

# DRAFT FINAL WORK PLAN

SUPERFUND RECORDS CTR	00 00
Site:	Centredale Manor
Task:	2.2
	AP 317

## ENGINEERING EVALUATION/COST ANALYSIS

### CENTREDALE MANOR SITE NORTH PROVIDENCE, RHODE ISLAND

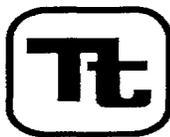
### RESPONSE ACTION CONTRACT (RAC), REGION I

For  
U.S. Environmental Protection Agency

By  
Tetra Tech NUS, Inc.

EPA Contract No. 68-W6-0045  
EPA Work Assignment No. 048-NSEE-016P  
TtNUS Project No. N0553

May 2000



TETRA TECH NUS, INC.

0734

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NORTH PROVIDENCE, RHODE ISLAND

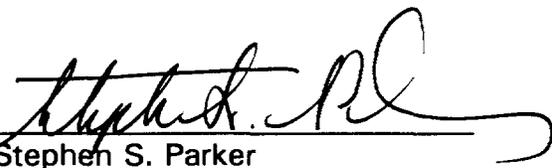
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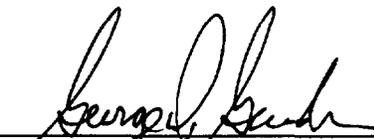
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Stephen S. Parker  
Project Manager

  
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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) provide continuing support for the Centredale Manor Restoration Project Site located in North Providence Rhode Island (the Site). This effort would be performed under Contract No. 68-W6-0045, Work Assignment No. 048-NSEE-016P. This Work Plan describes the scope of work and proposed schedule for performing an Engineering Evaluation/Cost Analysis for the Woonasquatucket River and abutting residential properties. The Work Plan was developed based on EPA Work Assignment Form (WAF), Revision No. 0 (dated February 22, 2000) and the associated Statement of Work, results of the March 2, 1999 scoping meeting between EPA and TtNUS, comments received on the Draft Work Plan dated April 26, 2000 and discussion with the EPA WAM.

### 1.1 Work Assignment Objective

The objective of this work assignment is to prepare an Engineering Evaluation/Cost Analysis (EE/CA) report for the area downstream of the Centredale Manor Site. This EE/CA report will be used to scope a non-time critical removal action in these areas in accordance with the Approval Memorandum dated January 26, 2000, and comments to the Draft Work Plan dated April 26, 2000.

TtNUS will evaluate available remedies to eliminate, reduce, or control risks to human health and the environment from contaminants in soils and sediments in areas of the river system downstream of the Centredale Manor Restoration Project Superfund Site. The EE/CA will include evaluation of existing data, evaluation of applicable or relevant and appropriate requirements (ARARs), screening and recommendation of remedial alternatives and estimating costs for recommended alternatives. In addition, TtNUS will provide continuing support to the EPA during public comment and response periods.

The work performed under this work assignment will culminate in the preparation and submittal of the EE/CA report. This report will focus on soils and sediment on or adjacent to residential properties within the floodplain of the river and ponds in the Villages of Centredale, Allendale and Lymanville in North Providence. The report will also address the sediments of the

Woonasquatucket River, its impoundments and flood plains, between Route 44 and the Lymansville Dam.

**1.2            Work Plan Organization**

This Draft Work Plan 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.

## 2.0 SITE DESCRIPTION

The Centredale Manor is a multi-unit apartment complex that houses elderly adults. It is located at 2074 Smith Street (Route 44) in Centredale, a village of North Providence, Rhode Island. Figure 2-1 presents the location of the site. This building, as well as the adjacent apartment building known as "Brook Village", located at 2072 Smith Street is located on the property of the former Metro-Atlantic Chemical Corporation, which occupied a mill complex on the property from the 1940s to the 1970s. The Woonasquatucket River follows the west boundary of the property, and there is the remains of a raceway for the mill complex on the eastern boundary of the property. The Site consists of all contaminated areas within this area as well as any other location to which contamination from this area has come to be located, or from which this contamination originated.

Historical records of Metro-Atlantic Chemical indicate that hexachlorophene was manufactured on site, and there were shipments of trichlorophenols to the site. The mill complex was destroyed by fire in 1972. Brook Village was constructed in 1977, and Centredale Manor was constructed in 1982. During construction of the apartment buildings, approximately 400 drums and 6,000 cubic yards of soil were removed from the site. Drum labels indicated that caustics, halogenated solvents, polychlorinated biphenyls (PCBs), and inks may have been contained in the drums.

Elevated levels of dioxin in fish were discovered in June 1996 by a study conducted by EPA Narragansett Laboratories and the Providence Urban Initiative program. A subsequent study conducted by EPA of the Woonasquatucket River (July 1998) found elevated concentrations of dioxin and PCBs in sediments in portions of the river and impoundments. Soil and sediment sampling conducted in September 1998 found dioxin present at concentrations above 1 ppb in portions of the river and in Allendale Pond, the first impoundment downstream of the site. Further sampling conducted in February 1999 on the property of the Centredale Manor also found elevated concentrations of dioxin in soils and sediment.

