

Quality Control Plan

**Remedial Investigation and Feasibility Study
TNT Area B, Former Plum Brook Ordnance Works
Sandusky, Ohio**

Prepared By:

**IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923**

Submitted To:

**Commander
U.S. Army Engineer District, Nashville
Post Office Box 1070
Nashville, Tennessee 37202-1070**

Revision 1

**Delivery Order 034
Contract Number DACA62-94-D-0030
IT Project Number 775616**

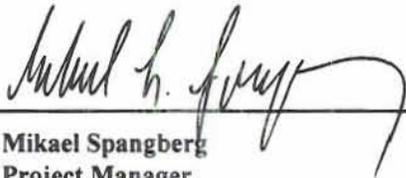
July 15, 1998

SIGNATURE PAGE

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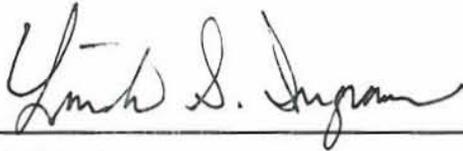


**Mikael Spangberg
Project Manager
IT Corporation**

7/15/98

Date

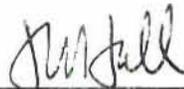
Accepted By:



**Linda Ingram
Technical Coordinator, Technical Management Section
U.S. Army Engineer District, Nashville**

20 JULY 1998

Date



**John W. Hall
Chief, Environmental Restoration Branch
U.S. Army Engineer District, Nashville**

7/31/98

Date

Quality Control Plan
Remedial Investigation and Feasibility Study
TNT Area B
Former Plum Brook Ordnance Works, Sandusky, Ohio

July 15, 1998

PROJECT OBJECTIVE AND TASKS

This Quality Control Plan (QCP) has been prepared in support of the Remedial Investigation and Feasibility Study at TNT Area B at the former Plum Brook Ordnance Works (PBOW) in Sandusky, Ohio, under Delivery Order (DO) 034 of IDT Contract DACA62-94-D-0030. The purpose of DO 034 is to conduct the remedial investigation and feasibility study (RI/FS) at the former TNT Area B to evaluate the following Project Decision (PD) Statements:

- Define site physical features and characteristics
- Determine the physical, chemical, and toxicological characteristics of the wastes
- Evaluate fate and transport pathways
- Determine the nature and extent of source areas
- Define current and future routes of exposure
- Characterize risk to current and future exposed human/biotic populations
- Determine whether contaminant distribution is consistent with DOD activities
- Determine acceptable risk based on cleanup levels
- Determine ARARs
- Evaluate effectiveness of technology
- Evaluate implementability of technology
- Evaluate cost of technology
- Evaluate long-term effectiveness of alternatives
- Evaluate short term effectiveness of alternatives
- Evaluate implementability of alternatives (short/long term)
- Evaluate protectiveness of alternatives
- Evaluate cost

These PD Statements will be evaluated based on soil sampling results at the TNT Area B site at PBOW and through the completion of human health and ecological risk assessments as well as evaluation of available remediation techniques. Specific objectives of this investigation are to (1) delineate the nature and extent of the source areas, and (2) to collect data for use in a risk assessment evaluation of the TNT Area B. Specific tasks include:

Task 1: Preparation and Submittal of Quality Control Plan (QCP). IT will prepare and submit a Quality Control Plan (QCP) for the work to be conducted at PBOW. The QCP will be prepared in accordance with the requirements of ER 1110-1-12, *Quality Management*, and CEORD 1110-1-9, *Quality Control*. A verification statement will be included with all products submitted to the Government under this SOW. The statement will be signed by the independent reviewers identified in the QCP, stating that they have reviewed the applicable document or product and that all internal comments have been resolved, thus completing the product for release to the Government. All comments generated by reviewers of a product or document, along with their resolution, will be submitted with the verification statement.

Task 2: Preparation and Submittal of Site-Specific Addenda to the SHP and SAP. IT Corporation will prepare a SSHP for this work as an addendum to the PBOW Site-Wide Safety and Health Plan (SHP) of the *Site Investigations and Groundwater Investigations Work Plans* (IT, September 1996). The SSHP will be prepared under the supervision of a CIH, and will comply with the following requirements, as a minimum:

- Federal Acquisition Regulations (FAR), Clause 52.236-13, *Accident Prevention*.
- U.S. Army Corps of Engineers (AE), *Safety and Health Requirements Manual*, EM 385-1-1, October 1992.
- Occupational Safety and Health Administration (OSHA) *Construction Industry Standards*, 29 CFR 1926; and *General Industry Standards*, 29 CFR 1910; with particular emphasis on 29 CFR 1910.120, *Hazardous Waste Site Operations and Emergency Response*; 29 CFR 1910.134, *Respiratory Standards*.
- NIOSH / OSHA / USCG / EPA, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, October 1985.
- USACE *Safety and Occupational Health Document Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities*, Appendix B, ER 385-1-92.
- USACE Contractor Guidelines for (1) *The Preparation of the Accident Prevention Proposal* (Safety Plan), and (2) *The Preparation of the Activity Hazard Analysis*, ORNP 385-1-2, May 1986.
- Nuclear Regulatory Commission Standards (10 CFR 19 – 171).
- Other applicable federal, state, and local safety and health requirements.

