evaluated visually for stains or separate phase liquids as they are characterized for the boring logs. Details on the sample screening program will be described in the SAP and QAPP.

4.2.3 Subtask 0220 - Subsurface Soil Exploration

Soil explorations at the source area shall be conducted through a series of soil borings at locations selected as described in this section. These subsurface explorations will be performed to determine if contaminants present in the soils and groundwater at the source area are able to move and be discharged into the river or ponds.

Because surface soils were evaluated in 1999, additional surface soil samples are not anticipated to be collected for screening or laboratory analysis. However, subsurface soils will be collected through the installation of small, and standard diameter borings.

The subsurface explorations will be conducted in two phases such that the information from the first phase can be used to direct a simplified approach to conducting the second phase. The first phase of explorations are intended to determine how groundwater is likely to move through the source area. The second phase of explorations is intended to determine if and where contaminants are being discharged to the river or pond.

Borings to be conducted are summarized as follows:

Phase 1 (Subtask 0221):

- Four perimeter borings finished as well clusters (one overburden and one bedrock well) to study soil and bedrock conditions around the perimeter of the Source Area. Samples will be collected for soil classification and description.
- Five shallow borings into the former raceway, two finished as shallow overburden piezometers. Samples collected for soil classification and laboratory analysis at 1-foot intervals.
- Seven small diameter, shallow borings spread across the source area to evaluate general soil conditions and to be finished as temporary piezometers to monitor the seasonal water table elevation. Continuous sampling conducted for evaluation of soil conditions and VOC headspace screening to select two samples from each boring for laboratory VOC analysis.

Phase 2 (Subtask 0222):

- Five shallow borings located hydraulically downgradient of geophysical anomalies found in 1999, finished as temporary wells. Continuous soil samples collected for laboratory analysis at 1-foot intervals.
- One boring location to the south of the site finished as a clusters of two wells to study soil and bedrock conditions to the south of the source area: Laboratory analysis of soil samples is not anticipated to be necessary for these borings, as subsurface soil samples have already been collected in this area.
- Five shallow borings installed at locations on the river bank or pond banks where contaminants are anticipated to be discharged, and finished as temporary shallow wells or piezometers. Continuous samples collected for laboratory analysis at 1-foot intervals.

4.2.4 Subtask 0230 - Groundwater Evaluation

Groundwater monitoring wells will be installed in borings as described in Section 4.2.3 of this work plan amendment. Samples will be collected at the end of each phase of well installations using low-flow sampling methods. The borings finished as wells are summarized below:

Phase 1 (Subtask 0231):

- Four well clusters of two (one overburden one bedrock well each cluster) around the perimeter of the site.
- Two shallow overburden wells in the former raceway.
- Seven shallow temporary piezometers.

Phase 2 (Subtask 0232):

- Five source area shallow wells.
- Five discharge area shallow wells or piezometers.
- One cluster of two wells south of the source area, one cluster of two wells.

In addition, if till is found to be present throughout the site, three piezometers will be installed into the till layer to determine water transmissivity. It is anticipated that these piezometers will be installed hydraulically upgradient of the contaminated areas, to minimize the possibility of contaminant migration from the overburden to the groundwater. Samples for laboratory analysis will not be collected from these till piezometers.

In addition to the sampling activities described above, the groundwater investigation will also include determination of hydraulic gradient in both overburden and bedrock aquifers (through extended measurement of water table elevations during high (spring 2001) and low (winter 2000-2001) water periods using recording transducers), estimation of groundwater flow through and between the different aquifers (performing rising and falling head tests), and, to the extent possible, location and delineation of non-aqueous phase liquid (NAPL) (through

collection and laboratory analysis of Shelby tubes at specific intervals during boring advancement).

4.2.5 Subtask 0241 — Sediment Sampling, Manton and Dyerville Areas

This task will include collection of sediment from the underwater areas of the river downstream of Lymanville dam.

Aquatic sediment samples will be collected from areas of fine depositional sediments. Samples will be collected from the 0 to 0.5-foot interval as required for evaluation of ecological risk exposure scenarios.