In 1991, the downstream mill dam known as Allendale Dam breached, and the water in Allendale Pond receded. This caused much of the pond bottoms adjacent to residential properties in North Providence to be exposed, and since that time, opportunistic vegetation has covered this area. In 1996, the U.S. Senate secured limited funding under Section 358 of

the Water Resource Development Act of 1992 to reconstruct the dam. However, since that time the Corps of Engineers has stated that the funding is not adequate to replace the dam, and repair efforts may be ineffective at restoring the dam.

Additional historical information is available in the Expanded Site Inspection Report, prepared for the site by R.F. Weston (3-9-99).

USEPA Emergency and Rapid Response Service Region I (ERRS-I) conducted an evaluation of the Centredale Manor and Brook Village properties in the summer of 1999. Part of this evaluation included an extensive sampling program for soils and sediment from the occupied portions of the Centredale Manor and flood-plain wetlands to the south. Following the completion of this "on-site" investigation, two areas on the Centredale Manor Property were selected to be temporarily capped to reduce or prevent potential for contaminant migration. In addition, a fence was installed around the Centredale Manor and Brook Village properties and along residential properties adjacent to the river and pond in order to prevent access to contaminated areas.

Under Work Assignment 043-TATA-016P, TtNUS, Inc. conducted additional sampling in areas downstream of the site and the ERRS-1 actions. As of the date of publication of this Work Plan, a technical memorandum is under preparation that describes the nature of contamination in sediment and surface water downstream of the site.

For the purposes of this work assignment, and the previous work assignment, specific areas of the Woonasquatucket River and impoundments have been identified as areas of concern. Primary areas of concern are reaches of the river and abutting residential-use property found to contain dioxin in soil and sediment at concentrations in excess of 1 ppb. These areas are identified as follows:

- Woonasquatucket River, Centredale Reach
- Centredale Wetlands (flood plain area)
- Allendale Pond
- Woonasquatucket River, Lymanville Reach
- Lymanville Pond

## TARGET SHEET

THE MATERIAL DESCRIBED BELOW  
WAS NOT SCANNED BECAUSE:

- OVERSIZED
- NON-PAPER MEDIA
- OTHER:

DESCRIPTION: DOC #6734, FIGURE 2-1, COLOR-CODED  
BASE MAP

THE OMITTED MATERIAL IS AVAILABLE FOR REVIEW  
BY APPOINTMENT  
AT THE US EPA REGION 1 SUPERFUND RECORDS CENTER,  
BOSTON, MA

### 3.0 SCOPE OF WORK

The Scope of Work (SOW) for this Work Plan is to prepare a draft and final EE/CA report for the Woonasquatucket River system that will address contaminants associated with the Site.

The EE/CA will address primarily residential soils, as well as aquatic and floodplain sediments in the river, ponds, and other areas. The report will be used by EPA to support a non-time critical removal action in these areas.

The Scope of Work for this Work Plan includes the following activities and is based on the EPA SOW (February 22, 2000), the scoping meeting held March 2, 2000, and comments to the draft work plan dated April 26, 2000:

- Attend scoping meeting and develop project goals and objectives.
- Prepare a work plan and cost estimate.
- Review available information, including ERRS-I and IT Group data reports.
- Perform project management and monthly reporting activities.
- Attend technical and project meetings at EPA offices.
- Organize, reduce, and tabulate data from appropriate databases developed in the TtNUS Technical Assistance Work Assignment (043-TATA-016P).
- Prepare Engineering Evaluation Cost Analysis (EE/CA) report - prepare Draft, respond to EPA comments, and prepare Final.
- Prepare a fact sheet for the EE/CA report
- Provide technical support to EPA during two public meetings or hearings

- Provide technical support to EPA during their preparation of the responsiveness summary for EE/CA
- Provide technical support to EPA during their preparation of the action memorandum.
- Close out work assignment at completion.

## **4.0 TASK PLAN DESCRIPTION**

This section provides the details of the tasks to be performed by TtNUS to meet the requirements of the EPA Statement of Work and as discussed with the EPA WAM.

### **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. Six subtasks comprise project planning and are presented below.

#### **4.1.1 Subtask 0111 - Attend Scoping Meeting**

A scoping meeting between the EPA Project Officer, Contracting Officer, WAM, and TtNUS Deputy Program Manager, and work assignment Project Manager was held on March 2, 2000 at EPA in Boston. EPA provided additional information during the meeting to clarify the activities to be performed.

#### **4.1.2 Subtask 0113 - Evaluate Existing Information**

Under work assignment 043-TATA-016P, TtNUS has obtained and reviewed documentation of previous sampling efforts and administrative records referenced in the SOW. TtNUS Staff who have worked on the Centredale work assignment 043 will be used to the extent possible to minimize the need for project orientation and familiarization, however, two risk assessors and two engineers will need to review documentation for effective participation in the project.

In addition, documents not previously reviewed, including the Corps of Engineers flood elevation study for Allendale Pond (Corps of Engineers, 2000), and any available design drawings for the repair or replacement of the Allendale Dam will require review by project staff.

Documents and pertinent information will be reviewed by TtNUS engineering and risk assessment staff to evaluate implementability and effectiveness of potential remedial actions, applicability of ARARs, and other concerns pertinent to the EE/CA.

#### **4.1.3 Subtask 0114 - Develop Project Goals and Objectives**

TtNUS shall evaluate data needs and project objectives for evaluations to be performed. This effort will largely consist of project staff evaluating the data available and determining the need for additional data, as well as the definitions of the media addressed in the EE/CA report.