The SSHP Addenda required by 29 CFR 1910.120(b)(4), 29 CFR 1926.65(b)(4) and

as defined by the SOW will describe the health and safety procedures, practices, and equipment to be implemented and utilized to protect affected personnel from the potential hazards associated with the site-specific tasks to be performed. The level of detail provided in the addenda will be tailored to the type of work, complexity of operations to be accomplished, and hazards anticipated.

IT Corporation will also prepare a SSAP for this work as an addendum to the PBOW Site-Wide Sampling and Analysis Plan (SAP) of the *Site Investigations and Groundwater Investigations Work Plans* (IT, September 1996). The SSAP will be compatible with previously approved SSAPs and in accordance with the SAP, EM 200-1-3, EM 1110-1-4000, and ER 1100-1-263.

The SSHP and SSAP will be submitted to the USACE and Ohio EPA for review and approval prior to commencement of any field work. All work will be performed according to the approved plans. Review comments received on the draft SSHP and SSAP will be addressed and incorporated into the final documents. Responses to the technical review comments will be included with the submittal of the final document.

Task 3: Field Sampling. A kickoff and coordination meeting will be held at the PBOW site prior to beginning field activities associated with this investigation. IT will present details of the investigation for discussion and coordination, including digging permits and utility clearances, with CELRN and NASA PBS representatives.

A total of 440 soil samples will be analyzed by ion mobility spectroscopy (IMS) technology. Of these, 360 will be composited surficial soil samples (0 - 12 inches) based on the sampling scheme developed around each process building within the TNT Area B for screening of explosive compounds. It is estimated that 40 subsurface (2-10 feet) screening soil samples will be analyzed by IMS technology based on the results of surficial samples. In addition, 40 confirmation samples will also be taken for off-site laboratory analysis. These samples will not be composited. Enough sample will be collected from these 40 locations to be analyzed by IMS and for the additional analytes specified in the Scope of Work.

Two composite samples per field day will be collected and analyzed by immunoassay kits to check for the effectiveness of the IMS screening procedures. Locations of surface and subsurface soil samples will be determined based on pre-staked grids. QA/QC samples will be collected as required by the SAP, QAPP, and SSAP. Upon completion of sample collection, each borehole will be abandoned by grouting to the surface.

Ten surface water samples and ten co-located sediment samples will be collected along Ransom Brook between Taylor Road and TNT Area B for analyses of parameters specified in the approved work plan.

A qualified geologist and a technician will be on-site for all drilling and soil sampling activities. Soil materials will be sampled continuously in all borings. In addition to the information required by EM 200-1-3, the geologist will visually classify and log borehole materials according to the USCS, EM 1110-1-4000, and CELRN's *HTRW Design Branch Logging Manual*. Soil borings will be logged in the field using ENG Form 5056-R and 5056A-R.

Following completion of soil sampling activities, IT will secure the services of an Ohio registered Professional Land Surveyor (PLS) to determine the coordinates and elevations of confirmation soil boring locations and locations of all surface water and sediment samples. The horizontal coordinates shall be to the closest 0.1 foot and referenced to the State Plane Coordinate System (SPCS). Vertical coordinates (ground elevation and well riser) will be to the nearest 0.01 foot and referenced to the 1929 National Geodetic Vertical Datum (NGVD). All survey data will be tabulated. Loop closure for survey accuracy shall be within the horizontal and vertical limits given above. Locations of screening samples will not be surveyed but will be determined using sample grids established on surveyed baselines.

Task 4: Analytical Requirements. IT will subcontract, coordinate, and oversee the IMS field screening activities, which will be completed by an individual meeting the following requirements as specified in Section 3.4.1 of the SOW:

- A background in environmental chemistry with 10 or more years of experience in the collection and analysis of environmental samples;
- 8 or more years of experience of on-site instrumental analysis of explosives.