It is anticipated that 14 stations will be sampled, in addition, two "background" locations (in the pond in line with the Assapumpsett Brook, in Johnston), and associated QC samples will be collected. This task includes collecting sediment samples, preparing chain-of-custody, documentation, packaging and shipping samples to the DAS analytical laboratory for the required analytical parameters (described in Task 0300). Aquatic sediments are defined in the Technical Memorandum for Woonasquatucket River Sediment Investigations (TtNUS, June 2000).

4.2.6 Subtask 0250 - Air Monitoring and Sampling

Air samples will be collected from inside the Centredale Manor building in April 2001. Five samples will be collected for volatile organic compounds using summa canisters. In addition, five samples will be collected for analysis of dioxins using particulate filters.

In addition, wipe samples will be collected from horizontal surfaces in the building for PCBs and dioxins.

The time and location of the air and wipe sampling effort will occur during a period that will assure minimal impact to the building residents, and avoid interferences from furniture treatments, cleaning materials, and other building maintenance activities. It is anticipated that EPA risk staff will assist TtNUS in selections of sample stations and sampling periods.

4.2.7 Subtask 0270 – Geophysical Study

In addition to the primary investigation tasks described in the preceding paragraphs, bedrock fracture orientation will be estimated at various locations in order to support the groundwater flow model (described in Section 4.6).

Bedrock strike and fracture orientation will be determined at three outcrops noted in the vicinity of the source area. One outcrop is located the north of the source area, and two are located to the south. This study will be performed prior to the installation of borings and wells. In addition, downhole geophysical evaluations will be performed, including use of an accoustical televiewer to determine orientation of linear features in the borehole, a heat pluse flowmeter to determine which zones produce water under static and stressed conditions, and measurement of natural gamma radiation in the borehole. Geophysical investigations will be conducted in the drilled bedrock boreholes, prior to completion of the monitoring wells. The bedrock fracture orientations will be determined using magnetic resonance to select the screened interval.

4.3 Task 0300 — Sample Analysis

Environmental samples will be analyzed in accordance with the DQOs presented in the QAPP. Sample analysis QA/QC will be consistent with the precision, accuracy, representativeness, completeness, and comparability required to meet the DQOs.

The samples obtained from the field work described above in Task 0200 will be analyzed under both the DAS and the CLP program: Aquatic sediments, will be analyzed under the DAS work assignment due to the anticipated concentrations of dioxins (greater than 1 ppb) and anticipated low solids content (below 30 percent). Soils and groundwater collected will be analyzed by CLP laboratories, with the exception of the dioxin analysis, which will be performed through DAS.

The LOE for subcontracting the DAS analytical services is included under the DAS work assignment. Only the costs for DAS analyses are included under this subtask.

Sediment samples will be analyzed for dioxins and hexachloroxanthene (HCX), pesticides/PCBs, semivolatile organic compounds (SVOCs), metals, acid-volatile sulfides and simultaneously extracted metals (AVS and SEM), total organic carbon (TOC), and grain size distribution.

Soil samples will be analyzed for dioxins and hexachloroxanthene (HCX), pesticide/PCBs, SVOCs, ^{VOCs} and metals. Groundwater samples will be analyzed for dioxins and hexachloroxanthene (HCX), pesticides/PCBs, VOCs, SVOCs, total and dissolved metals, alkalinity, sulfide, and TOC. Field measurements for pH, Eh, dissolved oxygen, conductivity and turbidity will be made during the collection of groundwater samples (Tasks 0231 and 0232).

4.4 Task 0400 - Analytical Support

This task includes coordinating with EPA Region I Sample Control Center (RSCC), the Contract Laboratory Analytical Services Support (CLASS), and the EPA New England Office of Environmental Measures and Evaluation (OEME). In addition, this task includes LOE for DAS and CLP sample management, obtaining performance evaluation samples from EPA, and providing analytical support to field and project activities. This task also includes archiving sample data packages at the conclusion of the data validation.

