QUALITY ASSURANCE DOCUMENT OF THE COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY

LABORATORIES SECTION

1965 South Workman Mill Road
Whittier, California 90601

July 2003

The Laboratories Section of the Sanitation Districts of Los Angeles County operates ten environmental laboratories. Each laboratory operates under one centralized quality assurance program and follows this Quality Assurance Document. The ten laboratories are listed below:

	LABORATORY NAME	ADDRESS
1.	San Jose Creek Water Quality Laboratory	1965 South Workman Mill Rd. Whittier, CA 90601
2.	Joint Water Pollution Control Plant Water Quality Laboratory	24501 South Figueroa St. Carson, CA 90745
3.	San Jose Creek Treatment Plant Laboratory	1965 South Workman Mill Rd. Whittier, CA 90601
4.	Los Coyotes Treatment Plant Laboratory	16515 S. Piuma Avenue Cerritos, CA 90701
5.	Long Beach Treatment Plant Laboratory	7400 Willow St. Long Beach, CA 90815
6.	Whittier Narrows Treatment Plant Laboratory	301 N. Rosemead Blvd. El Monte, CA 91733
7.	Saugus Treatment Plant Laboratory	26200 Springbrook Ave. Saugus, CA 91350
8.	Pomona Treatment Plant Laboratory	295 Humane Way Pomona, CA 91766
9.	Valencia Treatment Plant Laboratory	29185 The Old Road Valencia, CA 91355
10.	Lancaster Treatment Plant Laboratory	1865 W. Avenue D Lancaster, CA 93534

This Quality Assurance Document has been reviewed by the Technical Services / Laboratories Section staff. The signatures below indicate that the plan is being accepted and that the contents shall be implemented in the Laboratories Section's daily activities.

Dwayne F. Fischer, Manager of Laboratories — Date: 7/28/03

Elly M. Gabrielian, Superintendent of San Jose Creek Water Quality Laboratory — Date: 7/22/03

Jean Lee, Superintendent of Joint Water Pollution Control Plant Water Quality Laboratory — Date: 7/22/03

H. Kent Seitz, Supervisor of Treatment Plant Laboratories — Date: 7/22/03

Maria Y. Pang, Supervisor of Quality Assurance/Sample Receiving — Date: 7/28/03

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INTRODUCTION

The County Sanitation Districts of Los Angeles County serve the water pollution control and solid waste management needs of approximately five million people in seventy-eight cities and unincorporated areas within Los Angeles County. The Districts operate 11 wastewater treatment plants and three active sanitary landfills, and the Laboratories Section provides the analytical support services relating to the operation of these facilities. The Laboratories Section also provides technical support to the Districts' Industrial Waste Section, the Los Angeles County District Attorney's Environmental Crimes and OSHA Division, and the U.S. Department of Justice.

QUALITY PROGRAM OBJECTIVE

This quality assurance plan was prepared by the County Sanitation Districts of Los Angeles County Laboratories Section with the ultimate goal of generating the quality of data necessary to meet the needs of the Districts' laboratories and the requirements of different regulatory agencies (California State Water Resources Control Board, California Department of Health Services, U.S. Environmental Protection Agency) for compliance purposes. It encompasses all phases of the laboratories' daily activities, starting from sample collection to data reporting.

CAPABILITIES

The Districts' laboratories perform analyses for wastewater and hazardous waste testing mandated by regulatory agencies in support of the Clean Water Act (CWA) and the Resource Conservation and Recovery Act (RCRA). Eight treatment plant laboratories have the capability to routinely analyze daily monitoring and control of wastewater treatment plant process parameters. Two larger laboratories are capable of analyzing wastewater and hazardous waste samples involving more sophisticated analytical protocols and equipment. There are research groups in the Laboratories Section that develop and validate new methodologies for the laboratories to keep abreast of current technology. These activities include, but are not limited to, analyses for regulated and non-regulated parameters and contaminants, the majority of which are listed in each respective laboratory's certificate. (Figures 1 to 10).

FACILITIES

The Districts' laboratories are adequately equipped to enable them to perform routine and non-routine duties. The names of the laboratories and their locations are found in Page i of this document.

At the San Jose Creek Water Quality Laboratory (SJCWQL), separate areas are assigned for GC and GC/MS, metals (atomic absorption, ICP, and graphite furnace AA) and ion chromatography analyses. Separate locations are specifically designated for inorganic analyses, organics extractions, metals digestions, microbiological testing, research, and sensitive bioassays. Other

locations are designated for sample receipt, log-in, and storage. There is also a main stockroom where supplies and chemicals are dispensed.

The Joint Water Pollution Control Plant Water Quality Laboratory (JWPCPWQL) has similar specified areas in their laboratory building dedicated to various aspects of laboratory functions.

Each treatment plant has a laboratory facility where samples collected by laboratory personnel can be processed and analyzed promptly and independently.

