PARSONS ENGINEERING SCIENCE, INC.
30 Dan Road • Canton, Massachusetts 02021-2809 • (781) 401-3200 • Fax: (781) 401-2575

January 2, 2002

Attn: Major David A. Sheets CEHNC-PM
U.S. Army Corps of Engineers
Engineering and Support Center, Huntsville
4820 University Square
Huntsville, AL 35816-1822

00272

SUBJECT: **Submittal of Addendum, Insert pages for the Final Work Plan for the Environmental Baseline Survey (EBS) at the Former Small Arms Range at the Lake Housing Site, Seneca Army Depot Activity**

Dear Major Sheets:

Parsons Engineering Science, Inc. (Parsons) is pleased to submit this addendum to the Final Work Plan for the Environmental Baseline Survey (EBS) at the Former Small Arms Range at the Lake Housing Site, Seneca Army Depot Activity, New York. This work was performed in accordance with Task 1 of the Scope of Work (SOW) for Delivery Order 27 to the Parsons Contract DACA87-95-D-0031.

The enclosed pages include a response to a comment and pages to be inserted into the existing Final Work Plan for the Former Shooting Range at the Lake Shore Housing. These materials were prepared to address a comment received from personnel of the US EPA Region 2 after the submission of the Final Work Plan in November 2001. Please use the provided pages as replacements to equivalently numbered pages in your existing copy of the Final Work Plan. Parsons appreciates the opportunity to provide you with these materials. Should you have any questions, please do not hesitate to call me at (781) 401-2229 to discuss them.

Sincerely,

PARSONS ENGINEERING SCIENCE, INC.

Todd Heino, P.E.
Project Manager

cc: S. Absolom, SEDA
R. Battaglia, CENAN
K. Hoddinott, USACHPPM
C. Kim, USAEC
B. Wright, USAIOC

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

30 Dan Road • Canton, Massachusetts 02021-2809 • (781) 401-3200 • Fax: (781) 401-2575

January 2, 2002

Mr. Julio Vazquez, Project Manager
U.S. Environmental Protection Agency, Region II
Emergency and Remedial Response Division
290 Broadway, 18th Floor, E-3
New York, NY 10007-1866

Ms. Alicia Thorne
Division of Hazardous Waste Remediation
New York State Department of Environmental Conservation (NYSDEC)
625 Broadway, 11th floor
Albany, NY 12233-7010

SUBJECT: **Submittal of Addendum, Insert pages for the Final Work Plan for the Environmental Baseline Survey (EBS) at the Former Small Arms Range at the Lake Housing Site, Seneca Army Depot Activity**

Dear Mr. Vazquez / Ms. Thorne:

Parsons Engineering Science, Inc. (Parsons) is pleased to submit this addendum to the Final Work Plan for the Environmental Baseline Survey (EBS) at the Former Small Arms Range at the Lake Housing Site, Seneca Army Depot Activity, New York. The enclosed pages include a response to a comment and pages to be inserted into the existing Final Work Plan for the Former Shooting Range at the Lake Shore Housing. These materials were prepared to address a comment received from personnel of the US EPA Region 2 after the submission of the Final Work Plan in November 2001. Please use the provided pages as replacements to equivalently numbered pages in your existing copy of the Final Work Plan.

Should you have any questions, please do not hesitate to call me at (781) 401-2229 to discuss them.

Sincerely,

PARSONS ENGINEERING SCIENCE, INC.

Todd Heino, P.E.
Project Manager

cc: S. Absolom, SEDA
K. Hoddinott, USACHPPM
C. Kim, USAEC
E. Kashdan, Gannett Fleming
R. Battaglia, CENAN
D. Sheets, CEHNC-PM
B. Wright, USAIOC

PARSONS

TABLE OF CONTENTS

Page

LIST OF TABLE

LIST OF FIGURES

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Remedial Action by PRPs, April 1995, (HWR-4056).

2.4 DATA QUALITY OBJECTIVES (DQOs)

The RI/FS process requires decisions regarding future site remedial actions, including whether or not any actions are required. The RI serves as the mechanism for collecting and assessing data that will be used in the decision making process. During this portion of the overall process, data are collected and assembled to:

- characterize site conditions;
- determine the nature of the waste(s) or contaminant(s) present;
- assess the risk posed to human health and the environment by the identified waste(s) or contaminant(s); and
- perform testing to evaluate the potential performance and cost of treatment technologies that are being considered for use.