The available data includes data collected by TtNUS in October - December 1999, data collected by EPA and the IT Group in 1999, data collected by RF Weston in 1998 and 1999, and data collected by EPA as a part of an initial study in 1997. The extent of the sediment data available on residential properties and in the river and ponds will be used to determine if a quantity of affected sediment can be calculated with reasonable accuracy.

The limitations of the EE/CA will also be determined under this task. The limitations will be determined by evaluating the existing land use and land use potential. The potential for future contaminant migration and the areal extent of contamination will be considered in the EE/CA report.

It is anticipated that this task will include the first technical meeting, at which risk scenarios and land use will be discussed.

If determined necessary and is approved by the WAM, the Data Quality Objectives (DQO) for additional analytical sampling will be developed.

#### **4.1.4 Subtask 0115 - Develop Work Plan**

TtNUS will prepare and submit a Draft Work Plan as agreed to during the scoping meeting, and upon incorporation of EPA comments, prepare a Draft Final Work Plan. The Work Plans include 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 that provides specific dates (or assumed if this information is unavailable) for completion of each major 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 version will incorporate comments on the draft version as directed by the RPM and will reflect revisions as agreed to at the negotiations meeting.

#### **4.1.5 Subtask 0120 - Data Management Plan**

This subtask includes developing the data management procedures that will be used during the performance of the work assignment. This description is presented in this section.

Data collected and maintained by TtNUS for the Centredale Manor Site is summarized in Table 4-1.

The chemical and location information is currently compiled into a series of databases in Microsoft Access. The database holds separate fields for the source of the data (i.e. who

**TABLE 4-1  
SUMMARY OF DATA FOR CENTREDALE MANOR RESTORATION PROJECT SITE  
DRAFT FINAL WORK PLAN  
CENTREDALE MANOR SITE  
NORTH PROVIDENCE, RHODE ISLAND  
PAGE 2 OF 2**

<b>DATE OF ORIGIN</b>	<b>STATUS</b>	<b>DESCRIPTION</b>
<b>7) June 21- July 21, 1999</b>	Received from IT in Jan '00	IT and START collect hand auger soil samples from Centredale Manor and Brook Village. A total of 524 soil samples analyzed for dioxins and PCBs. Samples located at many of the same stations as those taken in 2/99, although at different depths. 20% of samples sampled for full suite (selection of these samples was judgmental).
<b>8) July 19-21, 1999</b>	Received from IT in Jan '00	28 soil samples collected at residential properties by hand auger. Analyzed for dioxins and PCBs.
<b>9) July 23- August 13, 1999</b>	In Database received from IT in Jan '00	68 soil samples collected at residential properties by hand auger. Identified as CMS-457 to CMS-508. Analyzed for dioxins and PCBs.
<b>10) September 29 - October 5, 1999</b>	In Database received from IT in Jan '00	43 soil/sediment samples collected from Allendale Pond/Floodplain. Identified as CMS-600-CMS-634. Analyzed for dioxins and PCBs.
<b>11) November 5, 1999</b>	In Database received from IT in Jan '00	11 soil samples collected at Brook village by riverbank. Soil still there but covered with rip-rap. Analyzed for a full suite of chemical analyses. Identified as CMS-700 to CMS-703.
<b>12) August 3, 1999</b>	Rcvd from EPA 3/13/00	5 indoor air samples collected in Centredale Manor and Brook Village by OEME and START. Looked for VOAs. Peter Kahn (EPA) involved. This data is summarized in a separate report for Ted Bazenias (EPA).
<b>13) September 8-9, 1999</b>	Received from IT in Jan '00	165 vapor diffusion samplers in wetland areas and in sections of W. river. Sampled for select VOCs. Sampled by USGS.
<b>14) October 20- November 29, 1999</b>	In Database although dioxin results are not validated.	346 Sediment (bank samples, floodplain soils and aquatic sediment) and surface water samples. All samples analyzed for dioxin, 129 analyzed for SVOCs, metals, Pest/PCBs, dioxin, grain size TOC, SEM/AVS. Sampled by TtNUS Inc. from just upstream of the Rte 44 Bridge through the Lymansville Pond area.

**TABLE 4-1  
SUMMARY OF DATA FOR  
CENTREDALE MANOR RESTORATION PROJECT SITE  
DRAFT FINAL WORK PLAN  
CENTREDALE MANOR SITE  
NORTH PROVIDENCE, RHODE ISLAND**

