Department of Water and Power the City of Los Angeles

ANTONIO R. VILLARAIGOSA
Mayor

RONALD O. NICHOLS
General Manager

March 1, 2011

Mr. Samuel Unger, Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 West 4TH Street, Suite 200
Los Angeles, California 90013

Attention: Information Technology Unit

Dear Mr. Unger:

Subject: 2010 Annual Self-Monitoring and Receiving Water Reports
Harbor Generating Station (CA0000361, CI-2020)
National Pollutant Discharge Elimination System (NPDES)

Enclosed is the Annual Monitoring Report for the Los Angeles Department of Water and Power's Harbor Generating Station, which includes:

1. Tabular Summaries of Chemical and Thermal Data.
2. Graphical Summary of the Average Monthly Plant Effluent Flow.
3. Chemical Use Summary.
4. Summary of Discussions of Compliance.
5. ELAP Certification.
6. Quality Assurance/Quality Control (QA/QC) Plan.
7. Receiving Water Monitoring Report.

If you have any questions or require additional information, please contact Mr. Bob Krivak of the Wastewater Quality and Compliance Group at (213) 367-1339.

Sincerely,

Katherine Rubin
Manager of Wastewater Quality and Compliance

BK:db
Enclosures
c/enc: Bob Krivak

Water and Power Conservation . . . a way of life

111 North Hope Street, Los Angeles, California 90012-2607 *Mailing address:* Box 51111, Los Angeles 90051-5700
Telephone: (213) 367-4211 *Cable address:* DEWAPOLA

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER

HARBOR GENERATING STATION

NPDES PERMIT NO. CA0000361
COMPLIANCE FILE NO. 2020

2010 ANNUAL SUMMARY

DISCHARGE MONITORING REPORT

Department of Water and Power

HARBOR GENERATING STATION

2010 Annual Summary of Monthly Discharge Monitoring Reports
NPDES Permit No. CA0000361 Compliance File No. 2020

Effluent Limitations

DISCHARGE SERIAL NO. 001

Chemical and Physical Constituents	Units	Limit	Monthly Summaries for 2010											
			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Total Residual Oxidant														
Daily Maximum	mg/L	*0.377*	0.20	0.22	0.31	0.32	0.19	0.15	0.32	0.23	0.31	0.23	ND	0.23
Daily Minimum	mg/L	*No Limit*	<0.05	<0.05	0.09	<0.05	<0.05	0.07	<0.05	<0.05	0.09	0.09	ND	0.06
Monthly Average	mg/L	*No Limit*	0.17	0.17	0.20	0.18	0.12	0.11	0.16	0.13	0.18	0.14	ND	0.11
Free Available Oxidant														
Daily Maximum	mg/L	*0.377*	0.11	0.17	0.20	0.20	0.12	0.12	0.20	0.22	0.23	0.16	ND	0.18
Daily Minimum	mg/L	*No Limit*	<0.05	<0.05	0.03	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	0.05	ND	<0.02
Monthly Average	mg/L	*0.2*	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	ND	0.08
pH														
Daily Maximum	pH units	*8.5*	7.9	7.9	8.0	8.0	8.1	8.0	8.0	8.0	8.0	7.9	ND	7.9
Daily Minimum	pH units	*6.5*	7.6	7.7	7.6	7.7	7.8	7.8	7.8	7.6	7.7	7.4	ND	7.7
Total Waste Flow														
Average Daily Flow	MGD	*No Limit*	55	53	54	57	46	49	52	56	50	27	ND	45
Temperature														
Daily Maximum	°F	*94***	85	80	75	85	80	86	83	77	80	87	ND	79
Daily Minimum	°F	*No Limit*	59	61	59	58	59	62	63	58	59	63	ND	56
Chronic Toxicity*														
Daily Maximum	TU_c	*4.1*§		2.0 / 4.0										
Suspended Solids	mg/L	*No Limit*	3.4	3	6.1	5.9	6.2	5.6	4.6	5.4	5.5	8	ND	10.3
Oil & Grease	mg/L	*No Limit*	0.7	<0.5	<0.5	<0.5	NA	<0.5	<0.5	<0.5	<0.5	0.9	ND	<0.5
BOD_5	mg/L	*No Limit*	3	<2	<2	<2	<2	<2	<2	<2	<2	2	ND	<2

Notes:

* Analyzed Annually.

** 106 °F during Heat Treatment; except during adjustment of the recirculating gate during Heat Treatment (110 °F).

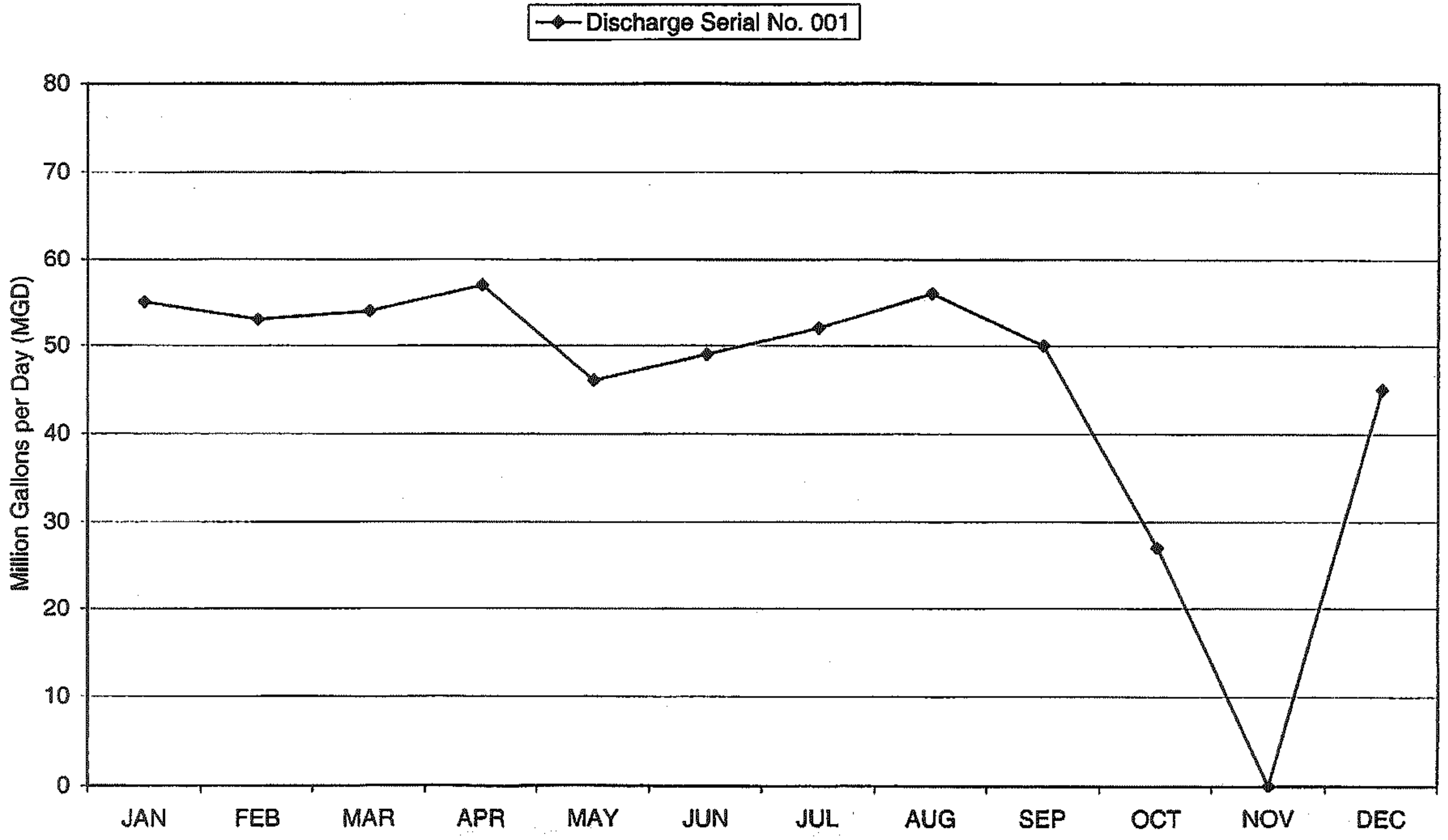
§ The most sensitive species used for chronic toxicity testing is the Giantb Kelp (Macrocystis pyrifera).
Two criteria are used in defining toxicity; Kelp Germination (the first number) and Kelp Tube Growth (the second).

Department of Water and Power

HARBOR GENERATING STATION

2010 Annual Summary of Monthly Discharge Monitoring Reports
NPDES Permit No. CA0000361 Compliance File No. 2020

Average Daily Flow



Department of Water and Power

HARBOR GENERATING STATION

2010 Annual Summary of Monthly Discharge Monitoring Reports
NPDES Permit No. CA0000361 Compliance File No. 2020

IN-PLANT WASTESTREAM

Chemical and Physical Constituents	Units	Limits* (TDA/Daily Max.)	Monthly Summaries for 2010											
			First Quarter			Second Quarter			Third Quarter			Fourth Quarter		
			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Demineralizer (Sump A)														
Suspended Solids	mg/L	*30 / 100*	No Discharge	1.0 / 1.1	NS	1.8 / 2.6	No Discharge	2.8 / 4	1.9	1.5 / 2.1	3	No Discharge	No Discharge	NS
Oil & Grease	mg/L	*15 / 20*		0.6 / 0.8	NS	0.6 / 0.8		<0.5	<0.5	<0.5 / 0.5	0.5			NS
BOD_5	mg/L	*No Limits (avg/max)*		2.5 / 4	NS	2 / 3		<2	<2	<2	3			NS
pH	-	*No Limits (range)*		2.0 - 2.1	NS	2 - 2.9		3.3 - 3.6	3.6	2.1 - 2.6	2.5			NS
Average Waste Flow**	gal/day	-		10,100	23,600	23,650		5,725	10,200	17,143	10,700			12,700
Days Discharged	day(s)	-		2	1	4		4	1	7	1			1

Notes:

* TDA = 30-day Average

** Average Waste Flow is based on the number of days discharged since this is a batch, not continuous, discharge.

NS = Not Sampled

Department of Water & Power
HARBOR GENERATING STATION
2010 ANNUAL SUMMARY NPDES ANNUAL MONITORING REPORT
NPDES PERMIT NO. CA0000361
COMPLIANCE FILE NO. 2020

Chemical Use Summary

Circulating Water Chemicals	Amount
Sodium hypochlorite	3,274 gallons

Demineralizer/RO Chemicals	Amount
Caustic Soda (Sodium hydroxide)	360 gallons
Sulfuric Acid	360 gallons

Los Angeles Department of Water and Power

Harbor Generating Station

2010 Annual Summary of Noncompliance

NPDES Permit No. CA0000361

Compliance File No. 2020

First Quarter

Quarterly Storm Water Monitoring

BOD analyses were not performed on the storm water samples collected January 13th and 26th. This oversight was the result of mislabeling of the sample bottles. During this time, the LADWP Environmental Laboratory (ELab) experienced a temporary shortage of personnel and had to rotate other chemists into sample management duties. This was an isolated incident. Staffing levels have returned to normal, and a sample handling program was developed and implemented.

BOD was not analyzed for the storm water sample collected February 27th due to exceedance of the holding time (48 hrs.) upon receipt by the ELab. Harbor Generating Station staff collected the sample at 4:45 a.m. on 2/27, which was a Saturday. The sample was not delivered to the ELab until 11:15 a.m. the following Monday, 3/1. In this case, there was no way of delivering this sample to the ELab within 48 hours, because: 1) the Elab is not open for business on the weekend, and 2) the ELab does not open on Monday until 7:00 a.m.

Weekly Low Volume Waste

Harbor Generating Station (HGS) staff failed to collect a low volume demineralizer regeneration waste sample from the discharge that occurred on March 1st. Normally, this waste stream is sampled weekly, as required per the Permit. A sample was collected on February 26th. As a result of staff retirement, a new chemist was assigned to HGS and misinterpreted the sampling protocol. A sampling procedure is in place and Environmental Compliance staff reviewed this protocol with the new employee so that this error does not recur.

Second Quarter

Monthly Monitoring of Discharge Serial No. 001

The Oil & Grease sample from outfall 001 collected on May 12, 2010 was improperly logged in at the Environmental Laboratory and therefore was not analyzed. This sample was reported as "NA" on the May self-monitoring report.

Weekly Low Volume Waste – Demineralizer Regeneration

The BOD_5 sample from the demineralizer regeneration waste collected on June 16, 2010 was improperly logged in at the Environmental Laboratory and therefore was not analyzed. This sample was reported as "NA" on the June self-monitoring report.

The Wastewater Quality and Compliance Group and the Environmental Laboratory (ELab) have developed a new Standard Operating procedure for the management of samples to be delivered, logged, and analyzed by the ELab. In order for these situations not to recur in the future, monthly training sessions were implemented so that any new employee will be knowledgeable on the handling and analysis of samples delivered to the Elab.

Fourth Quarter

Weekly Low Volume Waste

Harbor Generating Station (HGS) staff failed to collect a low volume demineralizer regeneration waste sample from the discharge that occurred on December 28th. Normally, this waste stream is sampled weekly, as required per the Permit. A sample was collected on January 5th; all constituents were in compliance. As a result of staff reassignment, a new chemist was assigned to HGS and was in training when the discharge occurred. A sampling procedure is in place, the chemist reviewed the procedure, and has completed training so this oversight will not recur.

Department of Water and Power
Harbor Generating Station
2010 NPDES Annual Monitoring Report
NPDES Permit No. CA0000361
Compliance File No. 2020

Declaration Statement

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

This report is required by and prepared specifically for the California Regional Water Quality Control Board – Los Angeles (Board). It presents truly, accurately, and completely the observed results of measurements and analyses required by the Board to be performed and submitted, but only such observed results. It is not intended as an assertion of the accuracy of any instrument, reading or analytical result, nor is it an endorsement of the suitability of any analytical or measurement procedure.

