



**LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY**  
**LEAKING UNDERGROUND STORAGE TANK PROGRAM**  
**QUALITY ASSURANCE PROJECT PLAN**

**Revision 8**

Document Review and Revision Record

**Note: Actions older than 5 yrs may be removed from this record**

Approval Date	Revision No.	Record of Activity
5/30/00	3	Document approved
10/15/01	4	Minor revisions throughout document
10/04/02	5	New Remediation Process Chart, addition of SW846 Method 5035/8021 or 8260B, change QA duties, and other minor revisions
02/25/04	6	<ul style="list-style-type: none"> <li>• A3 -Added statement "Official version will be posted on DEQ's Intranet. The following DEQ personnel will be notified via interoffice mail that the latest version is posted";</li> <li>• A4 -Update QAR Identification; Figure 1 – Update Organization Chart to enhance Operations Group;</li> <li>• A6 -Deleted reference VII, Groundwater Monitoring and Reporting Guidance Document, now it is part of RECAP; specified Reference IV is used by DEQ personnel; deleted "LUST" from 1<sup>st</sup> paragraph; reworded groundwater monitoring and reporting requirements</li> <li>• A8 –deleted words "8 hours" from HAZWOPER Annual Refresher; Update References to reflect addition of QAPP documents location and revised reference numbers; Added "ETD Supervisors" and "ETD" to last sentence</li> <li>• A9 -paragraph 3 replaced "five years" with "ten years"- Title 33 changed minimum retention time of records; paragraph 4 changed reference from "Subpart C" to "Subchapter B";</li> <li>• B2 -Deleted Appendix K;</li> <li>• B3 -paragraph 3-changed in first sentence "...documentation used to..."; deleted last sentence which references DEQ COC stating that information must be provided on the chain of custody form; paragraph 4 replaced "DEQ representative" with "sampler";</li> <li>• B4- Combined last two sentences</li> <li>• B5 -Figure 4 was updated, added acceptable preparation methods, added MEK and MIBK as indicators for gasoline; deleted BTEX and PAH as indicators for Kerosene Jet Fuel as per new RECAP, added TCEQ 1005 as acceptable method for TPH analysis;</li> <li>• Deleted Reference VI DEQ Chain of Custody Form; and</li> <li>• Other minor spelling, formatting, and punctuation revisions.</li> </ul>

Approval Date	Revision No.	Record of Activity
4/1/05	7	<ul style="list-style-type: none"> <li>• Section A3-moved Laboratory Services Division under Office of Environmental Assessment and delete the division under Office of Management and Finance. Change due to reorganization; added Engineer Group 4 Manager and Geologist/Engineer Team Leaders to Environmental Technology Divisions distribution list; added Environmental Scientist Team Leaders to Remediation Services Division distribution list; added Environmental Consultants to distribution list.</li> <li>• Section A4-added and defined the LUST Project QA Coordinator and defined this persons responsibilities; updated organization flowchart to show Project QA Coordinator independence; added a footnote to the RCAP 2003.</li> <li>• Section A5- updated the number of regulated USTs and referenced origin of this information; added a sentence to clearly define the purpose of the QAPP.</li> <li>• Section A6-Added a statement clarifying sampling and analytical work schedules can be found in investigation work plans.</li> <li>• Section A9-change RSD QAR to Project QA Coordinator.</li> <li>• Section B2-Added reference to DEQs SOP for Corrective Action System to be used to document any corrective actions required.</li> <li>• Section B3-added statement indicating labeling of samples; added reference to sample holding times; added reference to Title 33, Part I, Subpart 3, 5301 to clarify procedures followed when failures occur.</li> <li>• Section B5- added footnote 14 to the table figure 4</li> <li>• Section B6-Added statement about resolving equipment deficiencies and referenced Title 33 for laboratory equipment problems.</li> <li>• Section B7-Added reference to SOP for Instrument use and Calibration.</li> <li>• Section B10-Added reference to Title 33 covering SOP data handling</li> <li>• Section C1- Added reference to SOP for Corrective Action System</li> <li>• References – Added to list of references</li> </ul>

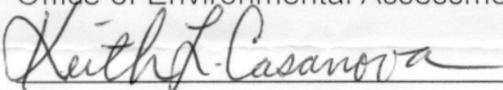
<b>Approval Date</b>	<b>Revision No.</b>	<b>Record of Activity</b>
3/31/2006	8	<ul style="list-style-type: none"><li>• Changed to new logo on cover page;</li><li>• Updated EDT Administrator name on approval signature page and throughout document</li><li>• In A3 added Toxicology Supervisor and changed to UST Trust Fund ES Manager from Supervisor</li><li>• Updated the GEO QAR representative name</li><li>• Updated in A5 estimated UST</li><li>• Section A6 updated number of USTs and facilities. Also added reference pre-Katrina</li><li>• Change LDEQ to DEQ throughout the document</li><li>• Updated the web links in reference section</li><li>• In A8 added documentation of training the Pathlore System</li><li>• Page 8 moved QA Manager and QA Officer under Laboratory Services Division, added Geology and Engineering QAR</li><li>• Updated links in Reference section</li><li>• Updated page numbers in the table of contents</li></ul>

**A1 APPROVAL SHEET**

Louisiana Department of Environmental Quality

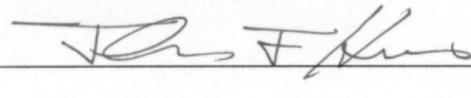
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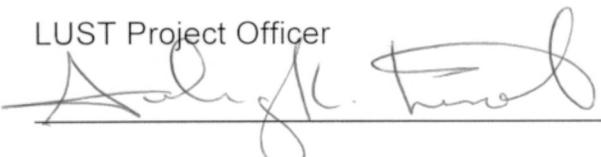
Title: Project Quality Assurance Coordinator  
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Title: LUST Project Officer

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## **A3 DISTRIBUTION LIST**

### **Louisiana Department of Environmental Quality**

The official version is posted on DEQ's Intranet. The Project Quality Assurance Coordinator will notify the following DEQ personnel via interoffice mail when the latest version is posted.

#### Office of Environmental Assessment

Executive Section  
Assistant Secretary

Remediation Services Division  
Administrator  
Environmental Scientist Managers  
Quality Assurance Representative  
Environmental Scientist Team Leaders

Environmental Technology Division  
Administrator  
Geologist Supervisors  
Engineering Group 4 Manager  
Engineering and Geology Quality Assurance Representatives  
Geologist/Engineer Team Leaders  
Toxicology Supervisor

Laboratory Services Division  
Administrator  
Quality Assurance Manager  
Quality Assurance Officer

#### Office of Management and Finance

Financial Services Division  
UST Trust Fund Environmental Scientist Manager

### **U.S. EPA Region 6 Personnel**

LUST Project Officer (receives an original copy)

### **Response Action Contractors (RACs)**

A copy of the QAPP will be supplied to each RAC listed on the current RAC List.