The FS provides the mechanism within which the alternative remedial actions are developed and scoped, assessed and evaluated. Ultimately, the output of the combined RI/FS process is a recommended alternative for remedial actions needed at the site that is based on the data that is developed during the RI/FS. Consequently, the collected data must be of sufficient quantity and quality to support defensible decision making.

The U.S. Environmental Protection Agency's (EPA's) Quality Assurance Management Staff (QAMS) developed the Data Quality Objectives (DQO) Process (US EPA, 1996) as a systematic planning tool for developing data collection designs that support defensible decision making in a resource-effective manner. Proper application and use of the EPA's recommended DQO Process can improve the effectiveness, efficiency and defensibility of data collection efforts used in the development and recommendation of potential remedial actions.

The DQO Process is an iterative process that consists of seven steps, as is shown in **Figure 2-3**. The output from each step influences the choices that may be made later in the Process, and may lead to reconsideration of prior decisions due to the development or discovery of new data that does not support prior decisions. The first six steps focus on the development and specification of decision performance criteria or the data quality objectives (DQOs) that will be used to develop the data collection design. Key components of each of these steps are highlighted below:

- State the Problem – Concisely describe the problem to be studied. Review existing information and data to serve as the basis of the problem definition.

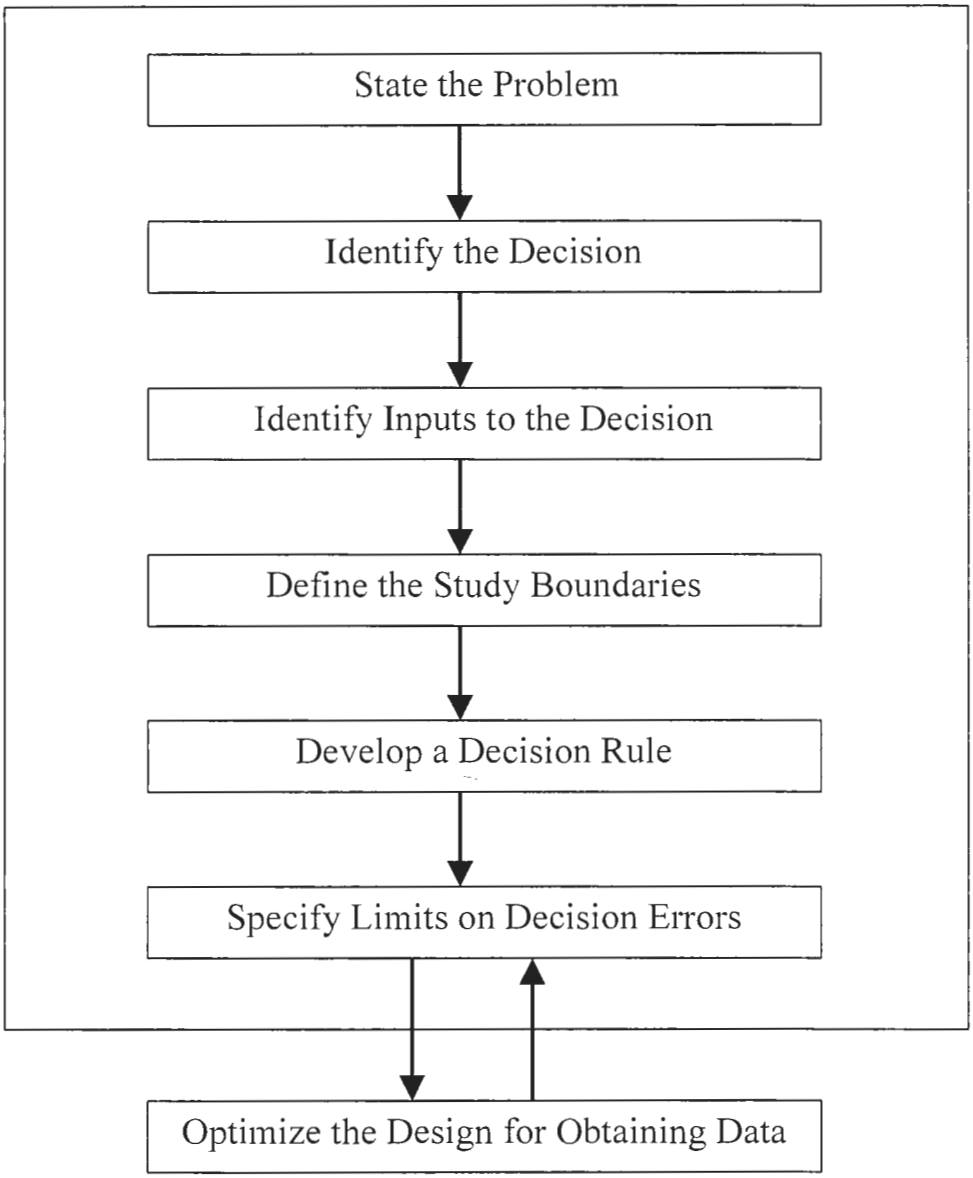

Figure 2-3

US EPA Quality Assurance Management Staff's

Data Quality Objectives Process

(Guidance for the Data Quality Objectives Process. EPA/600/R-96/055. Sept 1994)

- Identify the Decision – Identify what questions the investigation/study will attempt to resolve, and the actions that may result.
- Identify the Inputs to the Decision – What information/data needs to be obtained and collected to resolve the problem identified?
- Define the Study Boundaries – Specify the time periods and spatial area to which the decisions will apply. Determine where and when data should be collected.
- Develop a Decision Rule – Define the statistical parameter of interest, specify the action level, and integrate the previous DQO inputs into a single statement that describes the logical basis for choosing among the alternatives.
- Specify Tolerable Limits on Decision Errors – Define decision error rates based on the consideration of making an incorrect decision.

The last step of the DQO Process is the development and specification of the data collection design based on the DQOs. During this step, all of the data and information developed and collected during the prior steps of the process are evaluated and used to generate alternative data collection designs that could be applied to resolving the identified problem. Once the alternative data collection strategies are identified, the most resource-effective design that meets all the DQOs may be selected and implemented.