DATE OF ORIGIN	STATUS	DESCRIPTION
1) May, 1996:	Rcvd by TtNUS 3/13/00	Fish sampling event by EPA. Analysis done by EPA's Narragansett lab. 15 sunfish (composited into 3 samples of 5 fish each) collected at Valley St. site, Providence, RI. 3 American eel (composited into 1 sample) collected at Smith St. site, Providence, RI. Fillet and offal samples for each composite. Chemicals analyzed for include: Cd, Cr, Cu, Ni, Pb, Zn, Hg; PCB congeners - #8, 18, 28, 52, 44, 66, 101, 118, 153, 105, 138, 187, 128, 180, 170, 195, 206, 209. Pesticides - HCB, DDE, DDD, DDT, lindane, alpha - chlordane, nonachlor. Dioxins and dioxin-like PCBs.
2) October, 1997	Rcvd by TtNUS 10/99	OEME samples of water and sediment behind 7 dams on river - Esmond, Allendale, Lymanville, Manton, Dyerville, Olneyville, Lonigan. Water sampled for DO, Temp, conductivity, pH. Sediment - total metals, PAHs, PCBs, pesticides, AVS, SEM, dioxin and TOC. Results contained in report of Woonasquatucket River, Sediment Water Quality Analysis, 7/31/98, Prepared by EPA, Region 1, OEME
3) September, 1998	Rcvd by TtNUS 3/24/00	EPA collects 45 field samples at 42 locations for soil and sediment. 5 soil samples at Centredale Manor and 1 soil sample at Brook Village, 35 sediment samples on W. River and 4 sediment samples in drainage samples. Samples tested for dioxin and HCX, SVOCs, pest/PCBs. For results see Final Summary Report for Expanded site inspection for Centredale Manor, March 9, 1999, prepared by Roy F. Weston.
4) January 15, 1999	Rcvd by TtNUS 3/24/00	OEME and START team takes 17 soil samples (SS-99-00 thru SS-99-16) from Centredale Manor, No. Providence Boys and Girls Club, Early Years Learning Center, Lee Romano Baseball Field - just for dioxin. Sample depths ranged from 3-12 to 30-42 and 0-18 to 1-24 inches. Results in 3/9/99 RF Weston report.
	Rcvd by TtNUS 3/16/00	OEME and START team also takes 3 drinking water samples - 2 at Yacht Club Bottling Works Co. and 1 at Pied Piper School. See 3/9/99 RF Weston report for results.
5) January 27, 1999	Rcvd by TtNUS 3/24/00	EPA ERT and Weston take 5 soil samples from Lee Romano Baseball Field just for dioxins. See March 9, 1999 report for results. These samples are SS-21 through SS-25.
6) February 18, 1999	Received from IT in Jan '00	START personal take 222 soil samples on and around Centredale Manor and Brook Village and several residential properties located adjacent to removal site. Also geophysical survey. Centredale Manor and Brook Village only sampled for 2,3,7,8-TCDD. For newly sampled residential properties samples analyzed for all dioxins.

Revised 3/24/00

collected the samples), the station identifier, the type of sample collected (soil gas, water, flood plain sediment, etc), the northing and easting coordinates in Rhode Island State Plane feet, parameters for which the samples were analyzed, qualifiers assigned during validation, etc. The database can be queried to provide export tables in Access, Excel, or other spreadsheet formats of data subsets requested.

An index of data points is compiled and printed after each data group is entered into the database. The index includes station ID, data source, sample type, northing/easting coordinates, and number of analytical records associated with the sample.

The database is retained on the TtNUS Wilmington Office server, which is automatically copied onto a remote backup at the end of each working day.

#### **4.1.6 Subtask 0130 - Project Management**

TtNUS shall prepare monthly progress reports for a 10-month duration (March 2000 through December 2000) 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 technical project meetings, provide documentation of meeting results, and communicate with the WAM weekly, as appropriate, to report project status and to discuss future activities. It is assumed that three meetings with EPA will be held at their Boston office.

Overall project coordination by the TtNUS project manager is also provided under this subtask.

#### **4.2 Task 0200 - Community Relations**

TtNUS shall provide community relations support to EPA throughout completion of the EE/CA and until the issuance of the Action Memorandum. It is anticipated that the Action Memorandum will be completed within 90 days of the completion of the final EE/CA report (anticipated September 1, 2000).

#### **4.2.1 Subtask 0220- Fact Sheets**

TtNUS, Inc. shall prepare one fact sheet for the EE/CA to describe the associated non-time critical removal action (NTCRA). The fact sheets will be prepared to inform the public about activities related to the final design and construction, including schedule for the actions, probable inconveniences, and other relevant issues. Draft and final fact sheets will be prepared and submitted to the EPA after the completion of the EE/CA.

#### **4.2.2 Subtask 0230 - Public Meeting Support**

TtNUS shall assist the EPA during the public meeting or public hearing. It is anticipated that one public meeting or hearing will be held for the EE/CA. Assistance will include the following as necessary:

- Prepare technical input for news releases, briefing materials and meeting handouts
- Assist WAM with coordination with local agencies
- Assist preparation of public notices for the EE/CA
- Submittal of public announcement of meetings in local papers.
- Provide audiovisual equipment and aids, stenographer, and hall rental.

#### **4.2.3 Subtask 0250 - Proposed Plan Support**

TtNUS shall provide support to the EPA during the proposed plan phase. Such support will include provision of technical input for the proposed plans for the NTCRA, review of preliminary documents, and similar efforts.

#### **4.2.4 Subtask 0260 - Responsiveness Summary Support**

TtNUS shall provide support to the EPA for the preparation of a responsiveness summary. Comments recorded at the public meetings or hearings will be compiled into a comprehensive document and provided to the EPA WAM. TtNUS shall provide assistance and technical input to the WAM for the response to these comments as requested.

#### **4.3 Task 0600 - Data Evaluation**

TtNUS shall organize and evaluate existing data used in the EE/CA, as described under the following subtasks.