## **Environmental Consultants**

An Environmental Consultant carrying out a response action at a LUST site will be provided a copy of the LUST QAPP.

## **A4 PROJECT / TASK ORGANIZATION**

See Figure 1 of this section for an overview of the LUST Project Organization.

### **(1) U.S. EPA LUST Project Officer, Region VI - Audray Lincoln**

The EPA Region VI LUST Project Officer is responsible for coordination of EPA Region VI and DEQ Leaking Underground Storage Tank (LUST) Program administrative issues, including processing the LUST Grant Work Plan and approving the DEQ LUST Program Quality Assurance Project Plan (QAPP).

### **(2) Remediation Services Division (RSD) Administrator - Keith Casanova Environmental Technology Division (ETD) Administrator - Tom Harris**

The RSD and ETD Administrators are responsible for overall implementation of the LUST Program and associated remediation process activities as they relate to assessment and corrective actions within the RSD and ETD.

### **(3) RSD Quality Assurance Representative - Erin Folse Geology Quality Assurance Representative - Celeste Bonnezeze**

The QARs are responsible for all aspects and functions of the DEQ LUST Program QA/QC requirements including the following:

- Provide input to the department Quality Management Plan (QMP) and review of QAPP documents
- Orientation of the project staff to the quality assurance needs and requirements of the LUST program

### **(4) Project QA Coordinator – Erin Folse**

The Project QA Coordinator is responsible for maintaining the official, approved LUST QAPP. Also responsible for the following:

- Distributing the updated copies of the LUST QAPP to appropriate personnel
- Sending the LUST QAPP to EPA for approval
- Have updated QAPP posted on the intranet
- Conducting periodic assessments

**(5) Operations Group - Consists of the RSD/ETD Administrators, RSD Environmental Scientist Managers, ETD Geology Supervisors, and the Engineering Group 4 Manager**

The Operations Group is responsible for overall performance of the LUST program within the Remediation process including the following:

- Site classification and prioritization
- Team assignments
- Supervising the Technical Teams in regard to oversight of field activities performed by contractors
- Consistency of processes between regions (see Figure 2 of this section for map of regions)
- Direct work of and provide assistance to Technical Teams
- Balance workload between regions and staff
- Ensure proper hand-offs are made and received from other departmental processes and divisions

**(6) Technical Teams**

The Technical Teams consist of Environmental Scientists from RSD and Geologists, Engineers, and Toxicologists from ETD.

The Technical Teams are responsible for the following:

- Oversight of assessment and remediation of LUST sites
- Review of monitoring reports
- Assurance that all field equipment is properly maintained and calibrated, and those individuals operating this equipment are adequately trained
- Assurance that all field activities, including those performed by both the DEQ staff and contractors, comply with approved standard procedures and quality assurance requirements
- Proper documentation of field activities is maintained and that proper labeling, handling, storage and shipping requirements have been met
- Compliance with all appropriate chain-of-custody procedures

- Notification to the appropriate laboratory of particular circumstances that may adversely affect the quality of data derived from LUST site field activities
- Assurance that the site investigation, corrective action, site monitoring, and completion sub-processes (see Figure 3 of this section) are performed in accordance with the remediation process standard operating procedures (SOPs) (Reference IV)
- Assistance to the QARs in creating and revising the QAPP and any associated SOPs

#### **(7) Response Action Contractors/Environmental Consultants**

A Response Action Contractor (RAC) is a person who has been approved by the department and is carrying out any response action at a Motor Fuel UST Trust Fund (here in after referred to as the "Trust Fund") eligible site, including a person retained or hired by such person to provide services relating to a response action. A response action is any activity including, but not limited to, assessment, planning, design, engineering, construction, operation of a recovery system, or ancillary services that are carried out in response to any discharge, release or threatened release of motor fuels into the groundwater or subsurface soils. (See Section A5 for an explanation of the Trust Fund.)

The majority of LUST sites in Louisiana are Trust Fund eligible. Sites that are not Trust Fund eligible, those that qualify for federal reimbursement or are being funded by a private entity, are not required to use a RAC to investigate and remediate the site although they are allowed to use a RAC if they choose to do so.

An Environmental Consultant (EC) is a person other than a RAC carrying out a response action at a LUST site that is not Trust Fund eligible. In this document, the term "RAC/EC" will be used to indicate consultants working on Trust Fund eligible sites (RAC) and Trust Fund non-eligible sites (EC).

RAC/EC are responsible for performing remediation activities in accordance with the following guidance and regulations:

- DEQ Risk Evaluation/Corrective Action Program 2003 (RECAP) (Reference I)<sup>1</sup>
- DEQ/LDOTD Construction of Geotechnical Boreholes and Monitoring Well Systems Handbook, (Reference II)

#### **(8) Laboratories**

Laboratories performing analyses on samples from LUST sites must use department-approved methods. Commercial laboratories must participate in DEQ's Louisiana Environmental Laboratory Accreditation Program (LELAP) (Reference III).