IT will manage all analytical data beginning at the point of sampling, continuing through laboratory analysis, data reporting, data evaluation, and culminating with the required electronic data submittal (excluding screening sample results). Under this task, screening samples will be brought from the field, submitted to the field laboratory for screening analysis, and tracked through the field laboratory. A stand alone field tracking procedure will be set up for the screening samples, which will include a sample numbering system, a screening sample collection log, and pre-printed labels. The confirmation samples, sediment samples, and surface water samples will be shipped from the field, submitted for analysis, and tracked through the off-site laboratory system. Reported data will be reviewed, validated as required, and entered into an Oracle database for use by IT technical staff in the preparation and submittal of required reports, statistical analyses, and electronic data submittals.

Quality Assurance Sample Collection and Analysis. IT will coordinate, collect, package, and ship the required frequency (5%) of QA samples to the QA laboratory specified in the SOW for this effort. The U.S. Army Corps of Engineers, Northwest Division Laboratory has been identified as the QA laboratory. Field split samples

will be collected at the frequency specified and submitted to:

U.S. Army Corps of Engineers, Northwest Division Laboratory
CENWO-LB, ATTN: Mr. Douglas Taggart
420 South 18th Street
Omaha, Nebraska 68102-2586

In addition, quality control (QC) samples will be collected from 10% of the confirmation soil samples and 10% of the surface water and sediment samples.

Analytical Data Review, Reporting, and Assessment Requirements. Data will be extensively reviewed by the laboratory in accordance with the three-level process specified in EM 200-1-3. Documentation of this review will be included in the data package(s) submitted. A systematic technical review and validation will be performed for all environmental samples and field duplicates to ensure data quality and overall accuracy. The extent of the review and validation will be comparable to a Level III data validation. The Functional Guidelines for Organic and Inorganic Review (February 1993 and 1994) will be followed in the evaluation as well as the submitted laboratory SOPs and the guidance and project limits presented in the SSAP.

As a component of the field module of the Oracle database, samples will be logged with all associated field QC samples, including duplicates, splits, field blanks, and trip blanks, as required. The information will be forwarded in hardcopy and electronically to the Northwest Division Laboratory as well as to CELRN for their use in data evaluation and preparation of the Chemical Quality Assurance Report. All sample planning, collection, and tracking information will be maintained in the field module. This information will then be down-loaded to the Oracle database to act as a template and basis of comparison for the analytical data to be received.

Task 5: Investigation Derived Waste. Investigation derived wastes (IDW) to be generated during this project may include soil cuttings from boring locations, PPE, purge water, and decontamination water. Soil cuttings from soil borings will be returned to the borehole following sample collection. PPE will be double bagged and placed in an on-site industrial dumpster for disposal at an industrial landfill. Aqueous IDW will be placed in 55-gallon drums and stored at the site for later disposal. It is assumed that aqueous wastes may be disposed of on-site by pouring the drum contents on the ground in an area of known contamination.

Task 6: Geographic Information System Deliverable. IT will develop a database of collected geologic and chemical information for this investigation. This database will include information related to the boring locations, surveyed coordinates and elevations, and chemical (analytical) data. The deliverable package will be formatted

as specified in the *Data Standard for Corps of Engineers Environmental Restoration Sites* and the *Tri-Service Spatial Data Standards* (TSSDS).

Task 7: Prepare Baseline Human Health and Screening Level Ecological Risk Assessments. IT will complete a baseline human health risk assessment and a screening level ecological risk assessment for the TNT Area B in accordance with the requirements of *Risk Assessment Guidance for Superfund*, Volume I (EPA/540/1-89-002), Human Health, and subsequent guidance, and Volume II (Ecological Assessment) (EM 200-1-4); *Ecological Risk Assessment Guidance for Superfund* (EPA/540/R-97-006); *Tri-Services Procedural Guidelines for Ecological Risk Assessment*; and *USEPA 5, Biological Technical Assistance Group Ecological Risk Assessment Bulletin #1, Development and Use of Ecotox Thresholds*. In addition, the risk assessment will comply with the requirements of the Ohio Environmental Protection Agency (OEPA), the USEPA, Region 5 (see below), and the USACE *Risk Assessment Handbook*.

Baseline Human Health Risk Assessment. The human health risk assessment (HHRA) will be performed for the TNT Area B in support of the Defense Environmental Restoration Program (DERP). Under DERP, the responsibility for regulatory oversight resides with the state in which the facility is located, rather than with the regional office of the EPA. The PBOW is located in the State of Ohio (EPA Region 5), and the Ohio Environmental Protection Agency (OEPA) will provide regulatory oversight. Therefore, OEPA risk assessment guidance will be followed during the baseline risk assessment process. OEPA risk assessments generally follow the form and methodology prescribed by the U.S. EPA Risk Assessment Guidance for Superfund series, mentioned above, with some minor modifications.