EQUIPMENT

Major equipment used by Districts' laboratories include, but are not limited to, the following:

- Atomic absorption spectrometers with flame, electrothermal, hydride, and cold vapor techniques
- Inductively coupled plasma atomic emission spectrometers
- Gas chromatographs with various detectors: thermal conductivity, electrolytic conductivity; electron capture; flame ionization; photoionization; mass spectrometer
- High performance liquid chromatography instruments with UV/photodiode array, fluorescence, or mass spectrometer detectors
- Total organic halide analyzer
- Total organic carbon analyzer
- Ion chromatograph
- Flow Injection Analyzer
- Pure water systems

Other equipment found in Districts' laboratories include:

- Pensky-Martens Closed-Cup Flashpoint apparatus
- UV/VIS spectrophotometers
- Specific ion meters and electrodes
- Dissolved oxygen meters
- Microscopes
- Solvent-recovery apparatus
- Incubators/circulating baths
- Computers / printers
- Furnaces/ovens
- Fourier Transform Infrared Spectrometer
- Spectrofluorometer
- Turbidimeters
- Conductivity meters
- pH meters
- Autotitrators
- Solid phase extraction apparatus
- Analytical and top-loading balances
- Freezers / refrigerators/coolers
- Purge and trap concentrators
- Autosamplers

I. Organization of the County Sanitation Districts of Los Angeles County

1. The County Sanitation Districts of Los Angeles County consists of seven major departments: Office Engineering; Solid Waste Management; Sewerage; Technical Services; Financial Management, Human Resources; and Administrative Services (Figure 11A).

2. All seven departments are responsible for their activities to the Chief Engineer and General Manager as well as the Assistant Chief Engineer and Assistant General Manager.

3. The Chief Engineer and General Manager reports to the Board of Directors of the Sanitation Districts.

II. Organization of the Laboratories Section of the County Sanitation Districts of Los Angeles County and Qualifications and Background of Personnel

1. Laboratories Section

1.1 The Laboratories Section falls under the jurisdiction of the Technical Services Department and is under the direction of the Manager of Laboratories (Figure 11B).

1.2 The Laboratories Section consists of five major subsections: San Jose Creek Water Quality Laboratory (SJCWQL), Joint Water Pollution Control Plant Water Quality Laboratory (JWPCPWQL), Treatment Plant Laboratories (TPLs), Quality Assurance/Sample Receiving, and Laboratory Services. A total of 144 permanent employees currently work in managerial, supervisory, scientific, technical, subprofessional and clerical laboratory positions. The Laboratories Section also has individuals employed on a part-time or temporary basis.

1.3 Each subsection has either a Superintendent or Supervisor who reports directly to the Manager of Laboratories (Figure 12). The Superintendents of SJCWQL and JWPCPWQL, the Supervisor of the Treatment Plant Laboratories, the Supervisor of Laboratory Services, and the Supervisor of Quality Assurance and Sample Receiving are responsible for the over-all operation of the subsection(s) under their jurisdiction.

1.4 The Superintendent or Supervisor is assisted by group supervisors and supervising professionals who are responsible for the activities of individual technical groups under them. They directly oversee the daily activities of their respective groups. Most laboratory supervisors and managers have a bachelor's degree or an advanced degree in chemistry, biology, microbiology, or a closely related science, from an accredited college or university in addition to experience in the environmental field.

1.5 Chemists, microbiologists, and biologists comprise the professional staff. The minimum entry requirement for these positions is a bachelor's degree in the respective science or a closely related field, or performing professional level analyses in the respective science for a specified number of years. A number of Section professionals also have advanced degrees and many have previous experience in water quality laboratories.

1.6 Laboratory technicians work in the same three branches of science noted above. The minimum entry requirements are an AA degree or twelve college units in the specific science. Many of the technicians have more college education and wide experience in the field. Most have four-year college degrees in the science field.

2. **San Jose Creek Water Quality Laboratory**

The SJCWQL subsection includes separate groups involved in chemistry, microbiology, biology, and research. The supervisor of each group reports to the Superintendent of SJCWQL (Figure 13).

2.1 The analytical chemistry work is subdivided into a Wet Chemistry group and an Instrumental Chemistry group. The Wet Chemistry group is under the direction of a Laboratory Supervisor and is currently staffed by a senior chemist, one chemist, one senior technician, and six technicians. The Instrumental Chemistry group is under the direction of another Laboratory Supervisor who is assisted by two supervising chemists. The group is staffed by four senior chemists, five chemists, one senior technician, five technicians, and three attendants. These groups perform chemical analyses required for monthly National Pollutant Discharge Elimination System (NPDES) permit monitoring of the inland water reclamation plants. In addition, they analyze industrial wastes, ocean sediment samples, groundwater, hazardous wastes, and other special samples requiring sophisticated methodologies. These groups also perform weekly, monthly, semi-annual and annual analyses of the San Gabriel and Santa Clara Rivers.