Each of the first six steps of the DQO has been incorporated into the development and presentation of this work plan for the proposed environmental baseline survey for the Small Arms Range at the Lake Shore Housing. This work plan presents the Army's recommended approach to conducting an investigation that will be used to prepare a Decision Document that will be used to justify the future disposition of the site.

2.5 DATA NEEDS

2.5.1 Site Visit

After reviewing available historic documents, a site visit will be conducted to locate and define the extent of the Former Small Arms Range at the Lake Housing Site. A metal detector will aid the visual search for evidence of firing points and targets. At this time, an assessment will be made regarding the extent of brush cutting needed prior to performing the geophysical surveys.

2.5.2 Geophysical Data

Digital geophysical mapping will be used to determine areas with elevated levels of metallic debris. If found, such areas will be targeted by the soil sampling program.

2.5.3 Soil Chemistry Data

Soil samples will be collected and analyzed to provide the following information:

- Determine whether soil has been impacted by site activities
- Establish potential for constituents in soil to infiltrate to groundwater
- Assess the adsorptive potential of the soil by performing TOC analyses on soil samples
- Determine compliance with ARARs

2.5.4 Groundwater Chemistry Data

A minimum of three overburden monitoring wells will be installed and screened in the glacial till/weathered shale aquifer. Groundwater from these wells will be sampled and analyzed to determine the following:

- Determine whether groundwater has been impacted by site activities
- Determine aquifer characteristics, such as groundwater flow direction and hydraulic conductivity, to assess potential migration of chemical constituents
- Determine whether site groundwater chemistry complies with ARARs.

3.5 DATA VALIDATION

Analytical data developed during this environmental baseline survey will be used to support final decisions relative to the final disposition of the former shooting range. Analyses proposed as part of the investigation of the former shooting range at the Lake Shore Housing include analysis of explosives and metals in soil and groundwater, and total organic carbon analysis in soil. Sample analysis for explosives will be performed in accordance with SW-846 Method 8330. In order to meet the requirements of New York State, environmental samples for metals will be collected and analyzed according to US EPA and NYSDEC CLP protocols. Determinations of total organic carbon levels will be completed using the Lloyd Kahn protocol.

Validation of analytical data resulting from explosive determinations in soil and groundwater will be performed in a manner that is generally consistent with procedures defined in the US EPA's "National Functional Guidelines for Organic Data Review" and consistent with US EPA Region 2's Standard Operating Procedure HW-16, Explosive Residues (Nitroaromatics and Nitroamines by HPLC, Revision 1.3, September 1994).