Screening Level Ecological Risk Assessment. IT will complete a screening level Ecological Risk Assessment as specified in the SOW. Specific components of the ecological risk assessment task to be completed include the Ecological Risk Assessment Work Plan; Problem Formulation, including Ecological Site Description, Site Reconnaissance (Biota Checklist), Documentation of Potential Receptors of Special Concern and Critical Habitat, Significant Ecological Threats, Selection of Preliminary Chemicals of Ecological Concern, Selection of Key Receptors, Ecological Endpoint (Assessment and Measurement) Identification, and Ecological Site Conceptual Model (ESCM); Exposure Characterization; and Risk Characterization.

Risk Summary, Risk Management Recommendations, and Identification of Preliminary Remedial Action Objectives. IT will summarize both human health and ecological risk associated with releases from the TNT Area B based upon results of the baseline Human Health and screening level Ecological Risk Assessments. This will include development of recommendations for managing risk or for further risk

investigations and development of site-specific RAOs for the TNT Area B.

Task 8: Focused Feasibility Study

IT will determine appropriate federal, state, and local ARARs on a site-specific basis. It is anticipated that as more information is obtained additional ARARs may need to be developed. Based on the determination of ARARs, IT will identify potential remedial alternatives for TNT B Area through a series of analytical steps that will involve successively more specific definitions of potential remedial activities. IT will also develop remedial action objectives which will consist of medium-specific goals for protecting human health and the environment of previously identified ARARs.

Concurrent with the development of alternatives, IT will provide an initial determination of the areas or volumes of media to which general response actions may be applied. This determination will be made for each site media of interest (soil, sediment, and surface water) based on results of the screening and definitive analytical sampling conducted at TNT Area B.

In addition to above mentioned subtasks, the focused feasibility study will also include the following components:

- Initial process option identification
- Identification of remedial technology types and process options
- Screening of remedial technology types and process options
- Preparation of CADD flow diagrams, plans, and schematics
- Evaluation of process options (effectiveness, implementability, and cost)
- Assemble alternatives
- Screening of alternative technology types
- Screening evaluations
- Detailed analysis of alternatives
- Compliance with ARARs
- Evaluation of Long term effectiveness and permanence
- Reduction of toxicity, mobility, or volume through treatment
- Evaluation of short term effectiveness
- Evaluation of implementability (technical, administrative, service, and materials)

Task 9: Preparation and Submittal of Report of Findings. IT will prepare a single, four volume Report of Findings to discuss the findings of this delivery order. The report will be site-specific for the TNT Area B.

Volume I, Remedial Investigation Report. This volume will describe the findings of the RI, including all items necessary to describe the site and physical setting, nature and extent of contamination, source area(s), and other pertinent activities. In addition,

IT will include a preliminary list of ARARs and cleanup levels, as necessary, in this report volume.

Volume II, Human Health Risk Assessment IT will prepare a document that describes all points and findings of the baseline human health risk assessment of TNT Area B. This report volume will include items necessary to describe the findings of the HHRA, as well as site-specific ARARs and cleanup levels, as necessary.

Volume III, Ecological Risk Assessment IT will prepare a document that describes all points and findings of the screening level ecological risk assessment of TNT Area B. This report volume will include items necessary to describe the findings of the SERA.

Volume IV, Feasibility Study IT will prepare a document that describes all points and findings of the FS of TNT Area B. This report volume will include items necessary to describe the findings of the FS.

IT will respond, in writing, to all comments received on the draft report, incorporate changes resulting from the review comments, and issue a final report. Each of the report versions will be submitted to the USACE Nashville District Technical Coordinator for distribution (fifteen copies of the draft report and twenty copies of the final report).

Task 10: Meetings. IT will attend a total of eight (8) meetings. These meetings are intended for the following purposes:

Two Risk Assessment Meetings: to discuss the human health and ecological risk assessments; one meeting will be held at the USACE offices in Nashville, Tennessee, and one meeting will be held at the PBS offices in Sandusky, Ohio. IT participants will include the project manager, the senior toxicologist, and the risk assessor; in addition, the senior staff consultant will attend the meeting in Sandusky.

Two Project Findings Presentation Meetings: to discuss the project findings and other pertinent issues related to the investigation. One meeting will be held at the USACE offices in Nashville, Tennessee, and one meeting will be held at the PBS office in Sandusky, Ohio. IT participants will include the project manager, the senior toxicologist, and the senior geologist; in addition, the FS engineer will attend the meeting in Sandusky

Four Restoration Advisory Board (RAB) Meetings: to present project progress and to discuss findings and pertinent issues. All RAB meetings will be held in the vicinity of the site. IT participants will include the project manager and the senior geologist.