The concentrations of specific pollutants were obtained by employing methods of analysis listed in 40 C.F.R. Part 136 or otherwise specified in the permit. Toxicity tests were conducted in accordance with methods specified in the permit. These analytical tests are subject to the accuracy limitations associated with those methods in the subject sample matrices at the concentrations shown. Results lying between the appropriate detection level and the appropriate quantitation level are reported along with the appropriate numeric value of the detection level (e.g., <3). All values reported below the detection level, by definition, do not provide adequate confidence as to whether the constituent being measured is present. All values above the detection level but below the quantitation level, by definition, do not provide adequate confidence as to the actual concentration of the constituent being measured.

Executed on the 18 day of February, 2011, in Los Angeles, California.

Signature ____________________
Michael Wenzinger for Brad Chow
Electrical Service Manager

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER

ELAP Certification & Quality Assurance Manual

for

HARBOR GENERATING STATION

NPDES Permit No. CA0000361
Compliance File No. 2020

2010

CALIFORNIA STATE

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM BRANCH

CERTIFICATE OF ENVIRONMENTAL ACCREDITATION

Is hereby granted to

CITY OF LOS ANGELES DEPT OF WATER & POWER

WATER QUALITY & OPERATIONS

1630 NORTH MAIN STREET, BUILDING 7
LOS ANGELES, CA 90012

Scope of the certificate is limited to the
"Fields of Testing"
which accompany this Certificate.

Continued accredited status depends on successful completion of on-site, proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **1207**
Expiration Date: **06/30/2012**
Effective Date: **07/01/2010**

Richmond, California
subject to forfeiture or revocation

George C. Kulasingam, Ph.D., Chief
Environmental Laboratory Accreditation Program Branch

CITY OF LOS ANGELES DEPARTMENT OF WATER & POWER
INTERGRATED SUPPORT SERVICES

ENVIRONMENTAL LABORATORY
CERTIFICATE NO. 1207

1630 North Main Street, Building No.7
Telephone: (213)367-7270
Fax: (213)367-7285

QUALITY ASSURANCE MANUAL

Revision 21
Effective Date: February 2011

Reviewed By: ______________________ **Date:** 2/28/11
Larry N. Kerrigan, QA/QC Supervisor

Approved By: ______________________ **Date:** 2/28/11
Stanley M. Kung, Lab Manager

Annual review has been performed; there were no changes made to the current revision.

Reviewed By/Date: **Reviewed By/Date:**

______________________ ______________________

______________________ ______________________

______________________ ______________________

TABLE OF CONTENTS

Section **Page No.**

TABLE OF CONTENTS (cont.)

TABLE OF CONTENTS (cont.)

1 INTRODUCTION

1.1 Quality System and Objectives

The goal of this Quality Assurance Program is to establish a standard for quality laboratory analyses that is in accordance with state and federal regulations and to meet the safety, moral and legal requirements of the Department of Water and Power, its employees, and the public it serves. The following are the objectives for quality.

1.1.1 Maintain a formal quality system in accordance with all standards developed by the state and/or Environmental Protection Agency (EPA) regulations or requirements.

1.1.2 Communicate all laboratory quality policies and objectives to laboratory personnel. All laboratory personnel are to be responsible and accountable for the quality of their work. Personnel are to familiarize and to implement quality policies and procedures.

1.1.3 Provide education and training to all employees in order to achieve quality laboratory ethics, health, and safety.

1.1.4 Emphaisis on data collection and processing that is accurate and precisely performed in order to ensure scientifically valid and legally defensible results. Standardized procedures are documented for consistency of data generation.

1.1.5 Create statistical procedures to evaluate and control the accuracy of results from analytical measurements. Verify that all measurements are within acceptable control limits.

1.1.6 Identify early stages of possible problems that may affect data quality and determine the corrective action when necessary.

1.1.7 Laboratroy management is commited to compliance with International Standard ISO/IEC 17025, "General requirements for the competence of testing and calibration laboratories".

1.2 Laboratory Guidelines

1.2.1 This manual presents a detailed description of the Los Angeles Department of Water and Power (LADWP) Environmental Laboratory Quality Assurance Program. This program is written in accordance with the Environmental Protection Agency (EPA) and the California Department of Public Health (DPH) quality assurance guidelines, as outlined in SW 846 under RCRA, 40 CFR Part 136 under CWA, and other related documents. The Environmental Laboratory operates on a quality system that meets the requirements of the Environmental Lab Accreditation Program. (ELAP). The procedures described herein are mandatory for all authorized DWP Environmental Laboratory personnel. Incidents of noncompliance with these procedures constitute insubordination and shall be subjected for disciplinary action up to and including dismissal.

1.2.2 No undue influence shall be allowed either to pressure an analyst to work beyond his/her capacity nor to change a result from an analyst's best judgment. Any such attempts shall be immediately reported to the Environmental Laboratory Manager.

1.2.3 Quality activities shall emphasize the prevention of quality problems rather than detection and correction of problems after they occur.

1.2.4 Laboratory QA objectives will be accomplished by applying EPA method acceptance criteria and laboratory internal controls for QC parameters including preparation blanks, surrogates, spikes, duplicates, and laboratory control samples.

1.2.5 Participation in various audit studies, internal and external will be used to verify the adequacy of the quality objectives.

1.3 Terminology

Laboratory data quality will be quantitatively assessed through accuracy, precision, and respective method limitations. Qualitative assessment will be conducted through comparability, representativeness, and completeness. These quality assurance parameters are used as quantitative goals for the quality of data generated in the analytical measurement process.

1.3.1 Accuracy – defined as the degree to which the analytical measurement reflects the true value present. Surrogate, initial calibration verification, continuing calibration verification, laboratory control sample, and matrix spike recoveries will be used to measure accuracy.

1.3.2 Precision – defined as the measure of mutual agreement among individual measurements of the same pollutant in a sample analyzed under the same analytical protocols. It is expressed as relative percent difference (RPD).

1.3.3 Representativeness – Dependent upon the sampling plan.Assessment of site and collection representativeness is done by subcontracted or laboratory field service personnel. Procedures to ensure representativeness will be determined prior to the start of individual projects.

1.3.3 Comparability – defined as the extent to which samples can be verified or duplicated by another independent laboratory or compared against results previously found. Comparability will be assessed through internal and external audit results.

1.3.4 Completeness – defined as the percentage of valid data obtained compared to the amount of data collected. QC parameters that shall be assessed for quantitative determinations of completeness shall include initial calibrations; continuing calibrations, surrogate percent recovery, RPD's of duplicates, percent recovery and RPD for matrix spike recoveries, percent recovery for laboratory control samples, and holding times. The requirement for the quantitative assessment of completeness is 90%.

1.3.5 Sensitivity – established practical quantitation limits (PQL = 5 x mdl) and method detection limits based on procedures outlined in Appendix B of 40 CFR Part 136, have been documented for analytes of interest. Method detection limit (MDL) studies must be performed annually for each matrix type – water and soil. Minimum levels (MLs) are defined as the lowest standard concentration in the calibration curve, established for each analyte of interest.

1.4 Maintenance and Update Procedures

The Quality Assurance Manual is updated annually and whenever changes in the laboratory management's quality system are implemented. Such implementations would include changes in the laboratory's policies, systems, programmes, procedures, and/or instructions to further assure the quality of testing in the laboratory.

2 PROGRAM ORGANIZATION AND RESPONSIBILITY

Refer to the Environmental Laboratory Organizational Chart Appendix A.

2.1 Management / Supervisor Personnel

2.1.1 Environmental Laboratory Manager: Stanley M. Kung

2.1.1.1 Planning, budgeting, personnel.
2.1.1.2 Technical manager of laboratory.
2.1.1.3 Final report approval
2.1.1.4 Implement training programs for laboratory personnel.
2.1.1.5 Ensure compliance of QA program
2.1.1.6 Review new technologies which may improve laboratory efficiency and quality.
2.1.1.7 Maintain a work environment which emphasizes the importance of safety, data quality, teamwork, and client satisfaction.

2.1.1.8 Emergency Response Coordinator.
2.1.1.9 Familiarizes with laboratory quality documentation and implements the policies and procedures stated.
2.1.1.10 Ensures lab is in compliance with ISO/IEC 17025 requirements.

2.1.2 Assistant Environmental Laboratory Manager; operations, LIMS, NPDES, Mobile Laboratory: Kevin Han

2.1.2.1 Assist in technical management of laboratory.
2.1.2.2 Assist in planning, budgeting, personnel.
2.1.2.3 Assign and prioritize work projects.
2.1.2.4 Conduct training to laboratory personnel.
2.1.2.5 Monitor laboratory job charges, turnaround/holding time of samples received.
2,1.2.6 Responsible for NPDES regulatory activities and reporting.
2.1.2.7 Responsible for mobile laboratory operations and maintenance.
2.1.2.8 Instrument/supply procurement.
2.1.2.9 Development of sampling program plans.
2.1.2.10 Responsible for NPDES subcontract samples
2.1.2.11 Supervises field sampling operations of monitoring wells, site assessment, and PCB spills.
2.1.2.12 Supervises sample receiving and data control.
2.1.2.13 LIMS development and maintenance.
2.1.2.14 Archives and secures electronic data.
2.1.2.15 Provides support to laboratory personnel regarding LIMS data entry and processing of final reports.
2.1.2.16 Emergency Response Coordinator
2.1.2.17 Familiarizes with laboratory quality documentation and implements the policies and procedures stated.
2.1.2.18 Ensures lab is in compliance with ISO/IEC 17025 requirements.

2.1.3 Senior Chemist in charge of Organic and Safety/Wastes: Rose Gentallan

2.1.3.1 Supervises the laboratory's interlaboratory proficiency testing program.
2.1.3.2 Assign and prioritize work projects.
2.1.3.3 Conduct training to laboratory personnel.
2.1.3.4 Instrument/supply procurement.
2.1.3.5 Responsible for organic chemical analyses and instrumentation.
2.1.3.6 Ovesees laboratory safety and waste program.

2.1.3.7 Emergency Response Coordinator.
2.1.3.8 Familiarizes with laboratory quality documentation and implements the policies and procedures stated.
2.1.3.9 Ensures lab is in compliance with ISO/IEC 17025 requirements.

2.1.4 Senior Chemist in charge of Inorganic, Industrial, and Quality Control: Larry Kerrigan

2.1.4.1 Responsible for the conduct of the Laboratory Quality Control Program and for taking measures to ensure fulfillment of the quality objectives and the continuing accuracy and precision of data produced.
2.1.4.2 Assists management in the installation and supervision of quality control program.
2.1.4.3 Monitors quality control activities of the laboratory to determine conformance with established policies, regulatory or accreditation requirements and makes recommendations for appropriate corrective action and follow-up.
2.1.4.4 Reports the status of in-house QA/QC to the Environmental Laboratory Manager.
2.1.4.5 SOP maintenance.
2.1.4.6 Coordinate data review process.
2.1.4.7 Review and initial all reports.
2.1.4.8 Review and execute QA Program.
2.1.4.9 Instrument/supply procurement.
2.1.4.10 Responsible in all inorganic and industrial chemical analyses.
2.1.4.11 Emergency Response Coordinator.
2.1.4.12 Familiarizes with laboratory quality documentation and implements the policies and procedures stated.
2.1.4.13 Ensures lab is in compliance with ISO/IEC 17025 requirements.

2.2 Laboratory Personnel

2.2.1 Chemists (14)

2.2.1.1 Instrumental and wet chemistry sample analyses in accordance with prescribed method protocols.
2.2.1.2 Data entry into LIMS system.
2.2.1.3 LIMS report generation.
2.2.1.4 Management of sample preparation, digestion, and extraction.
2.2.1.5 Analysis and instrument documentation.

2.2.1.5.1 Instrument maintenance.
2.2.1.5.2 Ordering instrument supplies.
2.2.1.5.3 Analysis records (Run/Analysis Log, Maintenace Log, Standards and Reagents Log, Extraction Log)

2.2.1.6 Data processing and storage.
2.2.1.7 Method development
2.2.1.8 SOP development
2.2.1.9 Field services.
2.2.1.10 Supervise sample log-in.
2.2.1.11 Prepare sample and paperwork to contract laboratory.
2.2.1.12 Participate in Emergency Response operations.
2.2.1.13 Management of sample tracking and final disposal.
2.2.1.14 Maintain centralized preparation and analysis logbooks.
2.2.1.15 Familiarizes with laboratory quality documentation and implements the policies and procedures stated.
2.2.1.16 Ensures lab is in compliance with ISO/IEC 17025 requirements.

2.2.2 Laboratory Technician (1)

2.2.2.1 Receive samples, sign and review COC in accordance to Sample Acceptance Criteria.
2.2.2.2 Entering sample information into LIMS system, including location and storage.
2.2.2.3 Assist chemists in sample tracking of holding time and disposal.
2.2.2.4 Monitor and maintain refrigerator temperature logbook.
2.2.2.5 Sample preparation, digestion, and extraction in accordance to QC protocols.
2.2.2.6 Prepare requisition for laboratory supplies, services and equipment.
2.2.2.7 Wet chemistry testing.
2.2.2.8 Field service duties.
2.2.2.9 Filing COCs, subcontract COCs, and final reports in appropriate binders/drawers.
2.2.2.10 Participate in Emergency Response.
2.2.2.11 Familiarizes with laboratory quality documentation and implements the policies and procedures stated.
2.2.2.12 Ensures lab is in compliance with ISO/IEC 17025 requirements.

2.3 Personnel Qualifications

2.3.1 Chemist

2.3.1.1 A minimum requirement for the Chemist position for the City of Los Angeles involves graduating from a recognized four-year college or university with a major in Chemistry or Chemical Engineering and coursework involving at least two forms of instrumentation. Additional personnel qualifications for the Chemist position for the City of Los Angeles are also available on the web at http://www.lacity.org/per/perspecs/7833.pdf.

2.3.2 Laboratory Technician

2.3.2.1 A minimum requirement for the Laboratory Technician position for the City of Los Angeles involves completion of two general chemistry courses plus a course in analytical or quantitative chemistry that is required for a science major at a recognized college or university. Additional personnel qualifications for the Laboratory Technician for the City of Los Angeles are also available on the web at http://www.lacity.org/per/perspecs/7854.pdf.