Data managers will download electronic data deliverables (EDDs) received from the analytical laboratory into the Data Management system for Centredale Manor Restoration Project Site. Then summary tables will be extracted for EPA/OEME and TtNUS data validators. After these tables are updated by validation (Task 0500), the database will be updated a second time with the DV qualifiers.

4.5 Task 0500 - Data Validation

Tier II data validation will be performed for all analytical results of pesticides, PCBs, VOCs, SVOCs, metals, and the AVS/SEM. Tier I data validation will be performed for grain size, TOC, and water quality parameters results. It is anticipated that the Tier III data validation for dioxin will be performed by EPA/OEME.

Data validation will follow the procedures described in EPA Region I Laboratory Data Validation Functional Guidelines for Evaluating Organics 6/88, and modified by EPA Region I in February, 1989; EPA Region I Laboratory Data Validation Functional Guidelines of Evaluating Inorganics Analyses 2/88, and modified by EPA Region I in November 1988; and Volatile/Semivolatile Data Validation Functional Guidelines – Part II. Region I EPA New England, December 1996.

4.6 Task 0600 - Data Evaluation and Reporting

TtNUS will develop a Technical Memorandum that will summarize data collected for the Source Area Investigation. This technical memorandum will also include a summary of the sediment results from samples collected in the Manton and Dyerville area of the site.

4.6.1 Subtask 0611 - Data Usability Evaluation and Modeling

Data collected during the groundwater and soil investigations will be evaluated and used to prepare a conceptual model of groundwater flow through the source area. The model will account for confining layers found in the subsurface materials, transmissivity measured in overburden and bedrock aquifers, and gradients measured.

The conceptual model outputs will show extent of known groundwater contamination and anticipated contaminant discharge points to the river and ponds. Model outputs will be mapped by plan-view and with cross sections.

4.6.2 Subtask 0621 - Data Reduction, Tabulation, and Evaluation

Data evaluation is the process of reviewing and summarizing data into a format useful for evaluating the nature and extent of contamination. New data will be incorporated into the Centredale GIS system. Sediment contaminant distribution in Manton and Dyerville areas will be mapped similar to that performed for Allendale and Lymanville in 1999. Air and wipe sample data will be tabulated and compared to ambient RIDEM air quality standards (AALs) or risk-based criteria provided by EPA.

4.6.3 Subtask 0631 - Data Trend Evaluation and Submission of Source Area Technical Memorandum

TtNUS will prepare a Technical Memorandum that summarizes the results of the data evaluation conducted under subtasks 0610 and 0620. The report will identify all data sources evaluated, present TtNUS's interpretation of the data, and identify any remaining data gaps or limitations.

The primary focus of the technical memorandum shall be the evaluation of the groundwater data in a conceptual model showing input and output areas. Cross sections of the source area will be described showing the stratigraphy of the soils, the contaminants within the different aquifers and the flow gradient. In addition, contaminant plumes found in the groundwater will be mapped for selected contaminants, as needed for the data interpretation.

The Technical Memorandum will also present the results of the sediment sample collections performed in Manton and Dyerville, and the results of the air and wipe samples collected at the Centredale Manor building.

It is assumed that four copies of the draft Technical Memorandum will be submitted to EPA for review and comment. After the WAM's review, TtNUS will meet with the EPA WAM to discuss the data evaluation results and other activities needed. One revision of the Technical Memorandum will be provided, if necessary. Up to 26 copies of the Final Technical Memorandum will be provided.

The Technical Memorandum will also make recommendations (if appropriate) for future data collection and evaluation efforts that would be necessary to support the risk assessments to be performed by the EPA.

4.7 Task 0700 - Characterization and Disposal of IDW

This task includes work efforts necessary to characterize and dispose of wastes generated by sampling activities. TtNUS shall characterize and dispose of wastes in accordance with local,

state and Federal regulations. Drilling wastes will be separated into separate 55-gallon drums of water and soils, and staged at a central location within the fence for Cap Area 1 prior to shipment and disposal. It is anticipated that approximately 20 drums of drilling and decontamination wastes will be generated during the source area investigation (8 drums of soil, 12 drums of water), although more IDW may be generated depending on the depths to which borings and wells are installed. Sampling gear and personal protective equipment will be decontaminated and properly disposed of by TtNUS.