##### **4.3.1 Subtask 0610 - Data Usability Evaluation**

TtNUS shall review the existing database to find data appropriate to perform a risk screening analysis as described in Section 4.4 of this work plan. This assessment will require evaluation of data collected in the past and identification of horizontal and vertical location information appropriate for each risk scenario used in the screening process.

It is presumed for this Work Plan and Cost Estimate that all data will be validated prior to use in the risk screening and EE/CA preparation.

Also under this task, duplicate sample analytical results will be combined as requested by EPA for risk screening.

##### **4.3.2 Subtask 0620 - Data Reduction, Tabulation, and Evaluation**

TtNUS shall use the data sets produced under Task 0610 to design and set up final data tables for the EE/CA. Specifically, different sets of data will be evaluated as described in the following subsections.

#### Subtask 0621 - Geological Data

Soil and sediment data will be sorted and used to build separate data tables for flood plains, bank sediment, aquatic sediment, and residential use soils. Data on these tables will be plotted onto maps as appropriate so that quantities of affected soils can be determined under subsequent tasks. It is anticipated that some of the data may be used in the EE/CA report, if it is deemed appropriate.

#### Subtask 0624 - Evaluate Hydrogeological data

Surface water data will be sorted and used to build tables for each reach of the river system. This data will be used to identify the potential for contaminant transport to restored areas under the different remedial alternatives evaluated.

#### Subtask 0627 - Conduct Ecological Characterization

A site visit will be performed by TtNUS biologists in order to identify habitat and potential receptors present. A set of sketches will be prepared to describe standing water and vegetative cover for Allendale Pond, Lymansville pond, and the affected reaches of the Woonasquatucket River. In addition, a narrative description will be prepared describing the ecological parameters identified during the field visit. This narrative and the sketches will be the basis for the ecological risk screening.

#### Subtask 0628 - Endangered Species Evaluation

TtNUS shall contact state and federal wildlife agencies to request records of sightings of threatened or endangered species in the study area. In addition, published information on threatened and endangered species locations shall be evaluated to the extent possible. This information will be added to the narrative descriptions identified in subtask 0627 for the ecological risk screening.

### Subtask 0629 - Evaluation of Stream Flow and Flood Data

TtNUS shall evaluate available flood and flow data for the study area to determine average water levels under the following conditions:

- Average water levels under no flood condition with Allendale Dam restored to original elevation.
- Flood stage water levels with Allendale Dam restored to original elevation

Water levels under the conditions described above will be plotted onto existing base maps for presentation in the EE/CA report and other documentation. It is presumed that U.S. Army Corps of Engineers flood information determined in the winter of 2000 will be made available to TtNUS by April 15, 2000, so that these water levels can be plotted as needed.

Topography of the Allendale Pond area provided by the Corps of Engineers will be used for this evaluation to the extent possible. It is presumed that topography of the Lymansville reach is not available except on USGS quadrangle maps, and so flood conditions, other than those published in the FEMA maps for the area will not be evaluated in any detail.

This information is critical to support the selection of remedial alternatives as described elsewhere in this work plan.

#### **4.3.3 Subtask 0640 - Data Evaluation Summary**

TtNUS will meet with the EPA to discuss the data evaluation tasks. At this meeting, summary tables, sketches and revised maps will be provided as described in the previous subtasks. These interim tables and figures may be subject to revision as the EE/CA report is prepared. Based on agreements at the kickoff meeting held March 2, 2000, it is presumed a formal deliverable will not be required for this task.

#### **4.4            Task 0700 - Streamlined Risk Evaluation**

TtNUS will perform a streamlined risk evaluation to identify benchmarks for remedial actions. The streamlined risk evaluation will be a discussion to justify taking a removal action and identify what current or potential human and ecological exposures could be prevented.

Sampling data from the site will be used to identify the chemicals of concern, provide an estimate of how and to what extent receptors might be exposed, and provide an assessment of the potential health effects from those exposures. This streamlined risk evaluation will also project the potential risk of adverse effects to humans and ecological receptors for baseline conditions.

##### **4.4.1            Subtask 0710 - Streamlined Risk Evaluation**

The human health risk screening will consist of contaminant of potential concern (COPC) selection (screening of detected contaminants against Region IX PRGs) adjusted to  $10^{-5}$  risk levels for each media: Flood Plain (FP) sediments, bank (BK) sediments, and residential (RES) soils, identification of potential exposure points for human receptors, and calculation of risk for each exposure point. Risk evaluations will include the following receptors for the EE/CA:

- Residential receptors, using residential soils, BK sediments, and FP sediments (as determined after data is plotted).
- Recreational receptors, using FP sediments and BK sediments. Possible use of surface water if contaminants are found.

Human health risk screening will consist of the following steps, as discussed at the technical meeting held March 13, 2000, between EPA and TtNUS.

1. Download data for all sediments and soils, prepare tables of summary statistics for all contaminants detected.

2. \* Map area and plot all sample stations (approximately 500), identify bank stations, flood plain stations, residential soil stations, and aquatic sediment stations as appropriate.
3. Perform COPC screening with Region IX PRGs adjusted to  $10^{-5}$  risk level, against each group of stations described in #2 above, prepare summary table of exceedances.
4. Plot maps showing locations of exceedances.
5. \* Evaluate exposure locations, determine parameters for residential and recreational exposure (Currently it is anticipated that 30 residential exposure locations and four recreational exposure locations will be evaluated.)
6. Calculate risk for each scenario per area as determined in 5. (These tables will be delivered to EPA as described in subtask 0720). Removal action goals will be established for areas where risk is elevated.
7. Identify areas where lead exceeds screening concentration of 400 mg/kg (IEUBK model will not be employed for this EE/CA risk screen).