2.4 Employee Training

The training program is designed to ensure that all personnel are qualified and properly trained to perform all required tasks. It provides periodic evaluation of each analyst's skills by performance evaluation samples. Supplemental training includes development of SOPs, understanding of meeting QA/QC criteria to generate quality data, and the importance of proper documentation. Learning instrumentation can also be obtained from external training by agencies and manufacturers.

The goal of the environmental laboratory is to ensure a suitable and effective quality system and when necessary introduce changes and improvements which would benefit the laboratory.

Laboratory personnel shall comply with the qualifications set by the Human Resources of the City of Los Angeles which includes knowledge of laboratory background, instrumentation, and safety.

Employees shall comply with the policies stated in the "Department's

Administrative Manual" disciplinary action, which may include termination, will be taken for offenses such as: falsifying data and/or laboratory records, violation of safety rules, commitment of financial resources without authorization of the Water System Manager or the General Manager.

2.4.1 Training is provided so that the analysts can have more experience with the laboratory's instrumentation or other general functions, such as sample management and field work.

2.4.2 Instrument training is needed whenever there are a shorthanded number of analysts for a particular analysis, or for the analyst to gain more experience for a particular instrumental analysis.

2.4.3 The analyst is assigned a mentor by laboratory management according to the mentor's expertise and experience with the instrument. The mentor must be able to train the analyst to perform and demonstrate proficiency (by completing the "Accuracy and Precision" data and performance evaluation (PE) samples).

2.4.4 Training usually is performed for about a month, or until the new analyst completes all the required QA/QC criteria and demonstrates proficiency.

2.4.5 The following parameters are taught by the experienced mentor to the trainee during instrumental training:

2.4.5.1 Standard Operating Procedures (SOP)
2.4.5.2 Calibration
2.4.5.3 Method Detection Limit and Minimum level
2.4.5.4 Reporting Limit/Practical Quantitation Limit
2.4.5.5 Instrument Chemicals and Supplies
2.4.5.6 Instrumentation Principles
2.4.5.7 Instrument Parameters, Maintenance
2.4.5.8 Digestion/Extraction Procedures
2.4.5.9 Quality Assurance/Quality Control
2.4.5.10 Data Reduction and Record Keeping
2.4.5.11 Safety and Health Practices
2.4.5.12 Waste Management
2.4.5.13 Standards
2.4.5.14 Systems Performance Check
2.4.5.15 Documentation and Record Keeping

2.4.6 At the end of training, the Demonstration of Capability (Training) Checklist is completed with the new analyst's name, the analyst's mentor (trainer), duration of training, instrument trained in, and date of authorization to start running the instrument independently. All training records are documented and kept with laboratory personnel records.

2.4.7 Safety training and tailgate meetings are held every third Tuesday of each month by laboratory personnel. Additional details are stated in the Laboratory's Safety Manual.

2.4.8 Miscellaneous training (example: first aid, hazardous substance, computer skills, and employee relations) are available in-house by LADWP's Human Resources Department.

2.5 Impartiality and Operational Integrity

Employees must provide a high quality of service to the public and must consistently perform their dutied effectively and efficiently.

2.5.1 "Persons in the public service shall not only be ever conscious that the public service is a public trust but also shall be impartial and devoted to the best interests of the City, and shall so act and conduct themselves, both inside and outside the City's service, as not to give occasion for distrust of their impartiality or of their devotion to the City's best interest." (Department of Water and Power Administrative Manual, 1988)

3 PROCUREMENT

3.1 Chemical and supply procurement is handled from initial receipt to ultimate disposal. Procurement can be done one of two ways: 1) direct orders to vendors using credit cards and 2) preparing Requisition for Material Services (RMS) to be approved by the laboratory manager and sent to the Purchasing Division.

3.2 For more information on Chemical Procurement, please refer to the Chemical Hygiene Plan (effective May 21, 2008) under "V. Chemical Procurement".

4 CLIENT SERVICES

4.1 Client Communications

Clients requesting laboratory services are contacted via telephone call, fax, or e-mail. The client is reached whenever there is insufficient sample, concerns regarding actual analysis, when additional information is needed, or to report a rush result. A contact log is utilized to monitor and track when clients have been communicated with, either concerning their sample or by reporting a result.

4.2 Complaints

It is the goal of the laboratory to minimize complaints and to prevent them from recurring. Complaints may occur when nonconforming work from the policies and procedures in the quality or technical systems have been identified. Complaints received from clients and other parties are investigated and reviewed by authorized laboratory personnel to achieve resolution. Customer complaints are dated and recorded in the customer complaint logbook that describes the situation and by whom the complaint was made by. Corrective action procedures are initiated and documented for the complaint. (Please refer to QA Manual, "15 Corrective Action".)

4.3 Abnormalities

Whenever there are abnormalities or departures from normal or specified conditions that would affect the quality of testing of the laboratory, the requestor of the project is notified for further instruction.

Notification is made by telephone call, fax, and/or e-mail. Notification of the client and information as to how the sample or analysis should be treated is dated and documented in the laboratory's contact log. The same information can also be recorded on the sample's chain-of custody, and/or under "Analysis Comments" for that particular sample in the LIMS system.

Such abnormalities and departures from normal or specified conditions can be of the following:

4.3.1 Laboratory Samples

4.3.1.1 Insufficient amount of sample for the analysis requested.
4.3.1.2 Sample submitted passed sample holding time for that particular analysis.
4.3.1.3 Sample matrix will interfere with instrumental analysis.
4.3.1.4 Any other interference that would affect the ability of the analyst to report an acceptable result.

4.3.2 Laboratory Analysis

4.3.2.1 The instrument is non-operational and maintenance would have to be performed therefore delaying the results of the sample.
4.3.2.2 Any other interferences that would affect the ability of the analyst to report an acceptable result.

4.4 Customer Confidentiality and Proprietary Rights

Employees must perform their duties in a manner which earns and maintains the trust and respect of their supervisors, other employees, and the public.

4.4.1 "Persons in the public service shall not disclose confidential information acquired by or availablr to theim in the course of their employment with the City, or use such information for speculation or personal gain." (Department of Water and Power Administrative Manual, 1988.)

5 SAMPLING PROCEDURES

Assuring the quality of environmental data begins in the field at the time of sample collection. The LADWP's Water Quality and Operations Business Unit provides personnel who are well-trained and knowledgeable in sample collection, using the appropriate equipment and approved methods for obtaining samples, sample preservation, handling, storage, and transport, to insure the integrity of each sample.

Field tests and other pertinent information on the samples collected must be properly entered and completed in the field log books and Chain of Custody forms.

The selection of containers and application of appropriate preservatives are in accordance with the EPA guidelines published in the Federal Register, 40CFR Part 136.3 (Table 2). Special containers, including vials for volatile organics are purchased from suppliers who provide certificates of compliance with EPA regulations.

Containers, preservatives and holding times (See Table I)

Table I CONTAINERS, PRESERVATIVES AND HOLDING TIMES

Analysis	Container	Preservative	Holding Times	Customary Amount
Temperature	p/g	none	immediate	20 ml
pH	p/g	none	immediate	100 ml
Alkalinity	p/g	cool, 4°C	14 d	100 ml
Conductivity	p/g	cool, 4°C	28 d	200 ml
Total diss. solids	p/g	cool, 4°C	7 d	250 ml
Total hardness	p/g	$pH<2$ HNO_3/H_2SO_4.	6 mo	250 ml
Chlorides	p/g	none	48 hrs	250 ml
Sulfate	p/g	cool, 4°C	48 hrs	120 ml
Nitrate	p/g	cool, 4°C	48 hrs	100 ml
Nitrite	p/g	cool, 4°C	48 hrs	100 ml
Nitrate & Nitrite	p/g	cool, 4°C	48 hrs	100 ml
TOC	p/g	cool, 4°C($pH<2$ H_2SO_4/HNO_3)	28 d	5x40-ml vials
Bromide	p/g	none	28 d	100 ml
VOC	g	$pH<2$, cool, 4°C	14 d	5x40-ml vials
TCE, PCE, THM	g	cool, 4°C	14 d	5x40-ml vials
DBCP, EDB	g	cool, 4°C	14 d	5x40-ml vials

TSS	p/g	cool, 4°C	7 d	250 ml
Turbidity	p/g	cool, 4°C	48 hrs	200 ml
BOD5-20°C	p/g	cool, 4°C	48 HRS	1 L
Oil & grease	g	cool, 4°C (pH<2 H_2SO_4)	28 d	1 L
Settleable solids	p/g	cool, 4°C	48 hrs	1 L
Sulfide	p/g	ZnAc+NaOH to pH>9	7 d	500 ml
PCB	g, teflon-lined caps	cool, 4°C	7 d, until extraction 7 d, 40 days after extraction	2-1 L
Phenols	g, teflon-lined caps	cool, 4°C, 0.008% $Na_2S_2O_3$	7 d until extraction. 40 d after extraction	2-1 L
Acidity	p/g	cool; 4°C	14 d	100 ml
Boron	p	none	6 mo	100 ml
Bromide	p/g/	none	28 d	100 ml
COD	p/g	cool, 4°C, pH<2,H_2SO_4	28d	100 ml
Chlorine Residual	p/g	none	Analyze immediately (on-site)	500 ml
Cyanide	p/g	cool, 4°C, pH>12, NaOH	14 d	1 L
Fluoride	p	none	28 d	300 ml
Nitrogen-Ammonia	p/g	cool, 4°C, pH<2,H_2SO_4	28 d	500 ml
Total Kjeldahl Nitrogen	p/g	cool, 4°C, pH<2,H_2SO_4	28 d	1 L
TRPH	g	cool, 4°C, pH<2,H_2SO_4	28 d	2 L
Total Phosphate	p/g	cool, 4°C, pH<2,H_2SO_4	28 d	100 ml
Surfactants/MBAS	p/g	cool, 4°C	48 hrs	1 L
Metals (except Hg & Cr+6)	p/g/	pH<2,HNO_3	6 mo	200 ml
Mercury	p/g	pH<2,HNO_3	28 d	500 ml
Hexavalent Chromium	p/g	pH >9, Cr6 Buffer, cool	28 d	100 ml
EPA8260	g	cool, 4°C pH<2	**	4, 40 ml vials

EPA8270	g (amber)	cool, 4°C	**	2-1 L
EPA8015B	g	cool, 4°C pH<2	14 d	4, 40 ml vials
EPA8015M	g	cool, 4°C	14 d	2-1 L
EPA8021B	g	cool, 4°C pH<2	14 d	4, 40 ml vials
DGA (xfmr/cable oil)	syringe	none	none	syringe - full
Dissolved gases	syringe	none	none	syringe - full
Moisture	Syringe or vial	none	none	
Wastewater Profile	p/g	cool, 4°C	Immediate	8 oz
pH	p/g		Immediate	
Ammonia	p/g	cool, 4°C		
Conductivity	p/g			
Oil & Grease	g	cool, 4°C pH<2	28 d	4-1 L
Chlorine by X-ray	p/g			
PCB (water)	g (amber)	cool, 4°C	28 d	4-1 L
Asbestos in:				
Bulk	*plastic bag	none	none	small but representative
Air	*cassette	none	none	1 cassette >400 L
Water	g		1 d	1 L
RAF oils:	p/g	none	none	16 oz
As, Cd, Co, Pb				
Flash Point				
Chlorine by X-ray				
PCB				
CBM (Lube Oils):	p/g	none	none	16 oz
Appearance				
Color, ASTM				
Viscosity, cST/40°C				
Total Acid No.				
Water by KF				
Metals				
Particle count				
Stator Oil Test:				
Moisture	p/g	none	none	20 ml
Dielectric Constant	p/g	none	none	1 L

Environmental Pb:				
Pb in Soil	p/g	none	6 months	8 oz
Pb in Wipe	ASTM. E1792 wipes	none	none	Wipes placed in ICP Digestion Tubes
Pb in Paint Chips	p/g	none	6 months	8oz

* Should be airtight, double-bagged
** 7 days (aqueous) to extraction
g = glass
p = polyethylene
d = days
mo = month

5.1 Sampling Plans

5.1.1 Prepare Data Quality Objectives (DQO)
5.1.2 Arrange site sampling schedule
5.1.3 Available sampling equipment
5.1.4 Personnel experienced in the type of sampling
5.1.5 List of analytes

  5.1.5.1 Specify Level of Detection (LOD)
  5.1.5.2 Specify analytical method for each analyte
  5.1.5.3 Sample size needed based on method and LOD.

5.1.6 List of QA/QC protocols
5.1.7 Type of sampling
5.1.8 Number of samples needed
5.1.9 Number of sample sites
5.1.10 Number of test samples needed for each method
5.1.11 Number of QC samples needed (including field, trip, and equipment blanks)

5.2 Sampling Protocols

5.2.1 Record of observations at sampling site.
5.2.2 List of sampling equipment/devices.
5.2.3 List of sampling containers and preservatives.
5.2.4 List of supplies for equipment cleaning.
5.2.5 Necessary labels, tags, pens, and packaging materials.
5.2.6 Chain of Custody forms and sample seals
5.2.7 List of protective clothing and other safety equipment.
5.2.8 Instructions for equipment decontamination.
5.2.9 Instructions for sample collection

- 5.2.9.1 Number of samples and sample sizes.
- 5.2.9.2 Record of sampling times and conditions.
- 5.2.9.3 Instructions for field preparations or measurements.