KEY IT PROJECT PERSONNEL

- **Program Manager** - Mr. Don C. Burton, P.E., will serve as the Program Manager.
- **Project Manager** - Mr. Mikael L. Spangberg, will serve as IT's Project Manager.
- **Principal Investigator** - Mr. Steven Muffler, will serve as the Principal Investigator.
- **QA Manager** - Mr. Tony Smith, will serve as the QA Manager.
- **HSO Officer** - Ms. Melissa G. Smith, CIH, will serve as IT's HSO Officer.
- **Project QC Officer** - Ms. Maureen McMyler will serve as Project QC Officer.
- **Field Coordinator** - Mr. John Vogeding will serve as the Field Coordinator.
- **Sample Coordinator** - Mr. Duane Nielsen will serve as the Sample Coordinator.

Note: If necessary, identified field staff will be replaced by equally qualified alternates. The USACE will be notified of such replacement if needed.

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

This section of the QCP summarizes the IT internal technical and external peer review. The IT QA program provides controls for the formal verification (checking) of documents such as calculations and the presentation of information in the form of drawings, logs, and tables. Review and necessary approvals are also cited for quality-related documents; however, during the course of a project or proposal, verification of technical decisions and concepts (such as interpretation of data and evaluation of results) is required in order that the project or proposal can proceed on a sound conceptual basis. The review concept, or approach, may be needed to address the following general questions during project execution:

- During the project planning stage, have appropriate steps been implemented to satisfy the goals and objectives of the project?
- Are data of sufficient quality and properly interpreted so that conclusions can be justified and demonstrated?
- Are design parameters reasonable for the computations performed? What is the effect of variations of the assumptions upon the results?
- Do the results presented by IT in the form of a report, or other document, adequately represent the work performed and the conclusions reached? Do the results fulfill the objectives of the project?

The internal technical review process is used to verify these steps. Documents to be written during a project and indicated in the proposal will be subjected to an internal review process consisting of technical and peer reviews. The IT PM will complete a matrix of these documents on a delivery order basis, receive the Program Manager's concurrence, and use it to obtain the required reviews. Technical reviewers are selected from the project team (Table 1), and will perform comprehensive "internal" or project reviews of all project documents to ensure that the above requirements have been satisfied. In addition, peer reviewers are selected to perform a comprehensive "outside" review of the documents. A peer reviewer is selected based upon the following criteria:

- The reviewer must be independent of the project. The reviewer must be sufficiently informed regarding the project, but should not be making decisions which determine or affect the course of the project.
- The reviewer must be a person knowledgeable in the specific area of work, preferably a senior technical associate. Technical reviewers will be part of the IT organization.

At the conclusion of a technical (project) or peer review, the reviewer(s) will prepare written review comments, sign off on the Discipline Sign-Off Review form (Figure 1) and forward it to the Program Manager, PM, and QAO; a copy of these review documents will also be placed in the project files. Technical review comments will be responded to in writing by the preparer, incorporated into the document as appropriate, and submitted with the document to the USACE. Figure 2 is a data review flow chart for sample collection and field data collection activities.

External peer review will be performed on all draft project deliverables prior to issuance as final documents. It is anticipated that the external peer review will be performed, as a minimum, by the U.S. Army Corp of Engineers (USACE) and the Ohio Environmental Protection Agency (OEPA). A formal response to peer review comments will be issued to all reviewing parties, documenting revisions made where appropriate to the draft deliverables. All responses to the peer review comments will be coordinated with the USACE for their concurrence prior to incorporation. Final deliverables will be submitted after incorporating any pertinent comments that arise from peer review of the draft documents. Table 1 summarizes the preparation and review process for the required project deliverables.

Table 1

**Preparation and Review Process for Required Project Deliverables
Remedial Investigation and Feasibility Study, TNT Area B
Former Plum Brook Ordnance Works, Sandusky, Ohio**