Figure 1

LUST Project Organization

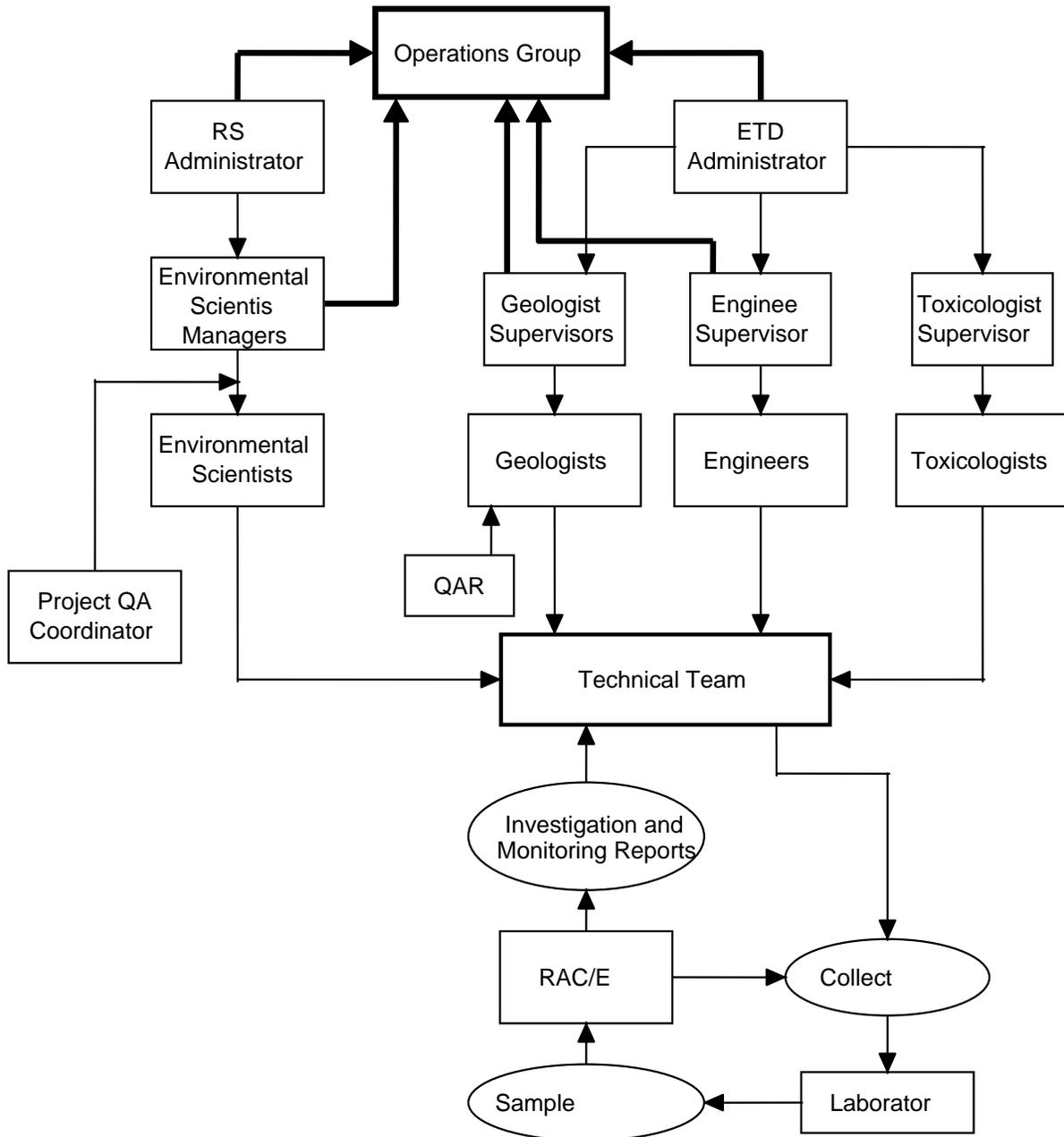


Figure 2

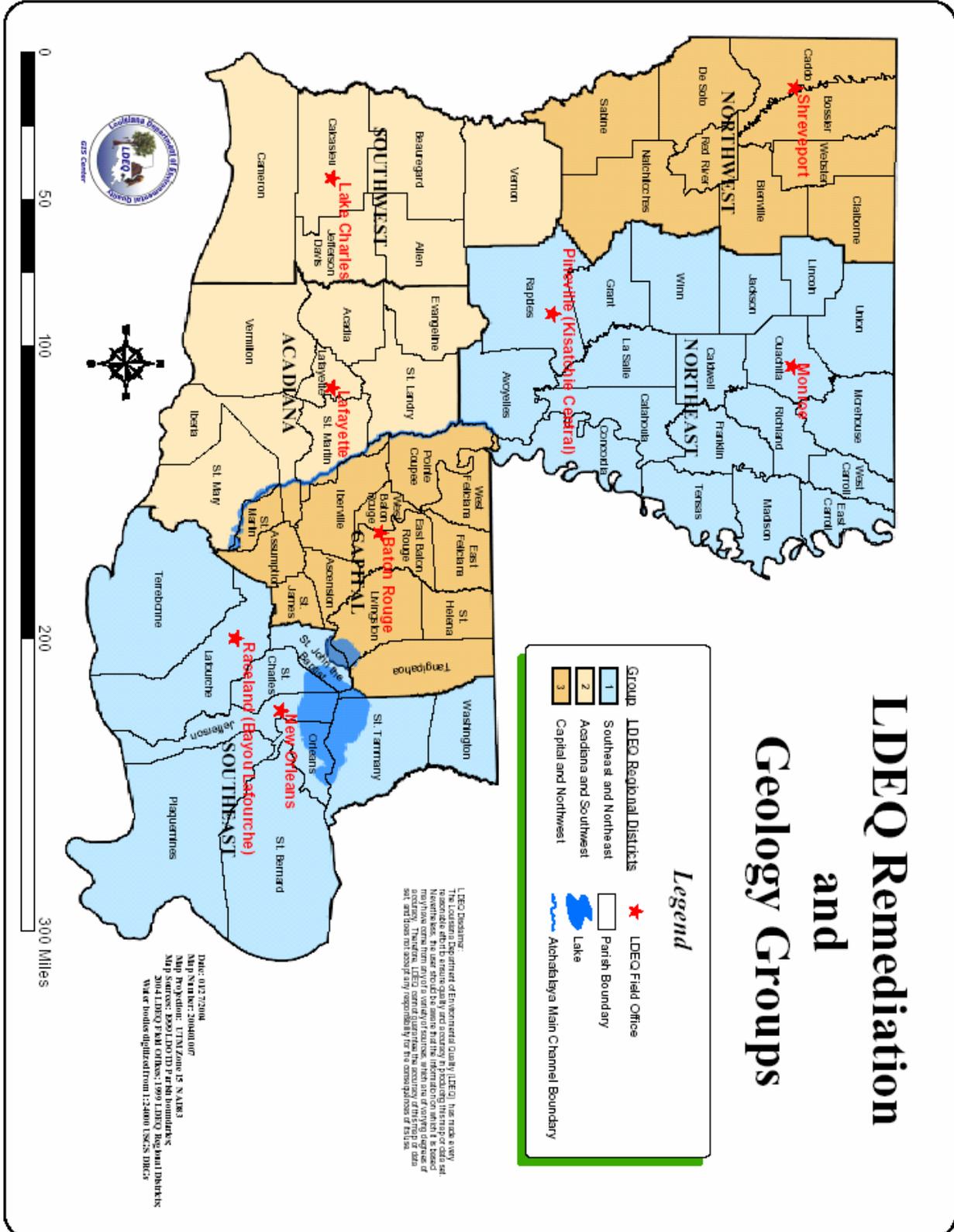


Figure 3

### Remediation Process



## **A5 PROBLEM DEFINITION/BACKGROUND**

Nationwide, the U.S. EPA estimates that there are approximately 660,000 federally regulated underground storage tanks (USTs) buried at hundreds of thousands of sites (Reference VII). It is also estimated that a substantial number of these USTs leak allowing petroleum and other hazardous substances to be released into the soil and groundwater. In addition, faulty installation or operating and maintenance practices increased the number of releases into the environment. To decrease the posed threat to our health and environment DEQ developed this project, as required by EPA, to be eligible to use federal funds to oversee, enforce, and pay for cleanups at sites where owner and operators are unknown or not responsive.