5.2.10 Instructions for packaging, transport, and storage.
5.2.11 Instructions for Chain of Custody procedures.

5.3 Field Safety

5.3.1 Safety policies, regulations, and requirements

- 5.3.1.1 Department and Federal policies
- 5.3.1.2 Job hazard analysis
- 5.3.1.3 Personal protective equipment
- 5.3.1.4 Safety training

5.3.2 Emergency contacts
5.3.3 Environmental conditions

- 5.3.3.1 Humidity and sun exposure
- 5.3.3.2 Bad weather
- 5.3.3.3 Flood
- 5.3.3.4 Earthquake
- 5.3.3.5 Fire

5.3.4 Chemicals

- 5.3.4.1 Use and handling
- 5.3.4.2 Transport
- 5.3.4.3 Storage and disposal

5.3.5 Transportation
5.3.6 Animals and plants

5.4 Field QC

5.4.1 Blank samples are defined as matrices that have negligible or immeasurable amounts of the substance of interest.

- 5.4.1.1 Field blank
- 5.4.1.2 Trip blank
- 5.4.1.3 Equipment blank
- 5.4.1.4 Field spike

5.5 Field Records

5.5.1 Records of field activities to provide evidence and support for the analytical data.

5.5.2 Records should consist of bound logbook/notebook and must be legible and protected against damage and loss.

5.5.3 Records shall include at the minimum.:

- 5.5.3.1 Sampling location
- 5.5.3.2 Sampling equipment/devices
- 5.5.3.3 Containers; types, sizes, numbers
- 5.5.3.4 Labels
- 5.5.3.5 Field logs
- 5.5.3.6 Number of samples, blanks and spikes
- 5.5.3.7 Preservatives needed
- 5.5.3.8 Chain of Custody procedures
- 5.5.3.9 Field measurements
- 5.5.3.10 Environmental conditions

5.6 Specific sampling procedures are included with the individual Standard Operating Procedures for the following:

- 5.6 .1 Asbestos sampling
- 5.6 .2 Soil sampling
- 5.6 .3 Water sampling
- 5.6 .4 Hazardous waste sampling
- 5.6 .5 Waste Drum sampling
- 5.6 .6 Working environment air sampling (Airborne Asbestos)
- 5.6 .7 Carbon Bed Air Sampling
- 5.6 .8 Emergency Response

5.7 Site Assessment

5.7.1 Assess soil and/or groundwater contamination from leaking underground storage tanks, superfund sites, and illegal dumping of hazardous wastes near or at the Department's real estate property.

- 5.7.1.1 Site investigation for potential environmental concerns within the context of state and federal regulations.
- 5.7.1.2 Historical evaluation of the property.
- 5.7.1.3 Review regulatory agency records
- 5.7.1.4 Sampling of soil, groundwater, waste materials on site.
- 5.7.1.5 Data analysis and reporting.

5.8 Field Sampling Equipment

5.8.1 Hand-held sampler

5.8.2 Cable and reel sampler
5.8.3 Open-mouth sampler
5.8.4 Thief sampler
5.8.5 Automatic sampler and pump
5.8.6 Bailer
5.8.7 Core sampler
5.8.8 Scoop/Shovel
5.8.9 Trowel
5.8.10 Auger
5.8.11 Soil probe
5.8.12 Tedlar bag

5.9 Field Measurements

5.9.1 Temperature
5.9.3 Dissolved oxygen
5.9.4 Specific electrical conductance
5.9.5 pH
5.9.6 Reduction-oxidation potential
5.9.7 Turbidity

6 MOBILE LABORATORY OPERATIONS

6.1 Generator Startup

6.1.1 Open the main circuit.
6.1.2 Do not crank engine continuously for more than 10 seconds.
6.1.3 Allow 60 seconds cool down period between cranking.
6.1.4 Crank only three times to prevent motor burnout.
6.1.5 If engine starts and then stops, allow the engine to come to complete stop before attempting to restart.

6.2 Stopping the Generator

6.2.1 Run generator set at no-load for five minutes to ensure adequate engine cool down.
6.2.2 Start/stop switch must be in the stop position until generator comes to a complete stop.

6.3 Generator Maintenance

6.3.1 Engine automatically shuts down 10 – 20 seconds after it reached 218°F (103°C).
6.3.2 Cool the generator before restarting.
6.3.3 Disconnect the battery negative lead first before servicing the generator.

6.3.4 Turn the generator set master switch to off position.
6.3.5 Disconnect power to battery charger.
6.3.6 Remove battery cable (remove negative lead first).
4.3.7 Reconnect negative lead last when reconnecting battery.

6.4 Mobile Lab Check List

6.4.1 Vehicle

6.4.1.1 Hour meter
6.4.1.2 Fault light
6.4.1.3 Input fuse (10 amp)
6.4.1.4 Engine oil level
6.4.1.5 Engine coolant level
6.4.1.6 Battery fluid level (lead-acid battery)
6.4.1.7 Air filter
6.4.1.8 Cooling system thermostat
6.4.1.9 Fuel filter
6.4.1.10 V belt

6.4.2 Analytical Instruments/Equipment/Accessories

6.4.2.1 Hewlett-Packard Gas Chromatograph Model 5890

6.4.2.1.1 Electron Capture Detector (ECD) – for PCB analysis
6.4.2.1.2 Flame Ionization Detector (FID) – for Gasoline (GRO) analysis
6.4.2.1.3 Photo Ionization Detector (PID) – for BTEX, MTBE analysis
6.4.2.1.4 HP GC autosampler
6.4.2.1.5 O.I Purge and Trap Concentrator Model 4560

6.4.2.2 HACH DR 4000 Spectrophotometer

6.4.2.2.1 Dissolved Oxygen
6.4.2.2.2 Residual Chlorine

6.4.2.3 Air generator
6.4.2.4 Analytical balance
6.4.2.5 Argon-methane gas cylinder
6.4.2.6 Computer, printer
6.4.2.7 Fire extinguisher (1)
6.4.2.8 First Aid Kit
6.4.2.9 FOXBORO MIRAN 1 IR – for Total Recoverable Petroleum Hydrocarbons (TRPH) EPA 418.1

6.4.2.10 Helium gas cylinder
6.4.2.11 Hood
6.4.2.12 Hydrogen generator
6.4.2.13 Instrument manuals
6.4.2.14 Mechanical shaker
6.4.2.15 Microwave oven
6.4.2.16 Millipore deionized water
6.4.2.17 Mobile Lab Logbook
6.4.2.18 pH meter
6.4.2.19 Preservatives (Sulfuric acid, Nitric acid, etc.)
6.4.2.20 Refrigerators (samples and standards)
6.4.2.21 Sample bottles, vials
6.4.2.22 Sampling equipment
6.4.2.23 Solvent cabinet

    6.4.2.23.1 Isooctane
    6.4.2.23.2 Freon
    6.4.2.23.3 Methanol

6.4.2.24 Thermometer
6.4.2.25 Turbidimeter
6.4.2.26 Safety/miscellaneous

    6.4.2.26.1 Cell phone, Radio
    6.4.2.26.2 Flashlight
    6.4.2.26.3 Kimwipes
    6.4.2.26.4 Paper and pens
    6.4.2.26.5 Paper towels
    6.4.2.26.6 Personal Protective Equipment
    6.4.2.26.7 First Aid Kit

7. SAMPLE CUSTODY

Chain-of-Custody (COC) Form (see Appendix B) is an official document which traces the possession and handling of the sample from the time of collection through analysis and final destination.

7.1 Sample Receiving

7.1.1 Samples are received and checked in accordance with COC protocols.

7.1.2 A Chain of Custody Form (Form # 1 Appendix B) must be properly completed but not limited to the following information:
7.1.2.1 Sample date and time of collection
7.1.2.2 Sample location and description
7.1.2.3 Sample matrix

7.1.2.4 Preservatives needed
7.1.2.5 Type, size, and number of containers
7.1.2.6 Analyses required
7.1.2.7 Work order/Job card number
7.1.2.8 Requestor's name, address, telephone/Fax numbers
7.1.2.9 Sampled by – (print and signature, date & time)
7.1.2.10 Relinquished by – (print and signature, date & time)
7.1.2.11 Received by – (print and signature, date & time)
7.1.2.12 COC log number
7.1.2.13 COC page number
7.1.2.14 Sample storage location
7.1.2.15 Analysts assigned
7.1.2.16 Sample priority

7.1.3 The COC is signed and stamped with the current date and time at the left hand bottom corner with the dating machine.

7.1.3.1 A COC number is attached on the left hand bottom corner of the form, a photo copy will be given to the sample originator/courier.
7.1.3.2 Sample labels must be consistent with the information written on the COC form.
7.1.3.3 The COC must be reviewed for completeness.
7.1.3.4 The original COC Form will be recorded in the Laboratory Information Management System (LIMS) and filed in the main COC folder on a monthly basis.

7.1.4 Where appropriate, the laboratory shall request that clients submit field blanks with their samples.

7.2 Sample Acceptance Criteria

7.2.1 Samples must be received in appropriate containers with proper preservation as specified in USEPA SW-846 for the intended analysis.

7.2.1.1 Sample size must be adequate and should be representative.
7.2.1.2 An Environmental Laboratory Job Card or yearly charge number must be established.
7.2.1.3 The sample must be accompanied by a properly completed, original Chain of Custody Form. See Appendix B.
7.2.1.4 Samples must be clearly labeled with all information required by the log-in procedure.
7.2.1.5 Samples requiring cooling must be shipped on ice; samples' temperature shall be measured and recorded at arrival.

7.3 Sample Control Procedure

7.3.1. Sample back-log and new samples are reviewed daily by an Assistant Laboratory Manager, Sample Manager, and LIMS manager.

7.3.2 The Sample Control Coordinator assigns a discrete alpha-numeric laboratory number to each sample and enters all the information into the LIMS system, including analyst's name assigned to the specific analysis.

7.3.3 Appropriate labels are attached on the samples before storing.

7.3.4 Samples needing refrigeration are stored in five appropriate refrigerators (# 1, 2, 4, 8, & 9).

7.3.5 Samples for metal analysis as well as other samples which don't need refrigeration are stored in sample bins located in the sample storage room.

7.3.6 Oils for dissolved gas analysis (DGA) are at DGA receiving station

7.3.7 PCB samples are in the PCB testing room.

7.3.8 Asbestos samples in the asbestos hoods. Bulk samples in one hood and air samples in the other.

7.3.9 Asbestos, PCB and DGA analysts should be notified immediately for emergency samples.

7.3.10 Photocopies of COCs are distributed to assigned analysts, supervisors, and Records Management.

7.4 Subcontract Samples

7.4.1 Form # 2 Chain of Custody (Appendix B) must be completed in reference to the original COC which came with the sample.

7.4.1.1 Lab Log Number (from original COC)
7.4.1.2 Analysis requested
7.4.1.3 Analytical method
7.4.1.4 Date needed
7.4.1.5 Name of contract laboratory
7.4.1.6 Prepared by
7.4.1.7 Relinquished by
7.4.1.8 RMS No., and/or P/O No.

7.4.2 A photo copy of the completed subcontract COC should be attached to the original COC.

7.4.3 The completed form should go with the sample to the contract laboratory and signed by specified personnel.

7.4.4 The COC from the contract laboratory should be filed with 'Outside COC Binder'.

7.4.5 In choosing a subcontract laboratory, the Environmental Laboratory's authority to contract rests in compliance with LADWP and City Charter Section 370 and Section 380. The Charter requires competitive bidding with award made to the lowest bidder representing the ultimate lowest cost in place and in use meeting the specifications, requirements, terms, and conditions contained in the bid request.

7.5 Sample and Waste Disposal

7.5.1 The LIMS sample tracking system provides a list of samples that can be disposed of on a monthly basis.

7.5.2 All samples are retained in their proper storage locations until their holding time has passed and the time for sample analysis has expired.

7.5.3 Solid and soil samples are retained for a year and water samples are retained from either 24 hours to 6 months depending on analysis requested.

7.5.4 Once the samples have expired or passed the time of retainment, they are now considered as waste and are disposed of accordingly. The samples are either drained in the sink, delivered to the 'Transformer Test Station', or handled by the Hazardous Waste Management depending on the matrix and nature of the sample.

7.5.5 Wastes generated from analyses are collected in suitable properly labeled containers. Information on these wastes is recorded in the Waste Logbook.

7.5.5.1 Waste log number
7.5.5.2 Container size
7.5.5.3 Start date of generating waste
7.5.5.4 Finish date of generating waste
7.5.5.5 Type of waste (liquid or solid)
7.5.5.6 Date removed from laboratory
7.5.5.7 Waste description
7.5.5.8 Initial of analyst/generator

7.5.6 Wastes of slightly acidic or slightly basic solutions are treated before disposal into the sink.

7.5.7 Oil wastes with < 2 ppm PCB are delivered to LADWP's Transformer Test Station for recycling.

7.5.8 Solid waste, such as soil, is stored in 55 gallon drums and is handled by the Hazardous Waste Management for proper disposal by an outside contractor.

7.5.9 Hazardous materials and wastes are handled according to current Federal, State and local regulations and the Departments' hazardous material and waste procedures manuals.

7.5.10 Final disposal of hazardous materials and wastes are conducted by licensed private contractors through the Department's Hazardous Waste

Management Unit.

7.5.11 For samples concerning environmental Lead Analysis, the samples are stored and retained at room temperature in the Laboratories' sample storage room for approximately 6-12 months. After storage, the samples are disposed of according to the analysis SOP and Chemical Hygiene Plan.

Samples are placed in either collection drums prior to disposal or digested and the digestate is disposed of in the heavy metals solutions disposal.

8 CALIBRATION PROCEDURES AND FREQUENCY

Calibration procedures apply to all instruments and gauges used for analyses and testing. Calibration shall provide confidence in measurement by establishing traceblility to appropriate measurement standards. Detailed calibration procedures are specified in the SOP for each analytical method.

8.1 Reagents and Standards

All standards used for calibration must be cross-referenced to another source and documented. This includes both purchased and laboratory made standards. They are traceable to the NIST.

8.1.1 Reagents and standards used for environmental Lead Analysis are of ACS ACS grade or better and consist of the following as specified by the SOP:

8.1.1.1 ASTM Type II water
8.1.1.2 Blanks and standards in a 5% HCl, 2% HNO_3 matrix
8.1.1.3 Plasma standard stock solutions from which were certified for high purity (current vendors: VHG Labs and Crescent Chemical Co.).
8.1.1.4 Calibration check standards certified for high purity (current vendor: CPI Analytical).
8.1.1.5 Interference check solutions (current vendor:VHG Labs).
8.1.1.6 Standard Reference Material for Trace Elements in Soil containing Lead for Paint from the National Institute of Standards and Technology (NIST).
8.1.1.7 Soil Standard Reference Material from Environmental Resources Associates (ERA).