Submittal Description/ Title	Document Preparation and Review Process								
	Principal Author(s)	Grade	Discipline	Peer Review	Grade	Discipline	Project Review	Grade	Discipline
Site-Specific Sampling and Analysis Plan (SSAP)	Maureen McMyler George Yu Dennis Seymore	E05 E07 E06	Project Chemist Hydrogeologist Geologist	Belinda Price	E12	Hydrogeologist	Mikael Spangberg Tony Smith Steve Muffler	E11 E08 E08	Engineer QA Officer Geologist
Screening Level Ecological Risk Assessment Work Plan	Greg Sylwester	E05	Ecologist	Robin Zimmer	E12	Ecologist/Risk Assessor	Mikael Spangberg Tony Smith Steve Muffler	E11 E08 E08	Engineer QA Officer Geologist
Baseline Human Health Risk Assessment Work Plan	Paul Goetchius	E10	Senior Toxicologist	Robin Zimmer	E12	Ecologist/Risk Assessor	Mikael Spangberg Tony Smith Steve Muffler	E11 E08 E08	Engineer QA Officer Geologist
Site-Specific Safety and Health Plan (SSHP)	Melissa Smith James Bolden	E10 E10	H&S Professional H&S Professional	Harry Pullum	E13	Indus. Hygienist	Mikael Spangberg Tony Smith Steve Muffler	E11 E08 E08	Engineer QA Officer Geologist
Report of Findings (Draft and Final)	George Yu Adrian Gonzalez Greg Sylwester W. Anderson	E07 E05 E05 E08	Hydrogeologist Risk Assessor Ecologist FS Engineer	Belinda Price Paul Goetchius Bill Norton	E12 E10 E10	Hydrogeologist Risk Assessor Senior Geologist	Mikael Spangberg Tony Smith Steve Muffler	E11 E08 E08	Engineer QA Officer Geologist