In October of 1986, Congress amended Subtitle I of the Resource Conservation and Recovery Act (RCRA) and therein created the Leaking Underground Storage Tank federal grant funds. Federal funds have been allocated to finance corrective action measures at sites where releases of petroleum products from underground storage tanks have occurred and financially responsible parties cannot be identified or are not satisfactorily responsive. Additionally, these funds are also allocated to pay for field personnel time and other resources used in the remediation of sites.

Through a cooperative agreement with the EPA, the DEQ is responsible for the administration of these funds for the enactment of LUST program activities in Louisiana. Because LUST program activities will involve environmental measurements and data generation used by DEQ Technical Teams and RAC/EC, the DEQ is required by the EPA regulations (40 CFR Part 31) to develop and implement a quality assurance system. The Quality Assurance Project Plan (QAPP) for the DEQ's LUST program is provided in this document and was developed pursuant to EPA Requirements for QAPPs, EPA QA/R-5; March 2001.

Additionally, the Louisiana Legislature established the Motor Fuels UST Trust Fund (hereinafter referred to as "the Trust Fund") under Act 767 on July 15, 1988, as a means of helping UST owners meet the financial responsibility requirements set forth by the EPA. The Trust Fund was initially financed through a per-tank fee of \$100 set by Act 767. On July 26, 1990, Act 1014 was passed, changing the fee structure from a per-tank rate to a rate based on the number of gallons delivered to a UST. On June 16, 1995, Act 336 of the 1995 Regular Session of the Legislature was passed increasing the fee from \$27.00 to \$72.00 for each delivery of 9,000 gallons of fuel (\$0.008 per gallon) delivered to a UST. This fee is collected by bulk operators and remitted to the Louisiana DEQ on a monthly basis.

The Trust Fund is designed to reimburse costs incurred during the rehabilitation and remediation of affected soils, groundwater, and inland surface waters at eligible motor fuel contaminated UST sites, provided these costs are necessary and appropriate. The Trust Fund will reimburse only those allowed costs, which return the site to the use and

occupancy in effect at the time the release occurred. It is the mission of the staff involved in processing the reimbursement claims to insure that the integrity of the Trust Fund is not jeopardized by the incorporation of inappropriate and excessive expenditures.

## **A6 PROJECT / TASK DESCRIPTION**

The responsibilities of the Leaking Underground Storage Tank (LUST) program in Louisiana are shared among different divisions within the DEQ. The bulk of the work primarily lies within the Remediation Services Division (RSD) and Environmental Technology Division (ETD) where corrective action, including investigation and remediation, is performed. The associated Trust Fund lies within the Financial Services Division, which is responsible for disbursement of funds from the Trust Fund. With respect to the LUST program, the Surveillance Division is tasked with compliance inspections and some oversight of investigative and minor remedial activities (e.g., tank removals) at gasoline stations and other fuel facilities.

Currently, there are approximately 13,953 underground storage tanks (UST) located at UST facilities throughout Louisiana (pre Katrina/Rita Hurricanes) that have been registered with the DEQ (average is 2.7 tanks per facility). Each of these approximately 5,167 facilities is unique depending on its components, the type of products stored, the local hydro-geologic conditions and the history of releases. In addition, LUST facilities exist in virtually every type of Louisiana community, ranging from rural to metropolitan. At any Louisiana facility where a leak from a UST has occurred (LUST site), the staff of the RSD and ETD is responsible for ensuring that all site activities are performed in accordance with accepted quality assurance procedures.

The DEQ's QAPP for the LUST program is presented in this document and describes the DEQ's quality assurance plan for Louisiana LUST site activities. Potential LUST site activities pursued by, for, or under contract to the DEQ, are conducted in accordance with the remediation process as depicted in Figure 3 of Section A4.

Some specific LUST site activities which will generate and/or affect environmental data include soil and water sample collection and analysis; soil boring and monitor well installation; decontamination procedures; groundwater, geophysical and other survey measurements; and data reduction and analyses. To ensure consistency with environmental data generation, all LUST sites activities are conducted in accordance with the following documents:

- Louisiana DEQ Risk Evaluation/Corrective Action Program 2003 (RECAP) (Reference I)<sup>1</sup>
- DEQ/LDOTD Construction of Geotechnical Boreholes and Monitoring Well Systems Handbook (Reference II)
- The DEQ personnel involved in LUST site activities in addition to the two documents above use Remediation Process Standard Operation Procedures (SOPs) (Reference IV)

These and all other pertinent LUST site activities that will generate environmental data will be subject to QAPP requirements. Potential uses for collected environmental data include determination of the source, estimation of the magnitude and extent of contamination, determination of the nature of contamination, characterization of site conditions for development of remedial action procedures, and documentation of effectiveness of remediation.

The primary goal of the quality assurance program outlined in this document is to ensure that all data generated by or for the DEQ which relates to LUST site activities will be scientifically valid, legally defensible, and of known and acceptable precision and accuracy. Specific objectives of the quality assurance procedures include the following:

- All data generated for or by the DEQ will be of sufficient or greater quality to withstand scientific and legal challenge
- The intended use of all data will be determined before data collection efforts begin to ensure that the necessary levels of data quality are attainable
- All sample collections and analysis are project specific and will be defined in investigation work plan
- All data produced by or for the DEQ will be of known and acceptable precision, accuracy, representativeness, completeness and comparability
- All LUST projects will receive adequate supervision by the RSD and ETD staff to ensure quality data are collected
- The RSD and ETD Administrators, through the QA Representatives and program supervisors, will have overall responsibility for the implementation of all quality assurance procedures related to sites managed within the LUST program

Data quality procedures and objectives for certain activities, which will commonly be required at LUST sites (e.g., groundwater and soil sampling and analysis), are identified in RECAP (Reference I). For specialized activities, which are required at LUST sites, specific quality assurance procedures and data quality objectives (DQOs) will be identified during development of the plans for site activities.