8.1.2 Standards and reagents are logged in the Standards Log Book (Q-Log). The Q Log Book contains the following information:

8.1.2.1 Date received

8.1.2.2 Description
8.1.2.3 Storage location
8.1.2.4 Concentration
8.1.2.5 Solvent/matrix
8.1.2.6 Name of supplier (vendor)
8.1.2.7 Lot number
8.1.2.8 Catalog Number
8.1.2.9 Expiration date
8.1.2.10 Quantity

8.1.3 Reagents, such as acids, are dated and initialed upon receipt.

8.1.4 Strict control and documentation of reagent solutions and calibration standards shall be maintained.

8.1.4.1 Certificate of Analysis and Material Safety Data Sheet (MSDS) documents of the reference standards are kept at the laboratory front desk and front office. Analysts may also make copies of the documentations to be kept next to the analysis instrument.

8.1.4.2 Certificate of Analysis and MSDS documents are assigned the same Q# as the reference standard as a means of cross-reference.

8.1.5 Stock and working standards are checked regularly for signs of deterioration, such as discoloration, formation of precipitates, significant change in concentration, and expiration dates.

8.1.5.1 Documentation of standard and solution preparations shall include:

8.1.5.1.1 Descripiton of Content
8.1.5.1.2 Date of Preparation
8.1.5.1.3 Concentration and/or purity of parent material
8.1.5.1.4 Manufacturer and lot # of parent material
8.1.5.1.5 Assigned expiration date
8.1.5.1.6 Preparer's initials

8.1.6 Reagents and standards should be adequately identified in order to be traced back to preparation documentation.

8.2 Testing

All equipment used for testing shall be calibrated before the instrument is put into service. The laboratory has an established programme and procedure for the calibration of its equipment. Certified reference standards are used to verify the calibration and are implemented as part of the laboratory's quality control and assurance.

8.2.1 A calibration curve must be constructed to meet the linear range of the analytical method, the instrument's capability and/or as required by regulatory agencies. Samples exceeding the linear range must be diluted. Linearity is validated statistically (i.e. linear regression).

8.2.2 Continuing Calibration Verification samples (check standards) are analyzed at the beginning, every ten samples and at the end of the run. Recoveries should be ± 15%.

8.2.3 Sample duplicate analyses are required for every batch and/or ten samples.

8.2.4 Organic analyses require the addition of surrogate standards into each sample.

8.2.5 Matrix spike/matrix spike duplicate are analyzed for every batch and/or ten samples.

8.2.6 Instruments are recalibrated after each major maintenance, failure of instrument performance evaluation, and a Relative Standard Deviation (%RSD) of over 20%.

8.2.7 Check standards and spiking solutions should be from a source other than the calibration standards.

8.2.8 Laboratory control sample (LCS) is processed along with other samples in the batch.

9 ANALYTICAL PROCEDURES

The Environmental Laboratory makes extensive use of the USEPA SW-846 Methods American Society of Testing and Materials (ASTM) and Standard Methods for the Examination of Water and Wastewater. The Laboratory's Standard Operating Procedures (SOP's) are derived and adapted from these methods.

9.1 General list of applicable methods are:

9.1.1 EPA 120.1, Specific Conductance
9.1.2 SM 4500-H^+ B, pH, Electrometric Measurement
9.1.3 SM 2540C, Filterable Residue (Total Dissolved Solids)
9.1.4 SM 2540D, Non-filterable Residue (Total Suspended Solids)
9.1.5 SM 2540B, Total Residue, Gravimetric, Dried at 103 - 105°C (TS)
9.1.6 SM 2540F, Settleable Residue, Volumetric, Imhoff Cone
9.1.7 SM 2550B, Temperature, Thermometric
9.1.8 EPA 180.1, Turbidity, Nephelometric
9.1.9 EPA 200.7, Inductively Coupled Plasma-Atomic Emission Spectrometry
9.1.10 EPA 200.8, Inductively Coupled Plasma-Mass Spectrometry
9.1.11 EPA 218.6/7199, Determination of Hexavalent Chromium by Ion Chromatography
9.1.12 EPA 245.1, Mercury (Cold-Vapor Technique)
9.1.13 EPA 300.0, Anions by Ion Chromatography

9.1.14 SM 2520B, Alkalinity
9.1.15 SM 4500-Cl D, Total Residual Chlorine
9.1.16 EPA 335.4, Analysis of cyanide, manual distillation
9.1.17 EPA 335.4, Automated analysis of cyanide
9.1.18 SM 4500-NH_3 B, Ammonia Nitrogen
9.1.19 SM 4500-NH_3 B, Total Kjeldahl Nitrogen
9.1.20 SM 5220C, Chemical Oxygen Demand
9.1.21 SM 5310B, Total Organic Carbon
9.1.22 EPA 418.1, Petroleum Hydrocarbons (Total Recoverable, Infrared)
9.1.23 EPA 420.2, Phenolics, Total - Colorimetric
9.1.24 EPA 602, Analysis of BTEX and MTBE in water
9.1.25 EPA 604, Chlorinated Phenols
9.1.26 EPA 624, Volatiles by GC/MS
9.1.27 EPA 625, Semi-volatiles by GC/MS
9.1.28 EPA 1311, TCLP (Toxicity Characteristic Leaching Procedure)
9.1.29 EPA 1664A, Oil & Grease (HEM/SGT-HEM) by solid phase extraction
9.1.30 EPA 6010B, Inorganics by ICP - AES
9.1.31 EPA 6020A, Metals by ICP/MS
9.1.32 EPA 7471A, Mercury in solid or semi-solid waste
9.1.33 EPA 8011, DBCP & EDB by Microextraction & GC
9.1.34 EPA 8015B, Gasoline Range Organics, Purge & Trap
9.1.35 EPA 8015M, Total Petroleum Hydrocarbons, Diesel, Motor Oil
9.1.36 EPA 8021B, Aromatic Volatile Organics
9.1.37 EPA 8041A, Phenols by GC
9.1.38 EPA 8082, Polychlorinated Biphenyls (PCBs)
9.1.39 EPA 8100, PAH by GC/FID
9.1.40 EPA 8260B, Volatile Organic Compounds by GC/MS
9.1.41 EPA 8270D, Semi-volatile Organic Compounds by GC/MS
9.1.42 EPA 9045C, Soil and Waste pH
9.1.43 EPA 9056, Inorganic Anions by Ion Chromatography
9.1.44 EPA 9075, Test Method for Total Chlorine in New and Used Petroleum Products by X-Ray Fluorescence Spectrometry (XRF)
9.1.45 ASTM D1500, Color petroleum test
9.1.46 ASTM D1298, API Specific Gravity petroleum test
9.1.47 ASTM D92, 93, D3828, Flash point, Cleveland open cup, Pensky-Martens, Seta Flash
9.1.48 ASTM D445, Kinematic viscosity
9.1.49 ASTM D1533, Water content, Karl Fisher
9.1.50 ASTM D97, Pour point
9.1.51 ASTM D974, Neutralization No.
9.1.52 ASTM D892, Foam tendency/stability
9.1.53 ASTM D1401, Water Emulsion
9.1.54 ASTM D2668, Inhibitor content, FTIR
9.1.55 ASTM D2285, Interfacial tension
9.1.56 ASTM D877, Dielectric strength, disk electrode

9.1.57 ASTM D96, Bottom sediments and water
9.1.58 Particle counts (Spectrex)
9.1.59 Multielements in oil
9.1.60 Metallurgy – composition of metals
9.1.61 HUD Method, Lead in Paint Chips by Energy-Dispersive X-Ray Fluoresence Spectroscopy (XRF)*

* X-Ray Fluorescence (XRF) not accredited by American Industrial Hygiene Association (AIHA).

9.2 Standard Operating Procedures (SOP)

The laboratory's Standard Operating Procedures (SOPs) are created by the analyst who perform the specific analytical method. Computerized copies are in the network database. Original copies are accessible to all laboratory personnel in Room 309. SOPs are continually monitored and updated as changes or new developments occur.

9.3 Calibration

9.3.1 Application of primary or secondary standards traceable to standards of the National Institute of Science and Technology (NIST) consistent with the test or analytical method.
9.3.2 Applies to all instruments and gages used for analyses and tests.
9.3.3 Laboratory calibration procedures and/or written instructions provided by the manufacturer of the equipment or specified by the individual methodologies.
9.3.4 Calibration intervals

  9.3.4.1 Initial calibration on new instruments
  9.3.4.2 Based on stability, sensitivity, purpose, accuracy and analytical method.
  9.3.4.3 Analytical balances are calibrated annually.
  9.3.4.4 Calibration should be done after preventive maintenance and/or failed performance evaluation.

9.4 Document Control

A document control program is established to ensure that all documents issued or generated are accountable and traceable. All documents are reviewed and approved for use by authorized personnel prior to use. A Master List of Controlled Documents is available that provides the most recent revision of the document as well as the location in which the document can be located. The general guidelines for documentation of any records or entries are listed below.

9.4.1 Logbooks/Notebooks

9.4.1.1 Legibility: All entries must be legible.

9.4.1.2 Recording entries: All entries are made using indelible ink pens, preferably blue or black.

9.4.1.3 Review all forms before entering information.

9.4.1.4 The originator(s) of all entries must be identified by initial(s) or signature(s).

9.4.1.5 All mistakes are crossed out with a single line so as to remain legible. Do not erase, write over, or use correction liquid. The cross out must be initialed and dated.

9.4.1.6 Abbreviations of chemical formula (e.g., NaCl, HCl, Na OH), and concentration units (e.g., ppb, ppm, ug/L, ug/mL, ug/Kg, mg/Kg) may be used without further clarification. Other abbreviations can be used but with traceable explanation.

9.4.1.7 Each logbook/notebook is identified with subject identification as instrument, method, and procedure. All entries must be clear, legible, initialed, and dated.

9.4.1.8 Analyst's Notebooks: Each analyst maintains a personal bound notebook to keep notes of their training sessions, seminars or meetings.

9.4.1.9 Instrument Maintenance Logbooks: Each instrument must have a logbook to record maintenance and repairs. These instruments are also covered by service contracts with the vendors.

9.4.1.10 Standard and Reagent Logbooks are logged-in with Q numbers and maintained in the front desk to keep records of standard traceability.

9.4.1.11 Extraction, Digestion Logbooks for each method is maintained to keep all documentations of extracted/digested samples.

9.4.1.12 Sequence Run Logbooks are used to record the sequence of the sample run, corresponding standards and QC samples.

9.4.1.13 Miscellaneous Logbooks: Refrigerator temperature log, balance check log, distilled water check, field log, etc. are used to record various laboratory equipment on a daily basis.

9.4.1.14 Waste Logbook is used to record all identified laboratory wastes for disposal. All laboratory wastes are picked up by a contract waste disposal company every two to three months.

9.4.1.15 A list of all logbooks is maintained in the Laboratories' data base.

9.4.2 Reference Documents

9.4.2.1 The laboratory updates and reviews all reference documents annually.

9.4.2.2 Documents are readily available to all laboratory personnel.

9.4.2.3 Policies, procedures, systems, and programs are documented to assure the quality of information that laboratory provides.

9.4.2.4 QA Manual – Serves as a general guideline the laboratory follows in order to maintain a quality system appropriate to the scope of its activities.

9.4.2.5 Chemical Hygiene Plan and Environmental Laboratory Safety Manual - Guidelines on laboratory safety are available to assure that the laboratory is in acceptable working conditions and the safety of laboratory personnel is documented and taken into consideration.

9.4.2.6 SOP list – Used to reference and monitor the current SOP for analyses performed in the laboratory.

9.4.2.7 MDL list – Used to reference and monitor current MDL values of each analytical test performed in the lab.

9.4.2.8 Miscellaneous References – Documents used as reference in internal laboratory documents. Updated whenever a new edition is available.

9.4.3 Environmental Laboratory Forms

9.4.3.1 Forms and checklists are used to help monitor the quality of data that the laboratory provides. Forms are available in the network drive for analyst to complete on such occasions as completion of training and analytical data review.

9.4.3.2 Corrective Action Form – to be filled out in order to monitor the outcome and result when analytical data is not within compliance of acceptable quality assurance standards.

9.4.3.3 Training Forms – also known as demonstration of capability. Checklist that is completed after analyst training to acknowledge that the individual is now capable of performing the analysis in the laboratory.

9.4.4 Document Changes

9.4.4.1 Handwritten changes in all laboratory documents are crossed-out, dated, and initialed.

9.4.4.2 All handwritten changes are made using indelible ink pens, preferably blue or black.

9.4.4.3 When a document is amended and additional information is added, the document is revised and re-issued as soon as practical. The revised document is titled with a revision number, revision date, and by whom the revision was done by. This information is included to assure that the document is the latest version to be referenced to.

9.4.4.4 All document changes are reviewed and approved for use by authorized personnel prior to use.

9.4.4.5 Document changes are monitored in the Master List of Controlled Documents with the most recent revision referenced.

9.4.5 Document Location

9.4.5.1 Authorized editions of appropriate documents are available at locations where essential for laboratory operations. (Example: instrument manuals located at the instrument).

9.4.5.2 References are readily available to all laboratory personnel at the front desk or electronically via the internet.

9.4.5.3 Environmental laboratory forms are available for print via the laboratory network drive. A hard copy of the forms are also kept by the QAQC officer.

9.4.5.4 If the laboratory were to cease operations, all laboratory documents are transferred to the administration department for the City of Los Angeles, Department of Water and Power.

9.4.6 Computerized Documents and Spreadsheets

9.4.6.1 Computerized documents are maintained and controlled by QAQC and managerial staff. All of our computerized documents are dated on the document itself as well as in the file name. Whenever a revision has been made to a computerized document, such as a report or SOP, a new file name is created with the revised date and labeled as "REV #".

9.4.6.2 Newly revised documents are then saved in the file folder for that current year. Old computerized files are then archived in an "old" file folder which is subdivided annually for easier back reference.