\* EPA input is anticipated.

For ecological risk screening, EPA and TtNUS ecological risk assessor will select the ecological effects criteria (benchmarks), and TtNUS will screen concentrations of contaminants detected for the EE/CA as follows:

- Residential soils, FP sediments, and BK sediments screened for terrestrial receptors, including vascular plants, annelids, possibly mammals.
- Surface water (SW), aquatic sediments (SD) and FP sediments screened for aquatic and semiaquatic receptors.

Ecological risk screening will consist of the following steps, as discussed at the technical meeting held March 13, 2000.

1. Abbreviated problem formulation and conceptual model for the EE/CA.
2. \* Data download, prepare table of summary statistics for all contaminants detected.
3. Map area and plot all sample stations, identify FP stations and SD stations as appropriate
4. \* Determine risk screening benchmarks for each media
5. Develop screening table per media, (SD, FP and BK, SS, and SW) per EE/CA (delivered to EPA as described in subtask 0720)
6. \* Plot locations where benchmark exceedances are found on maps
7. List ecological Contaminants of Potential Concern (COPCs) per medium

\* EPA input is anticipated.

Because the number of contaminants that exceed human and ecological benchmarks is not known at this time, it is not possible to define the number of maps that will be required to effectively show exceedances. However, for costing purposes, it is presumed that nine analytes will exceed benchmarks, and that due to the number of sample stations, four analytes can be plotted on each map. Lead exceedances will be plotted separately. Therefore, 22 maps are anticipated for this effort as summarized in the in-text table below.

Exposure Evaluated	Number of Maps Anticipated				
	Flood Plain Sediment FP	Bank Sediment BK	Residential Soils RES	Aquatic Sediment SD	Surface Water SW
	Human Health	3 <sup>(1)</sup>	0 <sup>(1)</sup>	3	0
Aquatic Receptors	0	0	0	2	2
Terrestrial Receptors	2 <sup>(1)</sup>	0 <sup>(1)</sup>	2	0	0
Semiaquatic Receptors	2 <sup>(1)</sup>	0 <sup>(1)</sup>	2	2	2
<b>TOTAL</b>	<b>7</b>	<b>0<sup>(1)</sup></b>	<b>7</b>	<b>4</b>	<b>4</b>

Note: The estimated number of maps assumes two maps for each exposure route. It is presumed that only one contaminant can be depicted on each map without overcrowding information.

<sup>(1)</sup> FP and BK stations will be plotted together for all exposure routes.

A summary of GIS mapping needs for human health and risk evaluations has been prepared by EPA and reviewed by Tetra Tech NUS, Inc. Those needs appropriate for this project will be provided as part of the EE/CA report or interim deliverables for discussion purposes. Some items requested can only be provided as GIS information, and mapping onto hard copy is not feasible. Therefore, at any time during the project, GIS components and ARCVIEW base maps as well as the database can be provided or queried to answer distinct questions relating to location of contaminants.

#### 4.4.2 Subtask 0720 - Risk Analysis Tables

Risk analysis tables will be prepared and provided as an informal deliverable to the EPA during the progression of the work assignment. It is anticipated that EPA will provide comments on these tables to TtNUS within one week of receipt so that there will be no delay in the continuation of the EE/CA preparation.

After the risk calculations are completed, TtNUS will meet with EPA to determine action areas. These action areas will be the basis for the development of removal alternatives necessary to abate, prevent, minimize, stabilize, mitigate or eliminate the release or threat of release (i.e. prevent contaminant transport, limit exposure, or remove contaminants) for 1) primarily residential use soils, and 2) ponds, river and associated sediments.

#### 4.5 Task 0800- Identification of Removal Objectives

TtNUS will define the scope, goals and objectives of the removal action, consistent with the Approval Memorandum to perform the EE/CA, necessary to abate, prevent, minimize, stabilize, mitigate or eliminate the release or threat of release, and to meet the objectives of the risk reduction. TtNUS will identify a limited number of viable alternatives appropriate to address the removal action objectives.

All potential ARARs and other criteria and guidance will be identified as early as possible and summarized into a series of tables. It is assumed that the RIDEM will provide a summary of ARARs for the State of Rhode Island via request from the EPA WAM.

Removal alternatives will be developed to address both the primarily residential use soils and for the pond and river sediments. Residential use soil will include soil on residential property and soil and flood plain sediments on property used recreationally where human receptors are expected to be regularly exposed to surface soils containing dioxin. It will also include surface soils that were covered with water prior to the failure of Allendale dam in 1991. It will not include soils deemed by sampling crews to be under more than 1 foot of water more than 2 months annually.

The river system sediments will include the river as well as impoundments and dam structures between Route 44 and Lymanville Dam. It will include soils deemed by sampling crews to be under more than 1 foot of water more than 2 months annually. For these sediments, TtNUS will use a recreational use scenario developed with EPA input as described in Section 4.4.1 of this work plan. The alternatives will also address probable risks to ecological aquatic and semi-aquatic receptors.