The DEQ will track the progress of work at LUST sites through monitoring reports submitted by RAC/EC or the Technical Team. Generally, groundwater monitoring is required quarterly and groundwater monitoring reports are submitted to DEQ semi-annually. Groundwater monitoring and reporting frequencies are adjusted in some cases depending on the severity of the groundwater contamination. Monitoring reports will be completed in accordance with the RECAP (Reference I).

## **A7 QUALITY OBJECTIVES AND CRITERIA**

The DEQ's primary goal for quality assurance procedures is to produce sufficient environmental data of known quality that will support the objectives of any LUST site investigation. The objectives which qualitatively and quantitatively specify the data requirements have been developed for data collection activities which will commonly be performed at LUST sites. See RECAP (Reference I).

The Technical Teams have responsibility for the quality of data produced for the DEQ LUST program. The Technical Teams will approve evaluations and decisions related to LUST sites that rely on collected data. The evaluations will include site contamination assessments and development of corrective action plans (CAPs) in accordance with RECAP (Reference1).

Generally, the objectives of any LUST site assessment may include source determination, estimation of the extent and magnitude of contamination, determination of the nature of contamination, characterization of site conditions for risk assessment and development of CAPs, and verification of remedial action. The level of data quality and quantity required to achieve any of these objectives is defined in RECAP (Reference I).

Environmental data collection activities which will most commonly be performed during the course of a LUST site project include boring and monitor well installations; groundwater, soil and surface-water screening and sampling; sample preservation and analysis. With respect to potential LUST site activities, some specific data collection techniques, associated analytical level requirements, and site project objectives are summarized in the Louisiana DEQ RECAP Document and the DEQ/LDOTD Construction of Geotechnical Boreholes and Groundwater Monitoring Systems Handbook (see References I and II respectively). Generally, the most common data acquisition activities performed at LUST sites will require strict adherence to established quality assurance procedures for both sampling and analytical procedures.

## **A8 SPECIAL TRAINING REQUIREMENTS/CERTIFICATION**

All DEQ technical staff involved in the remediation process working on LUST projects must have the following training:

- 40-Hour OSHA HAZWOPER
- OSHA HAZWOPER Annual Refresher

Training classes are listed on DEQ's Intranet, Student Training Center under My Training Plan if it is required for the job you perform. Employees can register on line for required classes.

Additionally, the following training is highly recommended:

- Introduction to Groundwater Investigations
- Sampling for Hazardous Materials
- RECAP Training
- Sampling solid materials using EPA SW846 Method 5035

The RSD Program Analyst and ETD Supervisors track training through the Pathlore Training System, which documents training requirements for RSD/ETD technical staff.

## **A9 DOCUMENTATION AND RECORDS**

The LUST Project QA Coordinator will be responsible for ensuring the appropriate DEQ project personnel have the most current approved version of the QAPP. The official version of the QAPP will be located on the DEQ Intranet (Reference V).

The RAC/EC and/or DEQ personnel performing sampling activities are responsible for producing an investigation report for the DEQ Technical Team to review. Required information and records in the specific format of the investigation report is described in the DEQ RECAP Document (Reference I). Report requirements are also included in RECAP Appendix B (Reference I).

In accordance with LAC 33:I, Subpart 3, 5315(A), the testing laboratory shall retain on record all raw data and observations, calculations and derived data, calibration records, and the final test report for a minimum of ten years or as required by regulatory or legal requirement (Reference III).

Regulations governing the retention of LUST program records and documents are found in CFR Title 40, Chapter I, Subchapter B, Section 31.42. In accordance with this regulation, documents and records generated by or for DEQ for LUST site activities will be retained for at least three years. The three-year time period begins from the date of the DEQ final yearly LUST Grant expenditure report to the EPA.

LUST program records and documents generated at DEQ or for DEQ will be scanned at DEQ into an electronic format and can be retrieved by DEQ employees via the Electronic Document Management System (EDMS). After being scanned, records and documents will be stored in a DEQ archive file room.

## **B1 SAMPLING PROCESS DESIGN (EXPERIMENTAL DESIGN)**

The following documents describe the data collection design for LUST activities in Louisiana including as appropriate the types and numbers of samples required, the design of the sampling network, sampling locations and frequencies, sample matrices, measurement parameters of interest, and the rationale for the design:

- DEQ Risk Evaluation/Corrective Action Program RECAP (Reference I)
- DEQ/LDOTD Construction of Geotechnical Boreholes and Groundwater Monitoring Systems Handbook (Reference II)

## **B2 SAMPLING METHODS**

In general, sampling procedures used during LUST site investigations, which should ensure representative sampling and consequently produce valid results include:

- Use of EPA approved sample collection, sample preservation, and field measurement methods as identified in the Louisiana DEQ RECAP Document (Reference I); Test Methods for Evaluating Solid Waste, Volume II: Field Manual Physical/Chemical Methods, SW846 (Reference VI); and the DEQ/LDOTD Construction of Geotechnical Boreholes and Groundwater Monitoring Systems Handbook (Reference II)
- Calibration of field instruments according to EPA or manufacturers' specifications before, during, and after use in the field and documentation of these calibration procedures (Section B7)
- Periodic inspection, maintenance and servicing of all field equipment and instruments according to EPA or manufacturers' specifications and documentation of these activities
- Use of EPA accepted chain-of-custody documentation

All DEQ staff and/or RAC/EC that will be involved in LUST site investigations will be familiar with the sampling procedure requirements above.

LUST site investigations will usually involve sampling from two media including soils and groundwater. Guidance for sampling soils and groundwater is provided in the DEQ RECAP document, Appendix B, and the DEQ/DOTD Construction of Geotechnical Boreholes and Groundwater Monitoring Systems Handbook (References I and II respectively).

Coordination with the laboratory doing the analysis will occur to ensure proper scheduling. Collection and preservation of samples will be done according to EPA approved methods. After collection, all samples will be handled as few times as possible. All personnel will use extreme care to ensure that samples are not contaminated from containers, pumps, tubing, bailers or any other equipment. Samples shall be properly identified, labeled, and transported to the laboratory in accordance with sample custody procedures in Section B3.

If for any reason it is determined that samples were not collected properly or contaminated, the incident must be documented following DEQ SOP for Corrective Action (Reference VIII).

## **B3 SAMPLE HANDLING AND CUSTODY**

Sample custody procedures are necessary to maintain and document sample possession and to adequately establish and support the use of sample data in potential enforcement,

regulatory or legislative actions. All sample handling and custody activities will be performed in accordance with Louisiana DEQ's Laboratory Accreditation Program described in LAC 33:I, Subpart 3 (Reference III). Section 5501 of Subpart 3 specifically addresses sample integrity.