9.4.6.3 Spreadsheets are maintained and controlled by QAQC, managerial staff, and the analyst. All spreadsheets are dated on the spreadsheet itself as well as in the file name. Spreadsheets are divided into subfolders according to the type of data that the folder pertains to.

9.4.6.4 Whenever a revision has been made to the spreadsheets, such as default calculations on analytical excel templates, a new file name is created with the revised date.

9.4.6.5 List of computerized documents and spreadsheets are available on the network drive and are checked and cross referenced by the user prior to use in order that the latest addition of that document is being used. These list are maintained by QAQC and managerial staff.

9.4.7 Obsolete Documents

9.4.7.1 Invalid or obsolete documents are promptly removed from all points of issue or use, or otherwise assured against unintended use. Old documents that have been revised and are no longer in use are placed in the "OLD" documents folder. This is to assure that the obsolete document is separated from the recently revised and approved document.

9.4.7.2 Obsolete documents retained for either legal or knowledge preservation purposes are suitably marked.

10 INTERNAL QUALITY CONTROL CHECKS

The Environmental Laboratory's Quality Assurance (QA) analyses represents at least 10 percent of the total number of the analyses performed. The minimum level of QA effort of one Reference Standard, one duplicate spike, and one blank (in addition to required instrument calibration samples) shall be performed for each set of ten samples.

10.1 QC Parameters – vary according to method, specific project requirements, and/or sample matrices encountered. They are also listed in specific SOP.

10.1.1 Wet Chemistry test

- 10.1.1.1 Sample/sample duplicate
- 10.1.1.2 Matrix spike/matrix spike duplicate
- 10.1.1.3 Laboratory control sample (water or solid)
- 10.1.1.4 Method blank

10.1.2 Metals test

- 10.1.2.1 Method blank
- 10.1.2.2 Sample/sample duplicate
- 10.1.2.3 Laboratory control sample
- 10.1.2.4 Matrix spike/matrix spike duplicate
- 10.1.2.5 Post spike

10.1.3 Organics test

- 10.1.3.1 Method blank
- 10.1.3.2 Sample/sample duplicate
- 10.1.3.3 Laboratory control sample
- 10.1.3.4 Matrix spike/matrix spike duplicate
- 10.1.3.5 Surrogates
- 10.1.3.6 Equipment blank

10.1.3.7 Field blank
10.1.3.8 Trip blank

10.2 Internal Standards

Internal standards are measured amounts of certain compounds added after sample preparation or extraction. They are used in an internal standard calibration method to correct sample results suffering from capillary column injection losses, or the effects of viscosity. Internal standard calibration is currently used for volatile organics, and GC/MS extractables.

10.3 Surrogates

Surrogates are measured amounts of certain compounds added before sample preparation or extraction. Analysts measure the recovery of the surrogate to samples analyzed for chlorinated pesticides, PCBs GC/MS extractables and volatiles, and GC volatiles.

10.4 Matrix Spikes

Matrix spike and matrix spike duplicates are analyzed to estimate precision and accuracy. Spikes are aliquots of samples to which known amounts of an analyte have been added. They are prepared and analyzed like samples. Stock solutions used for spiking are purchased or prepared independently of calibration standards. The spike recovery measures the effects of interferences in the sample matrix and reflects the accuracy of the determination. Spikes are prepared and run daily, at a frequency of at least 1 per 20 samples if more than 20 samples are run in a given batch. The results of matrix spikes are used to evaluate the effect of the sample matrix on the accuracy of the analytical procedure. Recoveries of matrix spike/matrix spike duplicates are calculated as % Recoveries and their difference as Relative Percent Difference (RPD).

10.5 Sample Duplicates

Duplicates are additional aliquots of samples subjected to the same preparation and analysis as the original sample. In cases where the analyte concentration is consistently below the detection limit, duplicate spikes are substituted for duplicates. The relative percent difference between duplicates or duplicate spikes measures the precision of a given analysis. Duplicates and duplicate spikes are prepared and analyzed daily, at a frequency of at least 1 per 20 samples if more than 20 samples are run in a given batch.

10.6 Laboratory Control Samples (LCS)

Certified QC blind samples from different suppliers are used as LCS. In some cases, it is a blank sample (reagent water) to which known concentrations of target analytes have been added. The spiked sample is then taken through the entire analytical procedure and the recovery of the analytes calculated. A LCS duplicate is also analyzed to measure process precision expressed as relative percent difference (RPD). The QC data derived from the analyses of LCSs are used to evaluate the effectiveness of the analytical process. Acceptable LCS results demonstrate that the batch analytical process is in control.

10.7 Initial Demonstration of Capability (IDC)

Every new employee must demonstrate initial proficiency by generating data of acceptable accuracy and precision. This demonstration is repeated for each new instrument and whenever any significant changes in instrumentation and/or methodology are made. Refer to Method 8000B section 8.4 for further discussion.

10.8 Method Detection Limit (MDL)

The method detection level (MDL) for each analyte in each method is to be determined before data from any samples are reported. Establish a MDL using deionized water, sea sand, and/or ASTM E1792 wipes fortified with an analyte concentraton of two to five times the estimated detection limit. To determine the MDL value, take seven replicate aliquots of the fortified water, sea sand, and/or ASTM E1792 wipes and process through the entire analytical method.

10.8.1 Calculate the average recovery and the standard deviation (s) of the seven replicates.

10.8.2 Calulate the MDL as follows:

$$MDL = (t) \times (s)$$

where:

t = Student's t value for n-1 degrees of freedom at the 99% confidence level; t = 3.143 for six degrees of freedom

s = standard deviation of the replicate analyses

10.8.3 The calculate MDL must satisfy the criteria set forth in the laboratory's MDL criteria spreadsheet or the entire process must be repeated.

10.8.4 The MDL is applied to reporting sample results by the following:

10.8.4.1 Results Below the MDL are reported as "not detected"

10.8.4.2 Results between the MDL and reporting limit (RL) are reported and qualified.

10.8.4.3 Results above the reporting limit (RL) are reported along its associated error.

11 DATA REDUCTION AND REPORTING

The analyst is responsible for the quality of his/her data generated according to QC protocols. After review of the data by the analyst, it is forwarded to the designated QA officer for secondary review in preparation for the final approval by the Laboratory Manager.

11.1 Data Reduction

11.1.1 Most of the data produced in the laboratory are generated through the use of dedicated instrumentation with microcomputer interfaces. These PC-based systems receive the original signal from the instrument to which the sample or extract has been submitted. The PC or minicomputer transforms the raw signal into a quantitative value.

11.1.2 An experienced analyst reviews this result either on screen or on a printout, to verify identifications, check quantitative formulas, and acquire final numerical values. The analyst then writes calculated results or checks off computer-produced results directly on the computer printout. The printout is cross-referenced to a sample or run number in a bound run log.

11.1.3 For instruments that operate independently of computers, the signal is recorded as a strip-chart trace, numerical output on a printer strip, or a direct reading from a digital or analog dial. In these cases, the analyst must reduce the data to a reportable format. The original signal must be multiplied by a calibration factor or compared with a standard curve. Blank correction may be required. Aliquot results are divided by the mass of volume of sample to correct for the concentration-based final result. Calculations are performed using hand calculators or simple programs.

11.1.4 All data is recorded in a "bench book" dedicated for the particular analysis in question. Results are entered by the analyst in the assigned report form and appropriate logbook.

11.1.5 Some lab tests, such as titrations or sensory evaluations, are not instrumented. For these, the quantitative result of observation is recorded directly in a bound book by the assigned analyst. Calculations, if needed, are also recorded in the same book.

11.1.6 For all methods of data reduction, the final analytical value is written on a computer-generated work sheet by the analyst. Auxiliary information, such as analyst name, method number, equipment ID, etc., is entered on the same sheet. The worksheets are turned in daily to a data entry operator to be keyed into the Laboratory Information Management System (LIMS).

11.1.7 For computer records, copies are produced as needed and data edits are documented within the computer files.

11.1.8 Analytical data generated from the instrument is "backed-up", or archived, using the CD-Writer. The CD-Writer program enables the data to be copied onto a compact disc for data storage. A schedule is created in which instrument data can be copied routinely at a certain time during non-work hours.

11.1.9 All laboratory analytical raw data is archived and stored in the basement of Building 3 located in the Main Street Yard. The purpose of archiving data is to have access to previous raw data records which later may be referenced upon for such purposes as litigations, previous history of a site, etc. Laboratory reports and raw data print outs, as well as compact discs containing raw analysis data are stored in labeled boxes and shelved by the analyst. Archived data is stored for at least five years. All environmental lead records are maintained and archived for at least ten years.

11.2 Data Validation

QC parameters to be checked to validate results:

11.2.1 Colorimetric Testing

11.2.1.1 Holding Times
11.2.1.2 Initial calibration
11.2.1.3 Continuing calibration
11.2.1.4 Blanks
11.2.1.5 Batching
11.2.1.6 Duplicates
11.2.1.7 Matrix spike/matrix spike duplicate (if applicable)
11.2.1.8 Laboratory control sample
11.2.1.9 Quantitation and reporting limits
11.2.1.10 System performance
11.2.1.11 Overall assessment of data

11.2.2 Gravimetric Testing

11.2.2.1 Holding Times
11.2.2.2 Blanks
11.2.2.3 Batching
11.2.2.4 Duplicates
11.2.2.5 Laboratory control sample
11.2.2.6 Quantitation and reporting limits
11.2.2.7 System performance
11.2.2.8 Overall assessment of data

11.2.3 Ion Chromatography

11.2.3.1 Holding Times
11.2.3.2 Initial calibration
11.2.3.3 Continuing calibration
11.2.3.4 Blanks
11.2.3.5 Batching
11.2.3.6 Duplicates
11.2.3.7 Matrix spike/matrix spike duplicate (if applicable)
11.2.3.8 Laboratory control sample
11.2.3.9 Compound identification and chromatography
11.2.3.10 Compound quantitation and reporting limits
11.2.3.11 Retention times
11.2.3.12 System performance
11.2.3.13 Overall assessment of data

11.2.4 Metals (ICP, GFAA, AA)

11.2.4.1 Holding Times
11.2.4.2 Initial calibration
11.2.4.3 Continuing calibration
11.2.4.4 Blanks
11.2.4.5 Batching
11.2.4.6 ICP Interference check sample
11.2.4.7 Laboratory control sample
11.2.4.8 Duplicate sample
11.2.4.9 Matrix spike/matrix spike duplicate
11.2.4.10 Post spikes (if applicable)
11.2.4.11 Quantitation and reporting limits
11.2.4.12 System performance
11.2.4.13 Overall assessment of data

11.2.5 Metals (ICP-MS)

11.2.5.1 Holding times
11.2.5.2 Short-term stability check
11.2.5.3 Initial calibration
11.2.5.4 Continuing calibration
11.2.5.5 Blanks
11.2.5.6 Batching
11.2.5.7 Surrogate spikes
11.2.5.8 Duplicate
11.2.5.9 Matrix spike/matrix spike duplicate
11.2.5.10 Laboratory control sample
11.2.5.11 Post spike (if applicable)
11.2.5.12 Internal standards

11.2.5.13 Compound Quantitation and reporting limits
11.2.4.12 System performance
11.2.4.13 Overall assessment of data

11.2.6 Meter

11.2.6.1 Holding times
11.2.6.2 Calibration
11.2.6.3 Blanks
11.2.6.4 Batching
11.2.6.5 Matrix spike/matrix spike duplicate (if applicable)
11.2.6.6 Laboratory control sample
11.2.6.7 Quantitation and reporting limits
11.2.6.8 System performance
11.2.6.9 Overall assessment of data

11.2.7 Titrimetric Testing

11.2.7.1 Holding times
11.2.7.2 Blanks
11.2.7.3 Batching
11.2.7.4 Duplicates
11.2.7.5 Matrix spike/matrix spike duplicate (if applicable)
11.2.7.6 Laboratory control sample
11.2.7.7 Quantitation and reporting limits
11.2.7.8 System performance
11.2.7.9 Overall assessment of data

11.2.8 Volatiles (GC, GC/MS)

11.2.8.1 Holding times
11.2.8.2 GC/MS Instrument performance check
11.2.8.3 Initial calibration
11.2.8.4 Continuing calibration
11.2.8.5 Blanks
11.2.8.6 Batching
11.2.8.7 Surrogate spikes
11.2.8.8 Duplicate
11.2.8.9 Matrix spike/matrix spike duplicate
11.2.8.10 Laboratory control sample
11.2.8.11 Internal standards
11.2.8.12 Compound Identification and Chromatography
11.2.8.13 Compound Quantitation and reporting limits
11.2.8.14 Tentatively Identified Compounds
11.2.8.15 System performance
11.2.8.16 Retention times

11.2.8.17 Overall assessment of data

11.2.9 Semi-volatiles (GC, GC/MS)

11.2.9.1 Holding times
11.2.9.2 GC/MS Instrument performance check
11.2.9.3 Initial calibration
11.2.9.4 Continuing calibration
11.2.9.5 Blanks
11.2.9.6 Batching
11.2.9.7 Surrogate spikes
11.2.9.8 Duplicate
11.2.9.9 Matrix spike/matrix spike duplicate
11.2.9.10 Laboratory control sample
11.2.9.11 Internal standards
11.2.9.12 Compound Identification and Chromatography
11.2.9.13 Compound Quantitation and reporting limits
11.2.9.14 Tentatively Identified Compounds
11.2.9.15 System performance
11.2.9.16 Retention times
11.2.9.17 Overall assessment of data

11.3 Data Review

Before any analytical results are reported, the following criteria must be reviewed and met as part of our data review process:

11.3.1 Meet holding times
11.3.2 % RSD of initial calibration must be < 20%, unless specified differently in SOP.
11.3.3 % Difference of continuing calibration must be <15%, unless specified differently in SOP.
11.3.4 Relative Response Factor (RRF) must be greater than or equal to 0.05, unless specified differently in SOP.
11.3.5 Report method blank bias for associated sample concentrations > 10 times the respective PQL's. Results must not be corrected by subtracting any blank value, unless method references state otherwise.
11.3.6 Surrogate recoveries should be 70 – 130 percent unless specified by the method.
11.3.7 Matrix spike/spike duplicate recoveries should be 70 – 130 percent unless specified by the method or professional judgment is used in conjunction with other QC criteria.
11.3.8 Laboratory Control Sample (LCS) recoveries should be within certified performance limits or based on both the number of

compounds that are outside recovery limits and the magnitude of the exceedance of the criteria. If the LCS recovery criteria are not met, then the LCS results should be used to qualify samples data for the specific compounds that are in the LCS solution. If the LCS recovery is greater than the upper performance limit, then positive results for the particular compounds should be qualified. If LCS compounds are below lower performance limits, results are not usable.