It is assumed that the removal alternatives developed will need to address the potential for a catastrophic sediment release from Allendale Pond to the lower reaches through the already damaged Allendale Dam. For this effort, a conceptual design prepared by the US Army Corps of Engineers to reconstruct the Allendale Dam (July 1997) and any associated information available from the Corps will be used as a basis for estimating costs of this component. It is anticipated that this design will require modification to meet all the requirements of the

recommended alternative prior to implementation. However, it is appropriate to use a conceptual design in this stage of the alternative selection process. Therefore, a modification of the available design will be used to estimate cost for this component of the evaluated alternatives.

Based on the available information from flood study drawings provided by the Corps of Engineers, the existing and planned elevation of the Allendale dam, and other information provided by the Corps of Engineers, it is assumed that the average pool elevation for Allendale pond water would be at approximately elevation 93 feet (NGVD) with the dam intact and operational.

#### **4.6 Task 0900 - Analysis of Removal Alternatives**

TtNUS will evaluate up to 12 alternatives for the EE/CA against the short and long term aspects of the effectiveness, implementability, and cost. Through a comparative analysis, TtNUS will identify the action that best satisfies the evaluation criteria. The recommended alternative for the NTCRA will be described in the EE/CA as appropriate.

#### **4.7 Task 1000 - Engineering Evaluation/Cost Analysis Report**

The culmination of this work assignment will be the development of the EE/CA report. The report will address the residential use soils on properties abutting the site and the sediments and water of the river system as far south as the Lymanville dam. It is anticipated that 30 copies of the draft and final EE/CA reports will be prepared.

##### **4.7.1 Subtask 1010 - Draft EE/CA Report**

The EE/CA report will include the following components, at a minimum:

Executive Summary - Two page summary describing the EE/CA evaluations and findings. A single figure may be included as a depiction of the recommended alternative.

Site Characterization - A description of the site and background information, description of the previous investigations and findings, removal actions etc.

Identification of Removal Action Objectives - The findings of the risk screening analysis (Task 0700) will be combined with the findings of Task 0800 to isolate the objectives and goals that address the needs to reduce risk and the requirements set forth in the ARARs. Limits of the actionable media (area and volume) will be determined.

Identification and Analysis of Removal Action Alternatives - Removal Action Alternatives will be described that address the removal action objectives. Each alternative will be discussed with regards to effectiveness, implementability, and cost.

Comparative Analysis of Removal Action Alternatives - A discussion will be presented that compares the proposed alternatives, based on the same three criteria.

Recommendation of Selected Removal Action Alternative - A single removal action alternative will be recommended for execution.

#### **4.7.2 Subtask 1020 - Final EE/CA Report**

The EE/CA report will be provided to EPA as a draft. After EPA review, TtNUS will meet with the reviewers to discuss comments, prepare a revision of the report based on the comments and the discussions and submit the revision as a Final Report.

It is anticipated that the EPA review period will be 2 weeks, and comments can be addressed quickly for a final submittal within 4 weeks of the draft.

#### **4.8 Task 1300 - Work Assignment Closeout**

The following subtasks describe activities to be conducted under Work Assignment Closeout.

**4.8.1 Return Documents to Government**

Activities associated with returning required documents to EPA will be conducted under this subtask.

**4.8.2 File Duplication/Distribution/Storage**

Activities associated with duplicating, distributing, and storing project file materials will be conducted under this subtask.

**4.8.3 File Archiving**

Activities associated with archiving project file materials will be conducted under this subtask.

**4.8.4 Prepare Closeout Report**

Under this subtask the Work Assignment Closeout Report (WACR) will be prepared, to include a breakdown of final costs and Level of Effort expended, by P-level, as specified in the EPA Statement of Work. The WACR will be submitted to EPA in electronic format.

## **5.0 PROJECT MANAGEMENT**

The overall TtNUS project management and control of the technical assistance support activities are presented below.

### **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 serve as the Project Manager for Work Assignment 048-NSEE-016P 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. Figure 5-1 presents the project organization, the lines of authority, and coordination.