The principle of sample custody is simply being able to account for the integrity of the sample from the moment the sample is placed in a container until all analytical tests have been completed and any remaining sample is discarded. This means that proper sample custody is a joint effort of the sampling crew, the sample transporter, and the laboratory staff. The investigation work plan will provide sample-handling details. Each sample will be labeled with a unique sample number, time, date, preservatives, and analytical parameters.

The chain-of-custody form is the primary documentation that is used to track proper sample custody from the time of sampling to the arrival of the sample at the laboratory. A chain-of-custody form will be completed for every sample event at any LUST site.

If any of the required information is omitted from the chain-of-custody form, including any of the required signatures or official change of possession times, the documentation of sample custody before arrival at the laboratory will be incomplete. In this case, the laboratory custodian should question whether the sample should be accepted. The question should be referred to the sampler for consideration.

After the sample has been collected, sample integrity must be protected by preventing the intentional and/or accidental contamination of the sample. The receiving laboratory should reject any sample that is suspect of tampering or contamination. The laboratory must record and document these instances of sample rejection.

The laboratory must follow all samples holding time as indicated in SW-846. Chapter three of SW-846 table 3.1 contains the sample holding times, recommended digestion volumes, and recommended collection volumes for inorganic analysis and Chapter 4, table 4-1 contains the sample containers, techniques, and holding times for volatile organics. (Reference VI)

## **B4 ANALYTICAL METHODS**

For the analysis of samples collected at LUST sites in Louisiana, commercial contracted laboratories must be accredited. The DEQ maintains a staff at its own laboratory in Baton Rouge, which may be required to perform analytical services for the LUST program. Contracted and DEQ laboratories will use only EPA approved methods when analyzing DEQ LUST site samples for suspected or known contaminants as specified in Figure 4.

Accredited laboratories as per Title 33, Part I, Subpart 3, 5301, must have procedures indicating what corrective actions are taken when failures occur, identify the documentation and person responsible for the corrective actions, SOPs must include a section on management of laboratory waste, provide method validation information, and SOPs for non-standard testing (Reference III).

## **B5 QUALITY CONTROL (QC)**

QC activities needed for each sampling, analysis, or measurement technique must be performed in accordance with Sections 2.4 and 2.5 of RECAP and LAC 33: I, Subpart 3, 5301 (Reference I and III respectively) and as stated in specific analytical methods.

Figure 4 Petroleum Hydrocarbons Sample Analyses and Methods

Product Stored	Sample Media	Analysis Required	Acceptable SW-846 Preparation Methods	Acceptable SW-846 Analytical Methods
Gasoline	Soil	BTEX <sup>1</sup>	5035	8021B <sup>2</sup> , 8260B <sup>14</sup>
	Water	BTEX <sup>1</sup>	5030	8021B <sup>2</sup> , 8260B <sup>14</sup>
	Soil	TPH-GRO <sup>3</sup> (C <sub>6</sub> -C <sub>10</sub> )	5035	8015B, TCEQ 1005 <sup>12</sup>
	Water	TPH-GRO <sup>3</sup> (C <sub>6</sub> -C <sub>10</sub> )	5030	8015B
	Soil	Lead <sup>5</sup>	3050B, 3051	6010B, 6020, 7420, 7421
	Water	Lead <sup>5</sup>	3005, 3010A, 3015	6010B, 6020, 7420, 7421
	Soil	MTBE <sup>6</sup>	5035	8260B
	Water	MTBE <sup>6</sup>	5030	8260B
	Soil	MEK, MIBK <sup>11</sup>	5035	8015B
Diesel	Soil	TPH-DRO <sup>3</sup> (C <sub>10</sub> -C <sub>28</sub> )	3540, 3541, 3545, 3550, 3560	8015B, TCEQ 1005 <sup>12</sup>
	Water	TPH-DRO <sup>3</sup> (C <sub>10</sub> -C <sub>28</sub> )	3510, 3520	8015B
	Soil	PAHs <sup>7</sup>	3540, 3541, 3545, 3550, 3560, 3580	8100, 8270C, 8310 <sup>8</sup>
	Water	PAHs <sup>7</sup>	3510, 3520	8100, 8370C, 8310 <sup>8</sup>
Crude Oil	Soil	TPH-DRO <sup>3</sup> (C <sub>10</sub> -C <sub>28</sub> )	3540, 3541, 3545, 3550, 3560	8015B, TCEQ 1005 <sup>12</sup>
	Water	TPH-DRO <sup>3</sup> (C <sub>10</sub> -C <sub>28</sub> )	3510, 3520	8015B
	Soil	TPH-GRO <sup>3</sup> (C <sub>6</sub> -C <sub>10</sub> )	5035	8015B, TCEQ 1005 <sup>12</sup>
	Water	TPH-GRO <sup>3</sup> (C <sub>6</sub> -C <sub>10</sub> )	5030	8015B
	Soil	TPH-ORO <sup>3</sup> (>C <sub>28</sub> )	3540, 3541, 3545, 3550, 3560	8015B <sup>4</sup> , TCEQ 1005 <sup>13</sup>
	Water	TPH-ORO <sup>3</sup> (>C <sub>28</sub> )	3510, 3520	8015B <sup>4</sup>
	Soil	PAHs <sup>7</sup>	3540, 3541, 3545, 3550, 3560, 3580	8100, 8270C, 8310 <sup>8</sup>
	Water	PAHs <sup>7</sup>	3510, 3520	8100, 8370C, 8310 <sup>8</sup>
Refined Oils	Soil	TPH-DRO <sup>3</sup> (C <sub>10</sub> -C <sub>28</sub> )	3540, 3541, 3545, 3550, 3560	8015B, TCEQ 1005 <sup>12</sup>
	Water	TPH-DRO <sup>3</sup> (C <sub>10</sub> -C <sub>28</sub> )	3510, 3520	8015B
	Soil	TPH-ORO <sup>3</sup> (>C <sub>28</sub> )	3540, 3541, 3545, 3550, 3560	8015B <sup>4</sup> , TCEQ 1005 <sup>13</sup>
	Water	TPH-ORO <sup>3</sup> (>C <sub>28</sub> )	3510, 3520	8015B <sup>4</sup>
Used Oil	Soil	TPH-ORO <sup>3</sup> (>C <sub>28</sub> )	3540, 3541, 3545, 3550, 3560	8015B <sup>4</sup> , TCEQ 1005 <sup>13</sup>
	Water	TPH-ORO <sup>3</sup> (>C <sub>28</sub> )	3510, 3520	8015B <sup>4</sup>
	Soil	Metals <sup>9</sup>	3050B, 3051	6010B, 6020, 7000 series <sup>10</sup>
	Water	Metals <sup>9</sup>	3005, 3010A, 3015	6010B, 6020, 7000 series <sup>10</sup>
	Soil	PAHs <sup>7</sup>	3540, 3541, 3545, 3550, 3560, 3580	8100, 8270C, 8310 <sup>8</sup>
	Water	PAHs <sup>7</sup>	3510, 3520	8100, 8270C, 8310 <sup>8</sup>
Kerosene & Jet Fuel	Soil	TPH-GRO <sup>3</sup> (C <sub>6</sub> -C <sub>10</sub> )	5035	8015B, TCEQ 1005 <sup>12</sup>
	Water	TPH-GRO <sup>3</sup> (C <sub>6</sub> -C <sub>10</sub> )	5030	8015B
	Soil	TPH-DRO <sup>3</sup> (C <sub>10</sub> -C <sub>28</sub> )	3540, 3541, 3545, 3550, 3560	8015B, TCEQ 1005 <sup>12</sup>
	Water	TPH-DRO <sup>3</sup> (C <sub>10</sub> -C <sub>28</sub> )	3510, 3520	8015B