The data package submittal requested from the laboratory for the explosive and metals determinations in soil and groundwater will contain all data generated in during the analysis analyses, including mass spectral identification charts, mass spectral tuning data, spike recoveries laboratory duplicate results, method blank results, instrument calibration, and holding times documentation. All sample data and laboratory quality control results will be requested for soil analyses completed for TOC.

Commensurate levels of data validation will be performed on the results and the data packages reported for the proposed analyses. A *qualitative* review will be completed for the TOC data. A qualitative review includes and analysis of the following items as they are applicable to the Lloyd Kahn procedure: data completeness, custody documentation, holding times, laboratory and field QC blanks, instrument calibrations, laboratory control sample recoveries, matrix spike/matrix spike duplicate (MS/MSD) precision and accuracy, laboratory duplicate precision, instrument performance, surrogate recoveries for organic analyses, field duplicate precision, internal standard responses for organic analyses, instrument run logs, and all other laboratory QC samples.

Metal and explosive analyses will be subjected to full data validation. Full data validation is a *qualitative* and *quantitative* review of those items evaluated during a qualitative assessment in addition to calculating sample and laboratory QC results with the instrument raw data. This level of data quality provides assurance that all sample results reported by the laboratory were transcribed, calculated, and reported correctly. Therefore, this level of data review requires laboratories to submit all environmental sample results, laboratory QC results, and instrument raw data (i.e., a full data package or "CLP-type" data deliverable).

5 REFERENCES

Jenkins, T.F., Grant, C.L., Brar, G.S., Thorne, P.G., Ranney, T.A. and Schumacher, P.W., September 1996, Assessment of Sampling Error Associated with Collection and Analysis of Soil Samples at Explosive Contaminated Sites, U.S. Army Cold Regions Research and Engineering Laboratory, Special Report 96-15.

Jenkins, T.F., Walsh, M.E., Thorne, P.G., Miyares, P.H., Ranney, T.A., Grant, C.L., and Esparza, J.R., August 1998, Site Characterization for Explosives Contamination at a Military Firing Range Impact Area, U.S. Army Cold Regions Research and Engineering Laboratory, Special Report 98-9.

Parsons Engineering Science, Inc., August 1995, Final, Generic Installation Remedial Investigation / Feasibility Study (RI/FS) Workplan for Seneca Army Depot Activity.

Parsons Engineering Science, Inc., May 2000, Final, Ordnance and Explosives Engineering Evaluation / Cost Analysis, Appendix C., Site Specific Geophysical Proveout.

U.S. Army Corps of Engineers, St. Louis District (CEMVS), December 1998, Final, U.S. Department of Defense, Base Realignment and Closure, Ordnance and Explosives Archive Search Report, Findings, Seneca Army Depot, Romulus, Seneca County, New York.

U.S. EPA Region 02 Standard Operating Procedure HW-16, Revision 1.3, September 1994: Nitroaromatics and Nitroamines by HPLC.

U.S. EPA, EPA 530/SW-846 Test Methods for Evaluating Solid Waste: Physical / Chemical Methods 3rd ed plus updates - 4 volumes, Office of Solid Waste and Emergency Response, November 1986

U.S. EPA, January 2000, Final, Data Quality Objectives Process for Hazardous Waste Investigations, EPA QA/G-4HW, EPA/600/R-00/007.

U.S. EPA, October 1988, Interim Final, Guidance For Conducting Remedial Investigations and Feasibility Studies Under CERCLA, OSWER Directive 9355.3-01.

U.S. EPA, October 1999, EPA-540/R-99-008 (PB99-963506), Contract Laboratory Program National Functional Guidelines for Organic Data Review.

3.5 DATA VALIDATION

Analytical data developed during this environmental baseline survey will be used to support final decisions relative to the final disposition of the former shooting range. Analyses proposed as part of the investigation of the former shooting range at the Lake Shore Housing include analysis of explosives and metals in soil and groundwater, and total organic carbon analysis in soil. Sample analysis for explosives will be performed in accordance with SW-846 Method 8330. In order to meet the requirements of New York State, environmental samples for metals will be collected and analyzed according to US EPA and NYSDEC CLP protocols. Determinations of total organic carbon levels will be completed using the Lloyd Kahn protocol.