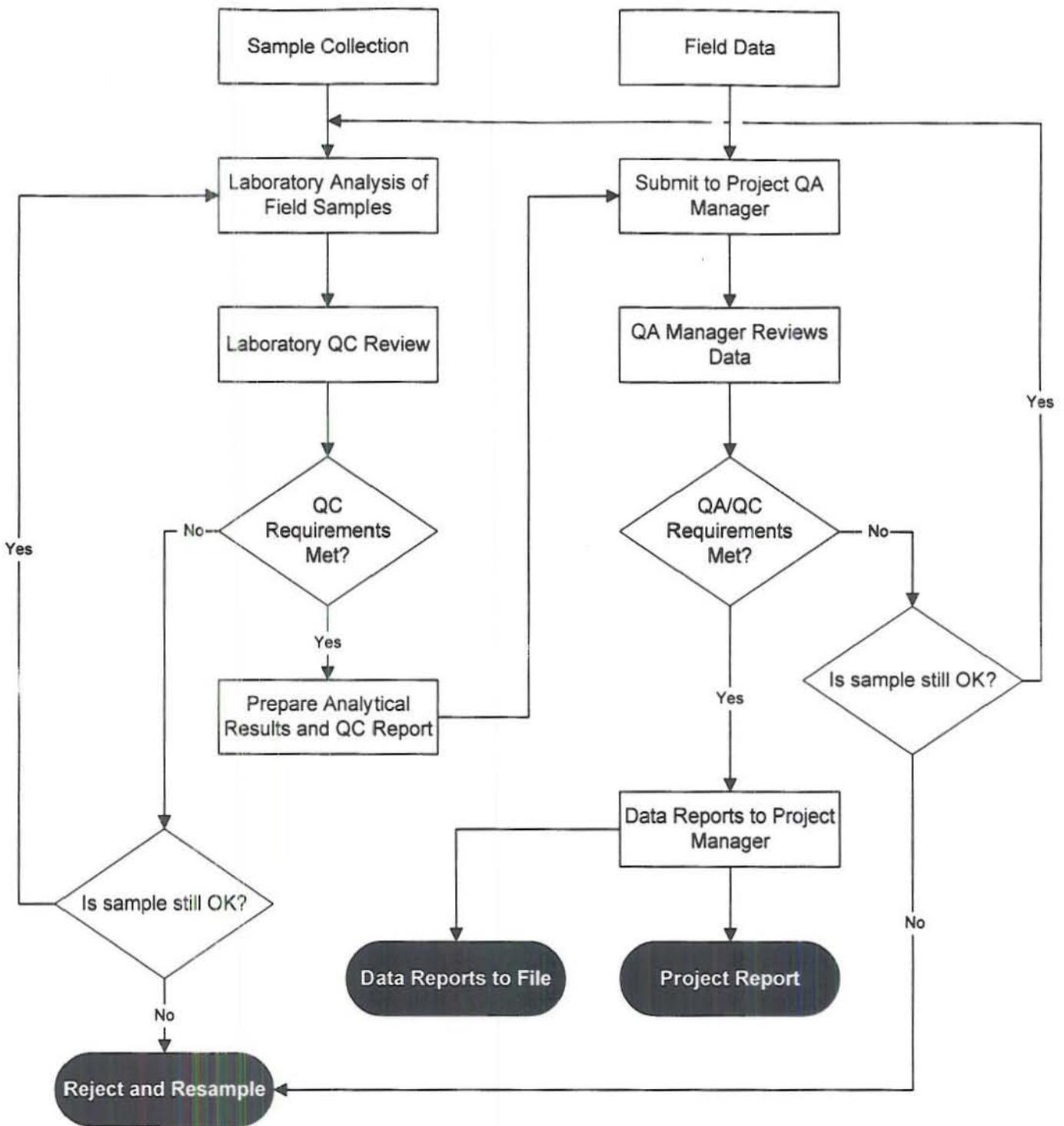


FIGURE 2

DATA REVIEW FLOW CHART

REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
 TNT AREA B
 FORMER PLUM BROOK ORDNANCE WORKS



FIELD ACTIVITY QA REQUIREMENTS

Field investigation activities will follow the procedures specified in the SSAP and SSHP to ensure that project quality requirements are satisfied. Field activity QA will be implemented by performing project-specific training; properly preparing for field work before mobilization; issuing variances, nonconformance reports, and corrective action reports; and documenting field quality control in the investigation reports.

Field team members, including IT personnel and subcontractor personnel, will receive project-specific training before mobilization to the job site by reading the applicable work plans and procedures. Upon mobilization to the site, but prior to commencing field activities, all site personnel will attend the project kickoff meeting, which will consist of a review of all project requirements and objectives to ensure that the project team is fully aware of the goals of the PBOW investigation. Before initiating each days field work, all team members will participate in a tailgate safety meeting (TSM) conducted by the IT Field Coordinator to address safety and quality issues pertinent to the activities to be performed. The TSM will be documented and all personnel will sign the attendance record. Worker training will follow the requirements specified in IT Corporation SOPs.

Prior to mobilization to the site, the IT PM, assisted by the IT Field Coordinator and the IT Analytical Coordinator, will examine project field work preparation requirements to ensure that all necessary arrangements, including personnel assignments, work plans, site entry/drilling permits, training, schedule, equipment rentals, supplies, subcontractors, have been accomplished for execution of the field effort in an efficient and effective manner. The IT PM and QAO must approve the project preparation prior to mobilization.

Changes or variances to the SSHP, SSAP, SAP, SHP, or QAPP may be initiated either in the office or in the field as may be necessary. All variances will be noted on the Field Activity Daily Log (FADL) and will be formally recorded on the Variance Log. Variances will be approved by the IT QAO and the IT PM prior to implementation of the change. Variances that will affect the project scope, cost, or schedule will be submitted to the USACE for approval prior to implementation.

Nonconforming equipment, items, activities, conditions, and unusual incidents that could affect

compliance with project requirements will be identified, controlled, and reported in a timely manner. A nonconformance is defined as a malfunction, failure, deficiency, or deviation that renders the quality of any item unacceptable or indeterminate. The originator (any IT employee) of a nonconformance report will describe the finding on the Nonconformance Report provided for this purpose and will notify the IT PM and QAO. Each nonconformance will be reviewed and a disposition will be issued for the item, activity, or condition. The disposition of a nonconformance will be documented and approved by the IT organization responsible for issuing the nonconformance. The QAO will concur with the disposition of the nonconformance prior to closure of the Nonconformance Report.

In addition, the IT PM will notify the USACE PM within 48 hours of significant nonconformances that could impact the project schedule or scope of work and will indicate the corrective action taken or planned.

SUBCONTRACTOR QA/QC REVIEW

IT has assigned personnel to monitor and review work performed by subcontractors in conjunction with this investigation. Mr. Mikael L. Spangberg will serve as the principal point-of-contact (POC).

The selection of qualified subcontractors will be accomplished in accordance with IT procurement and quality assurance (QA) procedures. Subcontractors such as drillers, on-site chemists, surveyors, and environmental monitoring specialists, must satisfy predefined qualifications developed by the PM and IT that are defined in the procurement bid packages. Each subcontractor bid submittal is reviewed by technical personnel, purchasing, and QA personnel to verify that the bidders are technically qualified and can satisfy the project objectives. Before starting work, IT will perform a quality check to ensure that the subcontractor(s) has fulfilled the procurement requirements necessary to begin activities. Subcontractors involved in environmental measurements will be monitored by the IT Field Coordinator to verify the use of calibrated equipment and qualified operators.

CUSTOMER INVOLVEMENT

Customer involvement will be ongoing throughout the duration of this investigation, and IT personnel will be available as needed for question, consultation, etc. Project personnel may be

reached at the following phone numbers:

Mr. Don C. Burton	(423) 690-3211 Ext. 2337	Fax (423) 690-4652
Mr. Mikael L. Spangberg	(423) 690-3211 Ext. 2378	Fax (423) 690-4652
Mr. Steven Muffler	(423) 690-3211 Ext. 2386	Fax (423) 690-4652
Mr. Tony Smith	(423) 690-3211 Ext. 2266	Fax (423) 690-4652
Ms. Melissa G. Smith	(423) 690-3211 Ext. 4131	Fax (423) 690-4652

Each work plan, report, or other deliverable will be submitted to the USACE Nashville for review and comment. All review comments will be addressed and incorporated into the final submittal.