<sup>1</sup> BTEX – Benzene, Toluene, Ethyl-benzene, and Xylenes

<sup>2</sup> If detected, 2<sup>nd</sup> column confirmations required (8000B, Section 7.9, page 29).

<sup>3</sup> TPH-DRO, GRO, ORO – Total Petroleum Hydrocarbons – Diesel Range Organics, Gasoline Range Organics, and Oil Range Organics

<sup>4</sup> Modified for RECAP Reporting Requirements

<sup>5</sup> When suspected to be present. Required for all gasoline USTs operated before 1/1/86.

<sup>6</sup> MTBE – Methyl tert-butyl ether

<sup>7</sup> PAHs – Polynuclear Aromatic Hydrocarbons (Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Pyrene)

<sup>8</sup> Use for RECAP screening standards if 8270C does not obtain screening standard.

<sup>9</sup> Metals – Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver

<sup>10</sup> Use methods in 7000 series of SW-846 for each metal specified in footnote 9.

<sup>11</sup> MEK – Methyl Ethyl Ketone, MIBK – Methyl Isobutyl Ketone. When suspected to be present.

<sup>12</sup> TCEQ – Texas Commission on Environmental Quality. Use SW846 5035 with modifications listed in section 6.1 of method TCEQ 1005.

<sup>13</sup> TCEQ – Texas Commission on Environmental Quality. Use SW846, Chapter 4, Section 4.1.

<sup>14</sup> Must use 8260B if MTBE analysis is also required to be eligible for trust fund reimbursement for analysis.

## **B6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE**

All field equipment and electronic laboratory equipment used for LUST site activities shall be maintained in accordance with the manufacturer's requirements and specifications.

The field instruments currently used by DEQ personnel in association with LUST activities are the organic vapor analyzers (OVA), water level indicators, explosimeters and Global Positioning System equipment. Preventive maintenance for these instruments includes checking the integrity of the battery before each use. Spare batteries will be available at all times.

A separate logbook will be maintained for each type of equipment whether field or laboratory. All preventive or corrective maintenance will be recorded in these logbooks and will be performed in accordance with the scheduled use of the equipment. The total history of maintenance performed will be available for inspection during a systems audit. General field equipment and/or supplies will be inspected and determined to be in sufficient quantity to provide acceptable quality environmental data.

In order to ensure consistently high quality data, routine inspections and preventative maintenance will be performed on all equipment. Technical Team members using prescribed procedures will perform the maintenance. Permanent records of all equipment maintenance will be kept locally, dated, and reviewed by the appropriate RSD Manager or ETD Supervisor. Logbooks containing maintenance records will be kept with the equipment while it is in use. When the equipment is de-commissioned, the maintenance logbooks will be stored in the RSD equipment room at the DEQ headquarters building. If for any reason equipment is found to be deficient, it should be taken out of operation until repaired. This is to be documented in the equipment logbook.

As per Title 33, part I, Subpart 3, 5303 all laboratory equipment found defective, shall be removed from service and labeled until it has been repaired and showed to be working properly. All equipment maintenance must be documented (Reference III).

## **B7 INSTRUMENT/EQUIPMENT CALIBRATION AND FREQUENCY**

The field equipment (organic vapor analyzers, water level indicators, explosimeters and Global Positioning System) currently used by DEQ staff will be calibrated in accordance with the manufacturer's requirements and specifications and RSD SOP for Instrument Use and Calibration. Electronic laboratory equipment will be maintained and calibrated in accordance with LAC 33: I, Subpart 3, 5303 and 5305 (Reference III).

## **B8 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES**

Since most of the environmental data collected for the LUST program is accomplished by RAC/EC conducting corrective action, the inspection and acceptance requirements for

supplies and consumables used to support their sampling and analytical operations are monitored by the RAC/EC. All support equipment, reagents, etc. must meet, at a minimum, standards as set forth in EPA publication SW846 and DEQ's Laboratory Accreditation Program, as well as, any recommended by the appropriate manufacturers. The same applies to any support equipment used by DEQ staff.

## **B9 NON-DIRECT MEASUREMENTS**

For use in the prioritization of and the planning for work at LUST sites, data from the sources listed below may be used:

- DEQ files
- Water well maps and files
- Federal, state, and local groundwater resources
- Geological publications
- Studies by academic entities
- U.S. Dept. of Agriculture Soil Conservation Service surveys
- Applicable information from other federal, state or local agencies or authorities

Descriptions of site geology, soil properties, and groundwater classification for use in final reports and calculations must be based on data from field sampling and direct measurements.

## **B10 DATA MANAGEMENT**

Sampling is conducted at LUST sites by DEQ staff and/or RAC/EC. A chain-of-custody form accompanies the samples to the laboratory. A copy of the chain-of-custody form will also accompany the laboratory personnel sample report. As per Title 33, Subpart 3, 5301, accredited labs are required to have SOPs covering document control, data handling which includes processing, compiling, analyzing, and transmitting accurate and reliable data, data archival and retrieval procedures, and procedures for acceptable hardware and software configurations. The analytical data results are ultimately conveyed to the DEQ Technical Team.