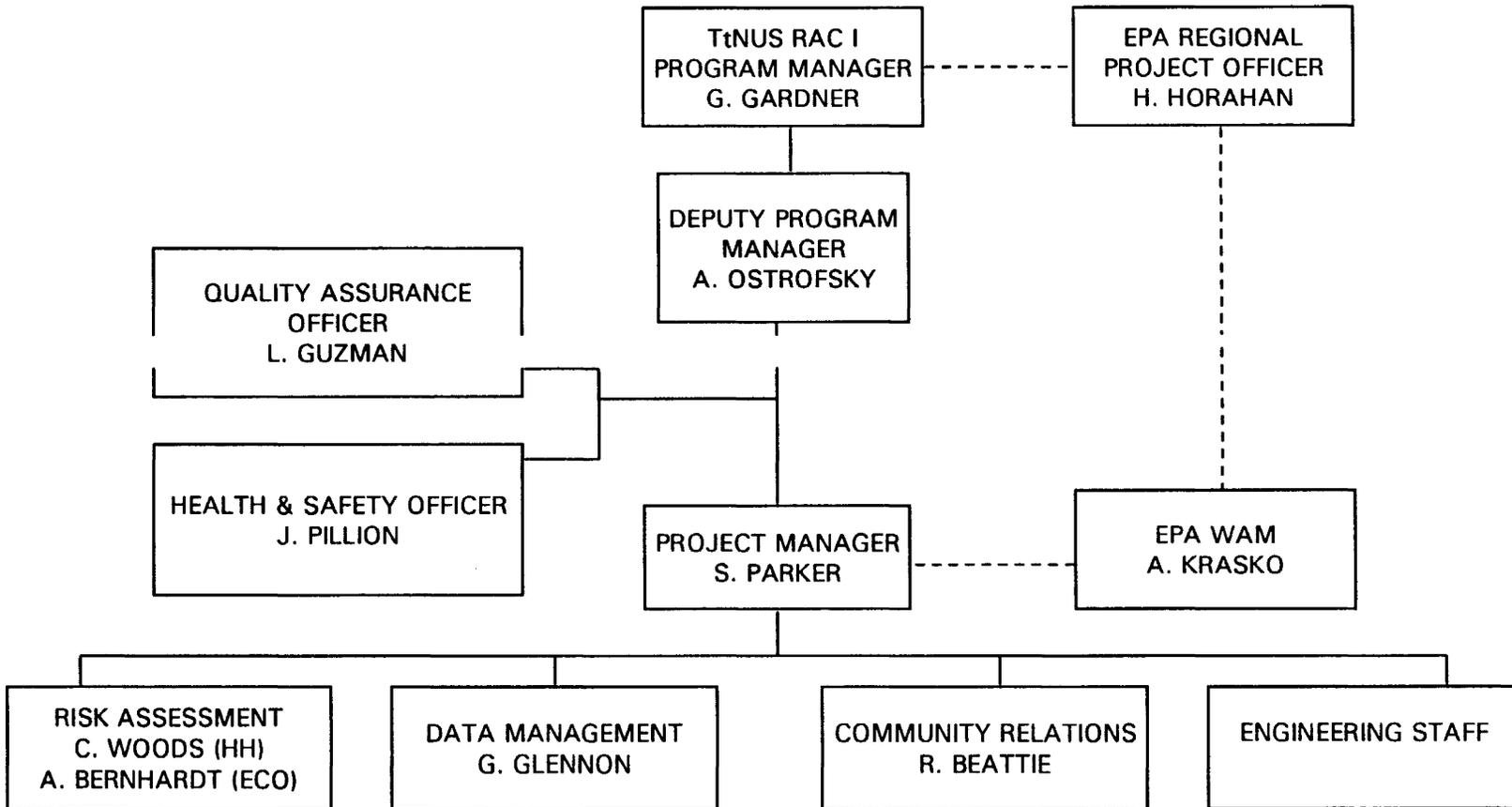
### **5.2 Quality Assurance and Data Management**

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 project schedule is presented as a deliverable list described below. The schedule begins concurrently with preparation of the Work Plan. The final technical deliverable for this work assignment is the Final EE/CA for Woonasquatucket River Sediments. However, the work assignment will require TtNUS to provide technical support to the EPA after that date through the completion of the Action Memorandum. Therefore, the completion date of the work assignment is anticipated to be 90 days following the final EE/CA submittal, or December 1, 2000.

FIGURE 5-1  
PROJECT ORGANIZATION  
DRAFT FINAL WORK PLAN  
WOONASQUATUCKET RIVER SEDIMENT EE/CAs  
CENTREDALE MANOR SITE, NORTH PROVIDENCE, RHODE ISLAND



Note: \_\_\_\_\_ Line of communication, direction, and authority  
----- Line of communication and coordination

Submittal	Completion Date
Draft EE/CA	August 1, 2000
Final EE/CA	September 1, 2000

The schedule of deliverables is an aggressive one, and there are critical path items that could, if not completed in a timely manner, delay the submittals. Some of these are noted as follows:

- Risk Screening values (ecological benchmark) provided to TtNUS by EPA on or before 3/30/00
- Locations of flood plain stations sampled by EPA and IT provided to TtNUS on or before 3/30/00
- Exposure locations and parameters for recreational exposure in the Human Health Risk Screening within 1 week of TtNUS completion of maps showing exceedances of criteria specified.
- Prompt resolution of any comments to risk summary tables (within 1 week of submittal)
- Prompt determination of action areas
- State ARARs provided to TtNUS by RIDEM prior to April 14, 2000
- Design drawings of Allendale Dam provided to TtNUS prior to April 14, 2000
- Flood elevation lines for Allendale Pond provided to TtNUS prior to April 14, 2000.
- Validated dioxin data provided to TtNUS prior to April 7, 2000.

#### 5.4 Project Cost

The overall cost for the performance of the technical assistance as described in this Work Plan 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 limited field activities for this work assignment. See also the Draft Final Detailed Cost Estimate for other equipment details.

### Non-Expendable Equipment

- Hand augers and trenching shovels
- Personal Protection Equipment for Level D use
- Cameras

### Consumable Supplies

- Health and Safety: Tyvek coveralls, rain gear, work gloves, disposable gloves, nitrile/butyl gloves, glove liners, overboots, portable (hand held) eye wash.
- Decontamination Supplies: Brushes, spray bottles, garden sprayers, detergent rinses (Alconox or Liquinox), garbage bags, buckets, plastic sheets.
- Documentation supplies: Logbooks, disposable camera, film, batteries, flagging, grade stakes, and clip boards.