DOCUMENTATION OF PROJECT DECISIONS AND RECORDS MANAGEMENT

The IT Project Records Clerk is responsible for maintaining control and retention for project-related records. Record control includes receipt from external and internal sources, transmittal, transfer to storage, and indication of record status. Retention includes receipt at storage areas, indexing and filing, storage and maintenance, and retrieval. IT will maintain the project repositories at 312 Directors Drive in Knoxville, Tennessee, for all project records, including correspondence. Records will be controlled and retained, as appropriate, in the office central files or laboratory files. The Project Records Clerk will assign control numbers to all outgoing documents and is responsible for properly filing the controlled records (except for those related to accounting, purchasing, and drafting, which are retained in the respective department files). IT will also provide the USACE Nashville District with a copy of all telephone memos, written correspondence, and meeting minutes regarding information related to the project within ten (10) days of the event. Copies of all records will be retained by IT for a minimum of seven (7) years after the end of the contract period. In addition, project records deemed to be of importance by the USACE will be turned over to the USACE at the time of project close-out.

PROJECT CLOSE-OUT

At the completion of this investigation, a project close-out meeting will be conducted. This will be at a time and place to be determined by Nashville District personnel, and may take the form of a teleconference. The purpose of this meeting will be to exchange feedback, discuss lessons learned, and conduct a final product verification.

27 July 1998

QUALITY ASSURANCE (QA) PLAN FOR
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
TNT AREA B
AT THE FORMER PLUM BROOK ORDNANCE WORKS
SANDUSKY, OHIO

1. This QA Plan covers the work to be performed under Delivery Order No. 0034 with IT Corporation under Indefinite Delivery Contract No. DACA62-94-D-0030. The award was made on 26 May 1998 with 3rd quarter funds.

2. Reference the Final Quality Control Plan, dated 15 July 1998, that was prepared by IT Corporation. A draft of this document was reviewed by both CELRN-EP-R-M and CELRN-EP-R-D. Comments were incorporated by the A-E.

3. CELRN-EP-R is doing this project under the DERP FUDS Program.

4. The CELRN-EP-R Project Team is as follows:

Linda Ingram, Technical Coordinator, EP-R-M, GS 12
Doug Mullendore, Chemical Engineer and POC for EP-R-D, GS 12
Jim Beaujon, Geologist, EP-R-D, GS 12
Becky Terry, Chemist, EP-R-D, GS 12
Lannae Long, Risk Assessment, EP-R-D, GS 12
Other personnel will be used as needed.

5. These items listed below are the general procedures that were/will be followed in-house to obtain a quality product.

a. Prior to preparation of the Scope of Work, CELRN-EP-R-D reviewed any existing documents that contained information about the TNT Area B and discussed with IT Corporation as needed.

b. CELRN-EP-R-D prepared the Scope of Work. It was reviewed by an in-house Technical Review Team and by the HTRW-CX. All of these comments have been incorporated/resolved. Documentation of this QC process is on file in CELRN-EP-R-M.

c. This is a Category "A" project and will not be supplied to the HTRW-CX for review.

d. Draft Work Plans will be reviewed by CELRN-EP-R-D, NASA Plum Brook Station, and Ohio EPA. They will be furnished to CELRH and the HTRW-CX for information only. The review will

be handled by CELRN-EP-R-M. The comments will be discussed and resolved with the reviewers as needed. All comments will be responded to in the Final Work Plans.

e. QA on analytical work will be performed by the U.S. Army Corps of Engineers, Northwest Division Laboratory.

f. CELRN-EP-R-D personnel will be present for field work unless it is determined that it is not necessary at all times.

g. The Draft Report will be reviewed by CELRN-EP-R-D, NASA Plum Brook Station, and Ohio EPA. It will be furnished to CELRH and the HTRW-CX for information only. The review will be handled by CELRN-EP-R-M. All comments will be addressed in the Final Report.

h. This project will be included in the Plum Brook Fact Sheet that is prepared each month. Also, the project will be reviewed in the Monthly ERC Project Meetings between EP-R-M and EP-R-D. The LRH Project Manager, Nancy Stouffer, will be kept informed and will be furnished a copy of all submittals. The role of LRH is as a Project Manager function rather than a technical function.

6. Information on schedule and budget can be found in the Monthly Fact Sheet.

7. At the completion of the project, a final project verification will occur.

Encl. as stated



Linda S. Ingram
Technical Coordinator, CELRN-EP-R-M

27 JULY 1998
Date



John W. Hall
Chief, CELRN-EP-R

7/21/98
Date