Validation of analytical data resulting from explosive determinations in soil and groundwater will be performed in a manner that is generally consistent with procedures defined in the US EPA's "National Functional Guidelines for Organic Data Review" and consistent with US EPA Region 2's Standard Operating Procedure HW-16, Explosive Residues (Nitroaromatics and Nitroamines by HPLC, Revision 1.3, September 1994).

The data package submittal requested from the laboratory for the explosive and metals determinations in soil and groundwater will contain all data generated in during the analysis analyses, including mass spectral identification charts, mass spectral tuning data, spike recoveries laboratory duplicate results, method blank results, instrument calibration, and holding times documentation. All sample data and laboratory quality control results will be requested for soil analyses completed for TOC.

Commensurate levels of data validation will be performed on the results and the data packages reported for the proposed analyses. A *qualitative* review will be completed for the TOC data. A qualitative review includes and analysis of the following items as they are applicable to the Lloyd Kahn procedure: data completeness, custody documentation, holding times, laboratory and field QC blanks, instrument calibrations, laboratory control sample recoveries, matrix spike/matrix spike duplicate (MS/MSD) precision and accuracy, laboratory duplicate precision, instrument performance, surrogate recoveries for organic analyses, field duplicate precision, internal standard responses for organic analyses, instrument run logs, and all other laboratory QC samples.

Metal and explosive analyses will be subjected to full data validation. Full data validation is a *qualitative* and *quantitative* review of those items evaluated during a qualitative assessment in addition to calculating sample and laboratory QC results with the instrument raw data. This level of data quality provides assurance that all sample results reported by the laboratory were transcribed, calculated, and reported correctly. Therefore, this level of data review requires laboratories to submit all environmental sample results, laboratory QC results, and instrument raw data (i.e., a full data package or "CLP-type" data deliverable).

U.S. EPA, September 1994, Guidance for the Data Quality Objectives Process, EPA QA/G-4, EPA/600/R-96/055.

Woodward-Clyde, February 1996, Environmental Baseline Survey Report, Seneca Army Depot, New York.

5 REFERENCES

Jenkins, T.F., Grant, C.L., Brar, G.S., Thorne, P.G., Ranney, T.A. and Schumacher, P.W., September 1996, Assessment of Sampling Error Associated with Collection and Analysis of Soil Samples at Explosive Contaminated Sites, U.S. Army Cold Regions Research and Engineering Laboratory, Special Report 96-15.

Jenkins, T.F., Walsh, M.E., Thorne, P.G., Miyares, P.H., Ranney, T.A., Grant, C.L., and Esparza, J.R., August 1998, Site Characterization for Explosives Contamination at a Military Firing Range Impact Area, U.S. Army Cold Regions Research and Engineering Laboratory, Special Report 98-9.

Parsons Engineering Science, Inc., August 1995, Final, Generic Installation Remedial Investigation / Feasibility Study (RI/FS) Workplan for Seneca Army Depot Activity.

Parsons Engineering Science, Inc., May 2000, Final, Ordnance and Explosives Engineering Evaluation / Cost Analysis, Appendix C., Site Specific Geophysical Proveout.

U.S. Army Corps of Engineers, St. Louis District (CEMVS), December 1998, Final, U.S. Department of Defense, Base Realignment and Closure, Ordnance and Explosives Archive Search Report, Findings, Seneca Army Depot, Romulus, Seneca County, New York.

U.S. EPA Region 02 Standard Operating Procedure HW-16, Revision 1.3, September 1994: Nitroaromatics and Nitroamines by HPLC.

U.S. EPA, EPA 530/SW-846 Test Methods for Evaluating Solid Waste: Physical / Chemical Methods 3rd ed plus updates - 4 volumes, Office of Solid Waste and Emergency Response, November 1986

U.S. EPA, January 2000, Final, Data Quality Objectives Process for Hazardous Waste Investigations, EPA QA/G-4HW, EPA/600/R-00/007.

U.S. EPA, October 1988, Interim Final, Guidance For Conducting Remedial Investigations and Feasibility Studies Under CERCLA, OSWER Directive 9355.3-01.

U.S. EPA, October 1999, EPA-540/R-99-008 (PB99-963506), Contract Laboratory Program National Functional Guidelines for Organic Data Review.