11.3.9 Sample duplicate recoveries should be 75-125 percent unless specified by the method or professional judgment in conjunction with other QC criteria.

11.3.10 Spectral Interference Check Solution recoveries should be within 5 percent initially, and 10 percent thereafter in order to verify the inter-element and background correction factors for metals analysis.

11.3.11 Mid-range check standards: must agree within 10% of the expected value.

11.3.12 Diluted samples: If the sample result fails to fall within the initial calibration range, the sample must be diluted in order to assure accurate results.

11.3.13 Once all criteria have been met, the analytical data review checklist is documented with the data package to assure that the analytical results have met all quality assurance standards and were verified.

11.3.14 Analytical data review checklist is provided with the analytical report upon client's request, otherwise the report will be noted "The quality assurance data validates that the accompanying sample data are of acceptable quality".

11.3.15 Original reports are signed by Laboratory Manager, a copy of which is released only to the client specified on the Chain-of-Custody. Our clients are from the different business units within the Department of Water and Power. Data requested by regulatory agencies or from a court-of-law, the data is obligated to submit all information when a written authorization is provided by the client.

11.4 Reporting

11.4.1 The Environmental Laboratory maintains log books, calibration books, and an original copy of each report. Each analyst maintains a copy of the chain of custody as well as a copy of the written report. The results of the analyses are entered daily into the lab book with the log number, initial, and date and finally into the LIMS system.

11.4.2 The LIMS system generates reports on some analyses. Special investigation reports are assigned to experienced analysts performing the analysis.

11.4.3 Report packages include: cover sheets that contain information pertaining to sampling procedures, analysis requested, analytical results, methods used, PQL, concentration units, name and address of the client, description of the sample as received, work order, QC compliance statement, analyst's initial approval signature, chain of custody documents, and QC report if requested.

11.4.4 The final report shall state the measured quantitative result of the analysis of any blank samples submitted to the laboratory. A statement must be made that discloses whether or not the sample results have been corrected for contamination based on the field blank or other analytical blank.

11.5 Control Charts

11.5.1 Control charts are generated in our LIMS database by the designated QA officer to monitor and detect trends of statistical analysis upon reviewing of results.

11.5.2 Control databases/charts are used to record quality control data and compare them with analysis specific acceptance limits such as upper and lower control limits.

11.5.3 Trend Monitoring

11.5.3.1 Analytical data trends are monitored using the control charts generated in LIMS. The charts are generated in LIMS by performing a search of results according to sample analysis and the date the sample was collected. The results are then complied in charts in a manner that is easy to interpret.

11.5.3.2 Control charts are adjusted according to sample collection dates in order to monitor the trends of the statistical analytical data over a specific time period.

11.5.3.3 Statistical data which are above or below the established QA acceptance limits are clearly defined in the control charts and are further investigated with necessary corrective action.

11.6 Computer Data Security

Laboratory employees are issued a unique network user created by the Information Technology (IT) Manager. Each employee must have a unique password. The passwords are to be changed every 90 days or as prompted by an automatic "change password" warning.

12 DATA ASSESSMENT AND VALIDATION

12.1 Measurement Uncertainty

12.1.1 Measurement uncertainty is a range of values within which the value of the quantity being measured is expected to be false. Every measurement has error that is ultimately unknown and unknowable. Reporting uncertainty along with measurement results is good practice, and may spare the user from making unwarranted or risky decisions based only on the measurement.

12.1.2 There are two (2) general sources of measurement uncertainty:

12.1.2.1 Random Error: The deviation in any step in an analytical procedure that can be treated by standard statistical techniques. Random eros causes variation in results from one measurement to the next in an unpredicatable way. Random errors can be reduced by making more measurements and calculating the average of the results.

12.1.2.2 Systematic Error (or Bias): The consistent deviation of measured values from the true value, caused by systematic errors in a procedure. Systematic errora cause results to differ from the true value by the same amount.

12.1.3 The simplest strategy for estimating typical measurement uncertainty is to measure a traceable (known) standard, then compute the difference between the measured value and the known value, assumed to be the true value being measured.

12.1.3.1 Precision

Precision is the degree to which the measurement is reproducible determined by replicate analysis of reference standards, samples or spiked samples. Sampling precision is evaluated from field duplicate samples and analytical precision is evaluated from matrix spike duplicate samples and split samples. It is calculated in terms of the relative percent difference (RPD).

$$\mathrm{RPD} = \frac{[(C_1 - C_2)\ \mathrm{x}\ 100\%]}{(C_1 + C_2)/2}$$

Where: RPD = relative percent difference

C_1 = larger of the two observed values
C_2 = smaller of the two observed values

12.1.3.2 Accuracy

Accuracy is a determination of how close the measurement is to the true value. Accuracy is evaluated using reference standards, laboratory control sample (LCS), matrix spike/matrix spike duplicate and spiked samples with surrogate compounds.

Calculation to determine the accuracy of any spiked sample is as follows:

$$P = 100(A - B)/T$$

Where:
P = percent spike recovery
A = concentration determined on spiked sample
B = concentration determined on original unspiked sample
T = true value of spike added

Using accumulated spike data, control limits for accuracy of an analysis are established and plotted as control charts. The average recovery and the standard deviation of the recovery are calculated and the limits set at two standard deviations for the warning limit and three standard deviations for the control limit.

12.1.4 Another method for measuring uncertainty consist of compiling results from previously run quality control samples and estimating uncertainty by plotting the results in control charts. Control charts define weather the analysis is statistically in control and provides control and warning limits as a measured value of uncertainty.

12.1.5 Uncertainty may also be specified in the standard methods. When well-recognized test methods specify the limits of uncertainty, the laboratory may report according to those limits as long as the laboratory demonstrates that the method has been followed without any modifications and meet the specified reliability standards.

12.1.6 Where Proficiency Testing (PT) samples are analyzed with sufficient data above the reporting limit, collective PT data can be used to estimate uncertainty.

12.2 Sources of Measurement Uncertainty

12.2.1 The sources of measurement uncertainty are many. Sources of uncertainty may include: sampling error, sample preparation, interference by matrix or other measurement quantities/qualities, calibration error variation, software errors, deviations from methods by analyst, instrumentations, environmental changes (temperature, humidity, ambient light, etc.), contamination of sample or equipment (carryover), variation in purity of solvent or reagent, and stability of sample, analyte, or matrix.

12.2.2. When changes to laboratory operations are made that may affect sources of uncertainty, the laboratory is required to re-estimate measurement uncertainty.

12.3 Reporting Measurement Uncertainty

12.3.1 When reporting measurement uncertainty, a quality assurance report is generated to reflect the precision and accuracy of the sample analysis batch. The quality assurance report constists of duplicate samples, spike recoveries, and relative percent differences through the analyisis of duplicates, reference standards, blank spike/blank spike duplicates, and matrix spike/matrix spike duplicates.

12.3.2 Quality assurance reports are reported in the same units as the analyte measured.

13 PERFORMANCE AND SYSTEM AUDITS

13.1 Proficiency Evaluation (PE) Program

The laboratory verifies the ability to correctly identify and quantitate analytes through participation in annual Performance Evaluation (PE) Programs:

13.1.1 Underground Storage Tank (UST) Study (via ERA)
13.1.2 ELAP Soil Study (via ERA)
13.1.3 ELAP Water Pollution (WP) performance evaluation (via ERA)
13.1.4 NPDES DMRQA Study (via ERA)
13.1.5 Internal PE samples as blind checks through purchased certified standards from ERA, Ultra Scientific, NSI, AccuStandard, Absolute Standards, and RTC Corporation.
13.1.6 ELPAT (Environmental Lead Proficiency Analytical Testing) provided by the American Industrial Hygeine Association (AIHA).

Continuing evaluations of processes are reviewed through the use of control samples, replicate measurements, and use of reference materials in conjunction with control charts.

13.2 American Industrial Hygeine Association (AIHA)

AIHA has been formally recognized as an approved lead laboratory accrediting organization by the EPA National Lead Laboratory Accreditation Program (NLLAP). To obtain EPA NLLAP recognition, the laboratory must also participate in the AIHA ELPAT Program. Accrediation by AIHA are in compliance with AIHA Accreditation Policy Modules and ISO/IEC 17025:2005.

Environmental Lead Proficiency Analytical Testing (ELPAT) samples are provided by the American Industrial Hygiene Association (AIHA) through the Environmental Lead Laboratory Accreditation Program (ELLAP).

ELPAT samples are analyzed to verify the laboratory's ability to correctly identify and quantitate environmental lead in soil, wipe, and paint chip samples using US EPA 6010B. Energy-Dispersive X-Ray Fluorescence Spectroscopy (XRF) is not accredited by AIHA.

13.2.1 General requirements under the ELLAP program for the analytical testing of environmental lead in soil, paint chips, and dust wipes are the following:

13.2.1.1 Reagents and standards are of ACS grade or better and include the following as specified by the SOP:

13.2.1.1.1 ASTM Type II Water
13.2.1.1.2 Blank standards in a 5% HCl, and 2% HNO_3 matrix.
13.2.1.1.3 Plasma standard stock solutions which are certified for high purity from (current vendor: VHG Labs and Crescent Chemical Co.)
13.2.1.1.4 Calibration check standards certified for high purity. (current vendor: CPI International)
13.2.1.1.5 Interference check solutions (current vendor: VHG Labs).
13.2.1.1.6 Standard reference material for Trace Elements in Soil containing Lead for Paint from the National Institute of Standards and Technology (NIST).
13.2.1.1.7 Soil standard reference material from Environmental Resources Associates (ERA).

13.2.1.2 Sample are stored and retained at room temperature in the sample storage room for approximately 6-12 months. After storage, the samples are disposed of according to the analysis SOP and Chemical Hygiene Plan. Samples are placed in either collection drums prior to disposal or digested and the digestate is disposed of in the heavy metals solutions disposal.

13.2.1.3 Laboratory records specific to environmental lead are retained for 10 years.

13.2.1.4 Daily instrument performance at the reporting limit concentration shall be verified, with acceptance limit documented.

13.2.1.5 The reporting limit acceptance range is ±20% and the check standard recovery acceptance range is ±10%.

13.2.1.6 Results less than the reporting limit are not reported. Environmental lead laboratories shall only report levels below the method reporting limit as "<" (less than) and reference the reportable limit along with the unit of measurement.

13.2.1.7 Samples are not blank corrected.

13.2.1.8 Calibration: The stored calibration within the instrument is a five-point plus a blank. The calibration is stored for a year, or until the next major service. A daily standardization is run in order to verify calibration.

13.2.1.9 Any changes that would significantly affect the laboratory's capability, scope of accreditation, or ability to meet the AIHA's requirements shall be reported to the AIHA within twenty (20) business days of the change.

13.2.2 Additional requirements specifically to the analysis of environmental lead in soil, paint chips, or dust wipes are the following:

13.2.2.1 Environmental Lead in Soil

13.2.2.1.1 Samples collected in plastic or glass 8 oz containers.

13.2.2.1.2 Soil LCS is traceable to NIST at levels appropriate for lead regulatory limits and have run as a source independent of the instrument calibration (e.g. 400-1000ppm)

13.2.2.1.3 Reporting limit for soil is at least twice the MDL and equal to or less than 20% of the lowest relevant action level or regulatory limit of interest (400ppm).

13.2.2.2 Environmental Lead in Dust Wipes

13.2.2.2.1 Samples collected on ASTM E1792 wipes and placed in ICP digestion tubes.

13.2.2.2.2 The method spike/method spike duplicate for dust wipes must be prepared by adding a known amount of solid paint, dust, or soil certified reference material to representative blank dust wipe media.

13.2.2.2.3 Field blanks for wipes are provided.

13.2.2.2.4 MDLs are run using ASTM E1792 wipes.

13.2.2.2.5 Reporting limit for dust wipe is at least twice the MDL and equal to or less than 50% of the lowest relevant action level or regulatory limit of interest (40 ug/ft^2).

13.2.2.3 Environmental Lead in Paint Chips

13.2.2.3.1 Samples collected in plastic or glass 8 oz containers.

13.2.2.3.2 Paint chip LCS is traceable to NIST at levels appropriate for lead regulatory limits and have run as a source independent of the instrument calibration (e.g. 600-10000ppm).

13.2.2.3.3 Commercial white paint is used for the paint chip samples during MDL determinations, as well as the method blank, method blank spikes, and spike duplicates.

13.2.2.3.4 Reporting limit for paint chip is at least twice the MDL and equal to or less than 20% of the lowest relevant action level or regulatory limit of interest (0.06% or 600ppm).

13.3 Internal Audits

Internal audits are performed annually by the laboratory's quality assurance and control personnel to verify that its operations continue to comply with the requirements of the quality system and the Internal Standard. Audits conducted internally shall be inclusive to the following parameters:

13.3.1 Verification of Standard Operating Procedures and analyst(s) understanding.

13.3.2 Verification of compliance with ISO 17025.

13.3.3 Verification and documentation of procedures and documents

13.3.4 Review of analytical data and calculations.

13.3.5 Review of analyst QA/QC data for accuracy, precision, completeness, representativeness, and comparability.

13.3.6 Review of instrument logs, performance test results and analyst performance

13.3.7 Review performance indicators such as calibration, blanks, surrogate recoveries, spike recoveries and duplicate/matrix spikes.

Findings are reported to the laboratory manager along with any corrective actions that need to be implemented. Corrective actions are completed in a timely manner and are summarized and dated on the audit report corrections form.

13.4 Management Review

13.4.1 Laboratory's executive management conducts reviews of the laboratory processes to ensure that the data continues to be valid, suitable, and accurate and to determine if any modifications need to be made.