4.8 Task 0800 - Work Assignment Closeout

Work Assignment closeout tasks are described in the Draft Final Work Plan for Technical Assistance (TtNUS Inc., October, 1999).

5.0 PROJECT MANAGEMENT

The overall TtNUS project management and control of the technical assistance support activities are presented in the approved Draft Final Work Plan for Technical Assistance (TtNUS, October 1999).

5.1 Project Organization

Mr. George Gardner, the Program Manager, is responsible for the overall management and implementation of the RAC I contract performed in US EPA Region 1. Mr. Stephen Parker will continue to serve as the project manager for Work Assignment 043-TATA -O16P and has the primary responsibility for the implementation and execution of the Work Assignment including technical quality, oversight/review, control of costs and schedule, and implementation of appropriate quality assurance procedures during all phases. In general, the technical disciplines and technical staffing will be drawn from the TtNUS's Wilmington, Massachusetts, office. When specialized or additional support is required, personnel from other TtNUS offices may be used.

5.2 Quality Assurance and Data Management

All quality assurance and data management work shall be performed in accordance with the TtNUS RAC I QA Program Plan.

5.3 Project Schedule

The schedule begins concurrently with preparation of the Work Plan Amendment (July, 2000). The primary deliverable for this work assignment, which is the final Technical Memorandum for the Source Area Investigations is anticipated to be complete on December 1, 2001.

5.4 Project Cost

The overall cost for the performance of the technical assistance as described in this Work Plan Amendment is presented in a separate document, the Detailed Costing Estimate.

6.0 EQUIPMENT AND SUPPLIES

The following equipment and supply needs are anticipated during the performance of the field activities. See also the Detailed Cost Estimate for other equipment details.

Non-Expendable Equipment

- Work Vehicles: (1 pickup truck, and 1 minivan)
- Shelby tube sediment sampler
- Two-way radios (2)
- Photoionization detector (with calibration kits, chargers, and calibration gas) (Photovac 2020 or equivalent)
- LEL/O2 meter
- Personal Protection Equipment for Level D use, and Upgrades to Level B
- Cameras
- Groundwater recording transducers
- Tool kits with sockets, wrenches, pliers, screwdrivers, wire cutters, shears, hammers, etc.
- GPS unit with sub-meter accuracy
- One Computer with internet access
- Work Trailer with phone, fax and electricity
- Sanitary facilities and dumpster

Consumable Supplies

- Health and Safety: Tyvek coveralls, rain gear, work gloves, disposable gloves, nitrile/butyl gloves, glove liners, overboots, safety vests, handwarmers, winter coveralls, hard hats, earplugs, safety glasses, goggles, first aid kits, fire extinguishers, portable (hand held) eye wash station, and caution tape.
- Decontamination Supplies: Tubs, brushes, spray bottles, garden sprayers, detergent rinses (Alconox or Liquinox), isopropyl alcohol, garbage bags, foil, buckets, plastic sheets, wash tubs, aluminum foil, DIUF water, 1" poly tubing and 55-gallon drums.

- Sampling Supplies: Coolers, tape (duct, strapping, and packing), stainless steel bowls, vermiculite, ice, trash bags, trowels, PVC tubing, tape gun, zip-loc bags, preservatives (acids, bases), bottles, drums, pH paper, and pipets.
- Documentation supplies: Logbooks, disposable camera, film, batteries, sample labels, drum ID tags, and clip boards.
- Miscellaneous: Flagging, paper towels, polyethylene rope, polyethylene sheeting, hand trucks, gas cans, drum trucks, steel or fiber tapes (100- and 200-foot lengths), wire brush, sledge hammer, tarp, traffic cones, electrical tape, car battery, battery charger, bung wrench, flagging, and grade stakes.
- Sample Containers: 2, 4, and 8 oz. wide mouth glass soil jars, 80-oz amber jugs, 1-liter amber jars, and 1-liter polyethylene bottles (sample containers are costed for CLP analysis only, groundwater and soil analysis).