U.S. EPA, September 1994, Guidance for the Data Quality Objectives Process, EPA QA/G-4, EPA/600/R-96/055.

Woodward-Clyde, February 1996, Environmental Baseline Survey Report, Seneca Army Depot, New York.

Response to the Comments from the U.S. Environmental Protection Agency

Subject: Draft Work Plan for the Environmental Baseline Survey (EBS) at the Former Small Arms Range at the Lake Housing Site
Seneca Army Depot Activity, June, 2001

Comments Dated: November 1, 2001

Date of Comment Response: January 2, 2002

Responder's Note:

The US EPA, Region 2 initially issued comments on the subject work plan in a letter to Mr. Stephen M. Absolom, BRAC Environmental Coordinator, Seneca Army Depot, dated August 10, 2001. A revised copy of the comments on the Draft Work Plan was issued by the US EPA, Region 2 on November 1, 2001. Essentially, the two sets of comments are equivalent, with the exception that the US EPA' s Specific Comment pertaining to Section 2.3, Data Quality Objectives (Specific Comment #5 of the August 10, 2001 comment letter) of the work plan, was expanded. The following material is provided to address the expanded content of the US EPA's comment pertaining to Data Quality Objectives.

Comment (from US EPA's November 1, 2001 letter):

Section 2.3, Data Quality Objectives, Page 2-16. The text states that Level 3 data packages will be obtained for most analyses and Level 4 data packages will be obtained for metals analyses. No mention is made of any data validation to be performed on these data packages.

Please note that reference to EPA Data Quality Objectives Levels 3 and 4 is outdated. This is from EPA document "Data Quality Objectives for Remedial Response Activities," March 1987, EPA/540/G-87/003. EPA's latest guidance on the Data Quality Objective process can be found in "Guidance for the Data Quality Objective Process," 9/94, EPA QA/G-4, available at the following web site:

http:/ /www.epa.gov/quality1/qa_docs.html

This guidance elaborates upon the systematic planning process which should currently be used to define the quality and quantity of data needed to support the environmental decision at hand. It does not define the contents of a data package. EPA recommends that the contents of the data packages obtained during this investigation be explicitly defined in this Work Plan or the Sampling and

Analysis Plan (if a SAP is being prepared).

The above information should be used by SEDA and incorporated into Section 2.3. [*Responder's Notation: Due to other changes required in response to oversight agency comments, Section 2.3 of the original document is now 2.4 in the revised document.*]

In addition, the data validation procedures to be employed here should be explicitly referenced or included. EPA Region 2 has data validation SOPs for the CLP organics, inorganics and some SW-846 analytical methods. These can be found on our web site:

http:/ /www.epa.gov/region02/desa/hsw/sops.htm

These SOPs should be used first and foremost. For those analytical methods which do not have a SOP which is presented on the Region 2 web page, it is required that all of the QA criteria stated in the analytical SOP as being "recommended," be performed and subsequent data validation (assessment of the results versus the QA/QC criteria in the method) procedures be included in the site specific SAP.

Response:

Requested changes updating the general discussion of Data Quality Objectives have been incorporated into section 2.4 of the Revised Work Plan. The Army has employed the EPA's recommended procedure in the development of the most recent investigation plan for the Small Arms Range at the Lake Shore Housing. However, outdated references remained. These references have now been updated.

A new section (Section 3.5) has been prepared. This section will discuss the requirements for the analytical data packages. Specific references to the data validation procedures components that will be completed for these analyses are also identified. The proposed revised write-ups relating to the Data Quality Objective Process and Data Validation are provided as attachments to this response.

2.4 DATA QUALITY OBJECTIVES (DQOs)

The RI/FS process requires decisions regarding future site remedial actions, including whether or not any actions are required. The RI serves as the mechanism for collecting and assessing data that will be used in the decision making process. During this portion of the overall process, data are collected and assembled to:

- characterize site conditions;
- determine the nature of the waste(s) or contaminant(s) present;
- assess the risk posed to human health and the environment by the identified waste(s) or contaminant(s); and
- perform testing to evaluate the potential performance and cost of treatment technologies that are being considered for use.

The FS provides the mechanism within which the alternative remedial actions are developed and scoped, assessed and evaluated. Ultimately, the output of the combined RI/FS process is a recommended alternative for remedial actions needed at the site that is based on the data that is developed during the RI/FS. Consequently, the collected data must be of sufficient quantity and quality to support defensible decision making.