The investigation report generated by or for DEQ will be scanned at DEQ into an electronic format and can be retrieved by DEQ employees via the Electronic Document Management System (EDMS). After being scanned, records and documents will be stored in a DEQ archive file room.

## **C1 ASSESSMENTS AND RESPONSE ACTIONS**

The commitment to use approved equipment and methods when obtaining environmental samples and when producing field or laboratory measurements must have periodic verification. The verification is accomplished by conducting performance and systems audits. The project QA Coordinator will conduct periodic audits.

Before any LUST investigation, it should be verified that proper equipment is available for all field activities. This includes sampling, safety, and field measurement equipment. The RSD Manager and/or ETD Supervisor should verify that all personnel involved in field activities have received sufficient training to properly use the equipment including calibration standards and decontamination procedures.

All laboratories participating in LUST site sampling analyses must perform QA/QC operations in accordance with Sections 2.4 and 2.5 of RECAP and LAC 33:I, Subpart 3, 5301. To assure that quality data is generated at the laboratory, routine performance audits shall be conducted in accordance with LAC 33:I, Subpart 3, 5101 (Reference III).

All field equipment used for LUST projects must be maintained and inspected in accordance with the applicable operations manual. Before the use of any field equipment, a performance audit shall be conducted by the Technical Team to ensure that the operation of the field equipment provides acceptable quality environmental data. If the results of the performance audit conclude that the field equipment produces insufficient data, the field equipment shall be sent to the applicable contractor for appropriate repairs and the Technical Team Leader shall notify the appropriate RSD Manager and/or ETD Supervisor of the audit results and solutions undertaken to rectify problems discovered during the audit. DEQ SOP for Corrective Action System should be used as documentation (see reference VIII).

Records of maintenance and repairs shall be kept in the calibration logbook for the specific piece of equipment. Appropriate ETD Supervisors and/or RSD Managers shall verify that logbook records are maintained properly.

## **C2 REPORTS TO MANAGEMENT**

The Technical Team member overseeing the LUST project will identify any problems in the field and document the problems on a Field Interview Form (FIF). The Technical Team member will ensure that problems are corrected in the field and will deliver a copy of the FIF to his/her supervisor and give a copy to the RAC/EC. In addition, the Technical Team member will report the problems verbally to his/her supervisor.

It is essential that the QAR be informed either informally or by formal memoranda of any quality assurance problems encountered and solutions adopted so this information can be disseminated to upper level management for distribution to appropriate staff. The Technical Teams, supervisors and/or managers will be responsible for informing the QAR of any QA problems associated with LUST projects. A written report, prepared by the appropriate RSD Manager/ETD Supervisor, outlining any problems and solutions employed discovered during any performance audits shall be submitted to the QAR for review and disbursement to upper Management/EPA as appropriate.

## **D1 DATA REVIEW, VERIFICATION, AND VALIDATION**

The criteria used to review and validate data in an objective and consistent manner are stated in Section 2.5 of RECAP (Reference I).

## **D2 VERIFICATION AND VALIDATION METHODS**

The validation and verification method for field screening analysis only requires that the field-screening instrument identify the concentration of petroleum hydrocarbons within the detection range limit of the specific screening instrument.

Specific validation and verification methods which include the acceptable analyte identification, minimum/maximum percent recovery of the target analytes and QA/QC compounds are defined in the acceptable analytical methods of SW846 listed in Figure 4. In addition, these methods set the performance criteria for instrument calibration, analyte identification, and identification/recovery of the QA/QC compounds.

The laboratory personnel are required to follow procedures outlined in SW846 or other department approved methods. DEQ field staff or RAC/EC are responsible for completing accurate chain-of-custody forms that accompany samples to the laboratory.

## **D3 RECONCILIATION WITH USER REQUIREMENTS**

Whenever the procedures and guidelines established in this project plan to meet the specified levels of data quality are not successful, corrective action may be required.

Any personnel involved in LUST program activities that have observed or are made aware of any variance from quality assurance protocol may initiate corrective action. Variances from quality assurance protocol which may require corrective action may include, but are not limited to the following:

- Field and/or laboratory equipment problems or failures
- Field and/or laboratory procedural problems or failures
- Exceedance of precision and accuracy control limits
- Sample custody, safety, transportation, holding time, or handling problems or failures
- Preventive maintenance deficiencies
- Documentation of deficiencies or problems

## REFERENCES

NOTE: Available links to the current versions have been provided.

<u>Number</u>	<u>Description</u>
I	Risk Evaluation/Corrective Action Program (RECAP) <a href="http://www.deq.louisiana.gov/portal/tabid/131/Default.aspx">http://www.deq.louisiana.gov/portal/tabid/131/Default.aspx</a>
II	DEQ/DOTD Construction of Geotechnical Boreholes and Groundwater Monitoring Systems Handbook <a href="http://www.dotd.state.la.us/intermodal/wells/wellhandbook.asp">http://www.dotd.state.la.us/intermodal/wells/wellhandbook.asp</a>
III	LAC 33:I, Subpart 3 - DEQ Laboratory Accreditation Program <a href="http://www.deq.louisiana.gov/portal/Portals/0/planning/regs/title33/TOC_SubP2">http://www.deq.louisiana.gov/portal/Portals/0/planning/regs/title33/TOC_SubP2</a>
IV	Remediation Process Standard Operating Procedures Official versions are available on DEQ's Intranet at <a href="http://intranet/sop/soplist.asp">http://intranet/sop/soplist.asp</a>
V	Quality Assurance Project Plan (QAPP) Official version is available on DEQ's Intranet at <a href="http://intranet/sop/Shared/DEQ_qapp_index.htm">http://intranet/sop/Shared/DEQ_qapp_index.htm</a>
VI	SW846 Methods <a href="http://www.epa.gov/epaoswer/hazwaste/test/main.htm">http://www.epa.gov/epaoswer/hazwaste/test/main.htm</a>
VII	EPA Underground Storage Tank Program Facts (March 2005) <a href="http://www.epa.gov/swrust1/pubs/ustfacts.pdf">http://www.epa.gov/swrust1/pubs/ustfacts.pdf</a>
VIII	DEQ's SOP for Corrective Action System (SOP 1667) <a href="http://intranet/sop/shared/sop_1667_r00.pdf">http://intranet/sop/shared/sop_1667_r00.pdf</a>

## Footnotes

<sup>1</sup>Management of an AOC/AOI may continue under RECAP 2000 until the current phase/task of the project has been completed and approved by the Department. Further assessment of the AOC/AOI shall be in compliance with RECAP 2003 unless otherwise approved by the Department.