13.4.2 Monthly meetings are held with laboratory management to record and document the laboratory activities from the past month and to determine if any decisions or actions need to be taken to ensure the laboratory's efficacy.

13.4.3 Annual Management Reviews are held as an overview of the laboratory activities from the past year and to determine a laboratory planning system which includes the goals, objectives, and action plans for the coming year.

13.4.4 Items to be included in the review include the following:

13.4.4.1 Suitability of policies and procedures
13.4.4.2 Reports from managerial and supervisory personnel
13.4.4.3 Outcome of recent internal audits
13.4.4.4 Corrective and Preventive Actions
13.4.4.5 External lab assessments
13.4.4.6 Results of proficiency tests
13.4.4.7 Changes in volume or type of work
13.4.4.8 Customer feedback
13.4.4.9 Complaints
13.4.4.10 Recommendations for improvement
13.4.4.11 Other relevant factors, such as quality control activities, resources, and staff training.

13.4.5 Findings from the Management Review and the actions that arise from them are recorded and shared with appropriate laboratory personnel. For all necessary actions requested, management ensures that the actions are carried out within an appropriate timeframe and are documented.

13.4.6 Management reviews have a targeted completion by the first quarter (January-March) of each year.

13.5 QA/QC Quarterly Review

At least quarterly, QA/QC personnel shall provide reports to laboratory management regarding quality assurance matters. These reports shall include, but are not limited to:

13.5.1 Information on internal audits
13.5.2 Proficiency program performance
13.5.3 Nonconformances and corrective/preventive actions taken

14 PREVENTIVE ACTION AND PREVENTIVE MAINTENANCE

14.1 Preventive Action

14.1.1 Preventive action is the action taken to eliminate the cause of a potential non-conformity or other potentially undesireable situation. It is different from corrective action in that corrective action is taken to prevent reoccurrence (after) whereby preventive action is to prevent occurrence (before).

14.1.2 Preventive action procedures include: staff training, feedback and complaints, servicing equipment, monitoring equipment (i.e. control charts), validating methods through quality assurance samples, and the use of quality control. Effectiveness of the procedures is ascertained by internal quality audits, management reviews, and internal and external proficiency quality assessments.

14.1.3 As part of the preventive action procedure, the laboratory management examines its technical and quality system to identify needed improvements and sources of non-conformance. If preventive action is required, action plans are developed, implemented, and monitored.

14:2 Preventive Maintenance

14.2.1 The Environmental Laboratory maintains service contracts for all of the major instrumentation in the laboratory, such as Gas Chromatographs, Atomic Absorption Spectrophotometer, GC/MS systems, and the Inductively Coupled Plasma Spectrometer.

14.2.2 The Laboratory and Testing Services Subsection has its own in-house instrument repair shop, machine shop, and electrical equipment testing facilities and qualified personnel.

14.2.3 Instruments are monitored by the use of daily calibration, sensitivity, and response checks to determine when nonscheduled maintenance is required.

Instrument operators perform routine maintenance checks on the respective instruments.

14.2.4 Preventive Maintenance Logs are kept for all instrumentation and equipment. They are kept adjacent to the respective instrumentation.

15 CORRECTIVE ACTION

Corrective action is a process by which analytical error is evaluated to point source analytical outliers. Whenever the analytical process is out-of-control, investigation/corrective action will be initiated by one or more individuals.

The analyst must be able to recognize out-of-control conditions and immediately notify the supervisor of the necessary corrective action.

The Quality Control Officer must notify the Laboratory Manager, help identify and solve the problem where applicable, and ensure that no suspect data is reported.

The immediate supervisor must review all analytical and quality control data for precision, accuracy, calculation errors, and completeness.

The Laboratory Manager will review all data to ensure that it meets all required QA criteria prior to its release.

15.1 Factors that affect data quality:

15.1.1 Systematic error

- 15.1.1.1 Calibration error
- 15.1.1.2 Consistent blank contamination
- 15.1.1.3 Expired standards
- 15.1.1.4 Operator bias
- 15.1.1.5 Interference
- 15.1.1.6 Matrix effects
- 15.1.1.7 Instrument sensitivity
- 15.1.1.8 Incorrect method use
- 15.1.1.9 Poor training
- 15.1.1.10 Consumables
- 15.1.1.11 Sample specifications

15.1.2 Random error

- 15.1.2.1 Calculation error
- 15.1.2.2 Contamination
- 15.1.2.3 Dilution factor

15.1.2.4 Instrument shifts
15.1.2.5 Mislabeled sample
15.1.2.6 Poor sample preparation
15.1.2.7 Poor surrogate recovery
15.1.2.8 Transcription error
15.1.2.9 Wrong units reported
15.1.2.10 Customer requirements

When re-analysis of sample batches is necessary, the resulting analysis will be investigated in a step-by-step method to isolate and correct faulty operations. The effectiveness of the corrective action shall be verified by the analysis of a QC blind sample.

The Quality Control Officer shall document corrective action taken on the corrective action form.

15.2 Documentation of Corrective Action:

All out-of-compliance instances will be documented using a corrective action form. This form should be used by the analyst, supervisor, and Quality Control Officer and Lab Manager whenever an out-of-control situation is recognized. The report should include the following information:

15.2.1 EPA or ASTM Method #
15.2.2 Instrument/Detector
15.2.3 Description of problem
15.2.4 Dates (data recognized, date occurred, date corrected)
15.2.5 Number of samples affected
15.2.6 Cause of problem – known or suspected
15.2.7 Corrective action taken
15.2.8 Resolution of problem
15.2.9 Signatures of analyst, QC officer, Lab Manager

15.3 Quality Assurance Reports

15.3.1 Reports of all quality control parameters that are outside warning and/or control limits are given to the supervisor and Quality Assurance Manager for review and corrective action. As a minimum, the reports shall contain the Environmental Lab log number, analysis, date, analyst name, analyses results outside of limits, and established limit(s) that were exceeded.

15.3.2 Data cannot be reported to the client until corrective action validates the result. The Quality Assurance Manager receives a copy of the report, so that corrective action will proceed in a timely manner.

15.3.3 To supplement the routine quality control reporting, all events that significantly affect the Quality Assurance Program are reported to the

Quality Assurance Manager, who subsequently notifies it to the Laboratory Management

15.3.4 The LIMS system generates Quality Assurance Reports and is provided to clients if requested.

16 REFERENCES

Methods for Chemical Analysis of Water and Wastewater, EPA-600/4-79 020, revised March 1983 and EPA-600/4-84-017, March, 1984.

Standard Methods for the Examination of Water and Wastewater, APHA, AWWA and WPCF.

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition.

Criteria for Identification of Hazardous and Extremely Hazardous Wastes, California Code of Regulations, Title 22, Article 11.

Draft Method for Total Petroleum Hydrocarbons and Total Organic Lead, Draft Method Available from Hazardous Materials Laboratory, California Department of Health Services 1625 Shattuck Avenue, Room 101 Berkeley, CA 94709-1611.

40 CFR, Part 136.General Requirements for the Competence of Testing and Calibration Laboratories, ISO/IEC 17025, Internal Standard, 2nd edition, 2005.

Chemical Hygeine Plan. Los Angeles Department of Water and Power, Environmental Laboratory, May 2008.

ORA Laboratory Manual 2004. U.S. Food and Drug Administration, August 18, 2003.

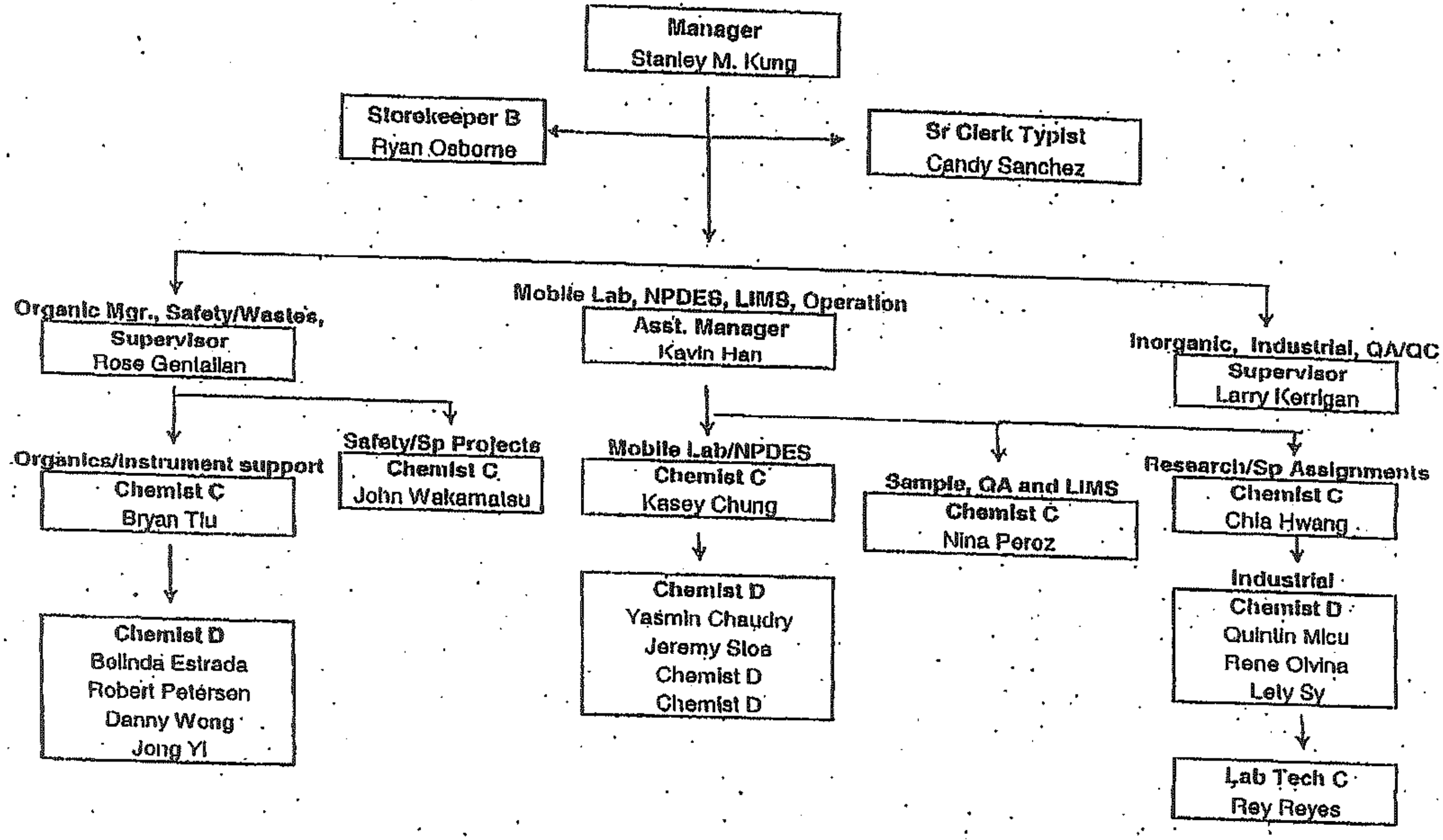
'Code of Ethics', Section 10-03, Department of Water and Power Administrative Manual, 1988.

Appendix A

Environmental Laboratory Organizational Chart

Interim Organization Chart

Environmental Laboratory, Water Quality and Compliance
1630 North Main Street, Building 7
14-Dec-10



Appendix B

Samples of Chain of Custodies

Environmental Laboratory
1630 N. Main Street, Bldg 7
Los Angeles, CA. 90012
(213) 367-7248/7399
(213) 367-7285 FAX

Department of Water and Power
City of Los Angeles
Chain of Custody Record

COC # :

Page __ of __

Report C# ________ JC# ________ WO# ________
Refrig#. ______ Shelf ______ Bin#. ______
Initial of Field Personnel: ☐
No. of Field Test ☐

Sample Location ____________________

Chem Lab use only CHEMISTRY LOG NUMBERS (For sample duplicates use 1 to X)	Sample Date	(24 Hr) Sample Time	Sample Location and Description	Preservatives	Container			Sample Matrix	Analysis Required	Test Result	Analyst(s) Assigned
					No.	Type	Size				
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											

Date & Time Stamp

Chem Lab COC Form #1
Revision: 10/2/2001

>> COC Label Here <<

Requested by. __________ Organization / Div. __________
Address. __________ Tele. __________ Fax. __________

Analyst ________ date ______
Approved by ________ date ______

Priority
2-4 Hrs
1Day
2 Wks
4Wks
Specify

Printed Name	Signature	Time	Date
Sampled by:	Sampled by:		
Relinquished by:	Relinquished by:		
Received by	Received by		

Environmental Laboratory

1630 N. Main Street, Bldg 7
Los Angeles, CA. 90012
(213) 367-7248/7399
(213) 367-7205 FAX

Department of Water and Power
City of Los Angeles

Chain of Custody Record

(For samples going to outside laboratory)

Site Description: ____________________

RMS# __________ S/PO#

COC # __________ Page OF

(Please attach a copy of this COC to the original COC)
Storage Location ____________________

Supervisor Approval: ____________________ (This signature and RMS # are required for authorizing payment)

LOG NUMBERS	Sample Date	Collection Time	DWP Log Number	Preservative	Container		Analysis Required	Analytical Method
					Size	No.		
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								

Please send and fax the test results and report(s) to Environmental Laboratory ONLY. Fax number (213) 367-7285
Sample log numbers must be transmitted as part of the billing process. If bills are submitted without relevant sample log numbers, such bill cannot be approved for payment.

Date and Time
sample received

Chem Lab COC Form 83
Revision 9/09/03

Bulk Needed?

Sent Report to: Mr. Stanley M. Kung
Address: P.O. Box 51111, 1630 N. Main St., Bldg.#7, Los Angeles CA 90012
Tele. (213) 367-7270
Fax. (213) 367-7285

Printed Name	Signature	Time	Date
Prepared by:	Prepared by:		
Relinquished by:	Relinquished by:		
Received by	Received by		

Contract Laboratory: ____________________