The U.S. Environmental Protection Agency's (EPA's) Quality Assurance Management Staff (QAMS) developed the Data Quality Objectives (DQO) Process (US EPA, 1996) as a systematic planning tool for developing data collection designs that support defensible decision making in a resource-effective manner. Proper application and use of the EPA's recommended DQO Process can improve the effectiveness, efficiency and defensibility of data collection efforts used in the development and recommendation of potential remedial actions.

The DQO Process is an iterative process that consists of seven steps, as is shown in **Figure 2-3**. The output from each step influences the choices that may be made later in the Process, and may lead to reconsideration of prior decisions due to the development or discovery of new data that does not support prior decisions. The first six steps focus on the development and specification of decision performance criteria or the data quality objectives (DQOs) that will be used to develop the data collection design. Key components of each of these steps are highlighted below:

- State the Problem – Concisely describe the problem to be studied. Review existing information and data to serve as the basis of the problem definition.

- Identify the Decision – Identify what questions the investigation/study will attempt to resolve, and the actions that may result.
- Identify the Inputs to the Decision – What information/data needs to be obtained and collected to resolve the problem identified?
- Define the Study Boundaries – Specify the time periods and spatial area to which the decisions will apply. Determine where and when data should be collected.
- Develop a Decision Rule – Define the statistical parameter of interest, specify the action level, and integrate the previous DQO inputs into a single statement that describes the logical basis for choosing among the alternatives.
- Specify Tolerable Limits on Decision Errors – Define decision error rates based on the consideration of making an incorrect decision.

The last step of the DQO Process is the development and specification of the data collection design based on the DQOs. During this step, all of the data and information developed and collected during the prior steps of the process are evaluated and used to generate alternative data collection designs that could be applied to resolving the identified problem. Once the alternative data collection strategies are identified, the most resource-effective design that meets all the DQOs may be selected and implemented.

Each of the first six steps of the DQO has been incorporated into the development and presentation of this work plan for the proposed environmental baseline survey for the Small Arms Range at the Lake Shore Housing. This work plan presents the Army's recommended approach to conducting an investigation that will be used to prepare a Decision Document that will be used to justify the future disposition of the site.

3.5 DATA VALIDATION

Analytical data developed during this environmental baseline survey will be used to support final decisions relative to the final disposition of the former shooting range. Analyses proposed as part of the investigation of the former shooting range at the Lake Shore Housing include analysis of explosives and metals in soil and groundwater, and total organic carbon analysis in soil. Sample analysis for explosives will be performed in accordance with SW-846 Method 8330. In order to meet the requirements of New York State, environmental samples for metals will be collected and analyzed according to US EPA and NYSDEC CLP protocols. Determinations of total organic carbon levels will be completed using the Lloyd Kahn protocol.

Validation of analytical data resulting from explosive determinations in soil and groundwater will be performed in a manner that is generally consistent with procedures defined in the US EPA's "National Functional Guidelines for Organic Data Review" and consistent with US EPA Region 2's Standard Operating Procedure HW-16, Explosive Residues (Nitroaromatics and Nitroamines by HPLC, Revision 1.3, September 1994).

The data package submittal requested from the laboratory for the explosive and metals determinations in soil and groundwater will contain all data generated in during the analysis analyses, including mass spectral identification charts, mass spectral tuning data, spike recoveries laboratory duplicate results, method blank results, instrument calibration, and holding times documentation. All sample data and laboratory quality control results will be requested for soil analyses completed for TOC.

Commensurate levels of data validation will be performed on the results and the data packages reported for the proposed analyses. A *qualitative* review will be completed for the TOC data. A qualitative review includes and analysis of the following items as they are applicable to the Lloyd Kahn procedure: data completeness, custody documentation, holding times, laboratory and field QC blanks, instrument calibrations, laboratory control sample recoveries, matrix spike/matrix spike duplicate (MS/MSD) precision and accuracy, laboratory duplicate precision, instrument performance, surrogate recoveries for organic analyses, field duplicate precision, internal standard responses for organic analyses, instrument run logs, and all other laboratory QC samples.

Metal and explosive analyses will be subjected to full data validation. Full data validation is a *qualitative* and *quantitative* review of those items evaluated during a qualitative assessment in addition to calculating sample and laboratory QC results with the instrument raw data. This level of

data quality provides assurance that all sample results reported by the laboratory were transcribed, calculated, and reported correctly. Therefore, this level of data review requires laboratories to submit all environmental sample results, laboratory QC results, and instrument raw data (i.e., a full data package or "CLP-type" data deliverable).

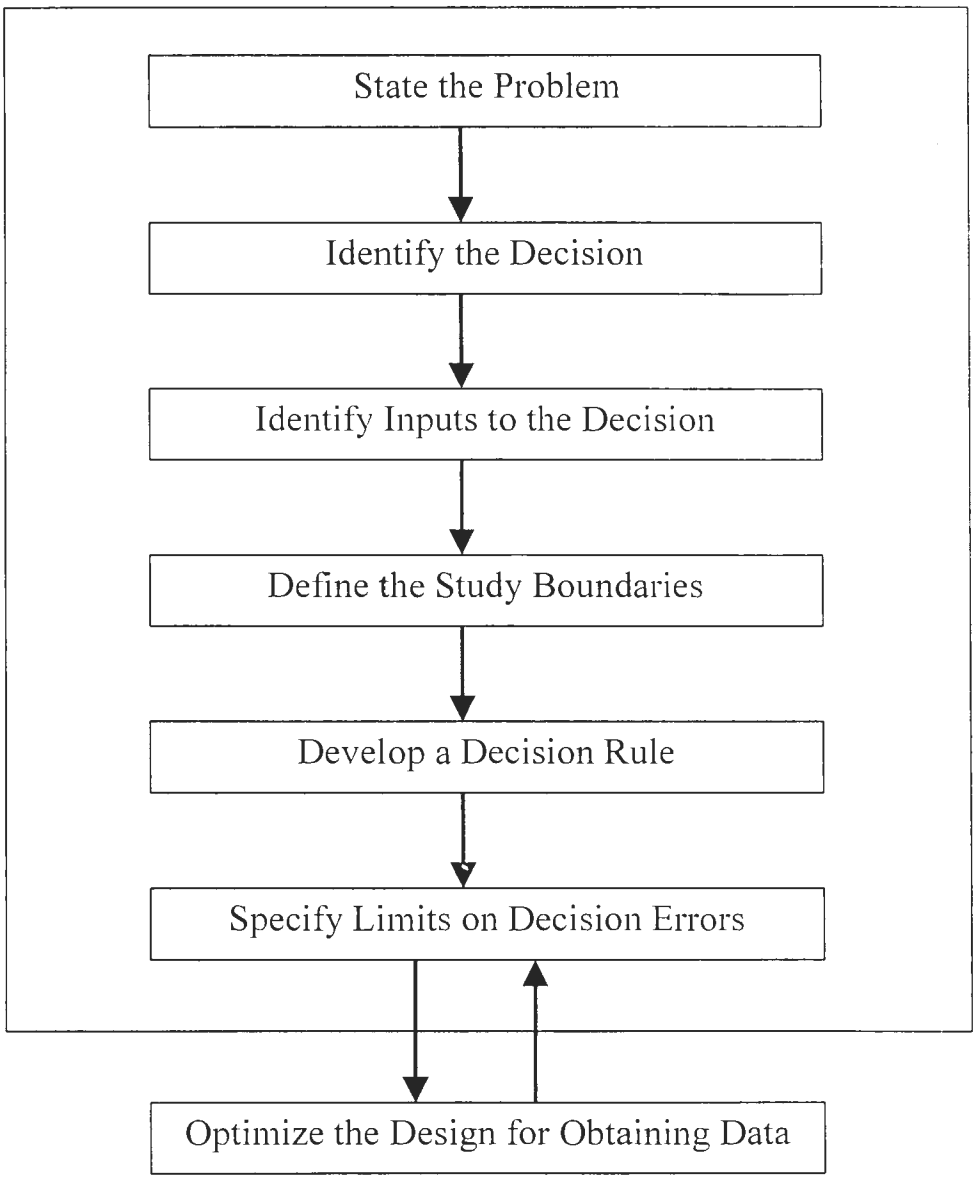

Figure 2-3
US EPA Quality Assurance Management Staff's
Data Quality Objectives Process
(Guidance for the Data Quality Objectives Process. EPA/600/R-96/055. Sept 1994)