2.2 The Microbiology group at SJCWQL does some routine monitoring, but is primarily concerned with process laboratory research programs. In addition to all phases of coliform testing, work is carried out in parasitology, pathogens, bacteria, mycology, virology, and molecular biology. Two senior microbiologists, three microbiologists, and two senior microbiology technicians report to a Microbiology Laboratory Supervisor. Two technicians employed on an hourly basis extend the staffing to seven days per week.

2.3 The Biology group is comprised of a Laboratory Supervisor, two senior biologists, two biologists, and six laboratory technicians. The major responsibility for the Biology group of the SJCWQL is the performance of acute and chronic bioassays and toxicity reduction/identification evaluations on plant effluents and receiving waters using standard toxicity test procedures developed by the EPA. The Biology group is also responsible for weekly monitoring and

sample collection of the San Gabriel and Rio Hondo Rivers, and Coyote Creek as required by the NPDES permits for the San Jose Creek, Whittier Narrows, Los Coyotes, and Long Beach water reclamation plants. In addition, research bioassays are conducted in special areas of interest including alternative statistical analysis and interpretation techniques for toxicity data and estrogenic activity of wastewater and groundwater samples.

2.4 The Research Group is under the direction of a Laboratory Supervisor. The group consists of two research chemists, one senior chemist, one chemist and two technicians who conduct research in areas related to wastewater treatment and analysis, adopt procedures from the literature, develop techniques based on in-house expertise, conduct specialized test procedures of a non-routine nature and publish papers and reports. In addition, the group consults with and provides technical expertise on wastewater and hazardous wastes issues within the Districts. Research chemists also work closely with outside agencies and academic institutions on multiple research projects that are of benefit to the overall operational goals and objectives of the Districts. The group also works closely with the County District Attorney's office and other law enforcement agencies involved with environmental crimes issues.

3. Joint Water Pollution Control Plant Water Quality Laboratory

The JWPCPWQL subsection includes separate groups involved in inorganic chemistry, organic chemistry and air toxics, microbiology, and research. The supervisor of each group reports to the Superintendent of the JWPCP Laboratory (Figure 14).

3.1 The Inorganic Chemistry group is under the direction of a Laboratory Supervisor who is assisted by a supervising chemist. The group can be considered as three subgroups:

3.1.1 Process Control carries out the daily monitoring required for the Joint Water Pollution Control Plant (JWPCP). Process Control operates 365 days/year and is staffed with a chemist, a senior laboratory technician, two laboratory technicians, and one laboratory attendant. Most of the analyses performed are the same as those performed at the inland plant laboratories. The majority of the data generated by Process Control is not logged-in, but is entered into a different database, designated Technical Database for JWPCP (TDJ). See Appendix 2 for a description of TDJ.

3.1.2 Wet Chemistry carries out traditional chemical analyses that are not required on a daily basis (e.g. cyanide, boron, fluoride, total hardness, etc.). They also set up complex, non-routine analytical procedures. Wet Chemistry has one senior laboratory technician and two laboratory technicians.

3.1.3 The Metals group analyzes liquid and solid samples for a variety of metals using atomic absorption spectrophotometry, with an emphasis on hydride generation analysis of arsenic, selenium, and antimony. The group is staffed with one chemist and four laboratory technicians.

3.2 The Organic Chemistry group is under the direction of a Laboratory Supervisor and is responsible for the pesticide analysis of sewage, sediments, fish, sludge, and well waters. The group also carries out the Districts' monitoring for toxic and related air halocarbons, aromatics, sulfur compounds, and permanent gases in air and gas samples from sanitary landfills and wastewater treatment facilities. The group has one senior chemist, three chemists, and three laboratory technicians.

3.3 The Research Group is under the direction of a Laboratory Supervisor. The group generally carries out research and analytical methods development work related to the analysis of environmental pollutants present in air and gas samples. This would include the analysis of volatile organic compounds (VOCs), sulfur gas compounds, amines, carboxylic acids, hydrocarbons, oxygenates, and odorant compounds. It also carries out other troubleshooting and special project work related to environmental chemistry. It has employed GC, GC-MS, solid phase microextraction (SPME), UV-Visible spectrometry, electrochemical, cryogenic/low temperature, olfactory detection, and IC techniques. The group is staffed with one research chemist, two senior chemists, and two chemists.

3.4 The Microbiology group is responsible for performing NPDES permit monitoring at the shoreline, nearshore and outfall stations for total coliform, fecal coliform and enterococcus bacteria. Shoreline and outfall monitoring is performed 365 days a year. Total chlorine residual analyses are also performed daily at the outfall. The group also monitors the JWPCP biosolids for fecal coliform and *Salmonellae*, supports Districts research projects, and performs emergency monitoring as needed. A Laboratory Supervisor is in charge of this group which consists of two microbiologists, a senior laboratory technician, and four laboratory technicians.

4. **Treatment Plant Laboratories**

The Treatment Plant Laboratories (TPLs) group consist of eight facilities: Long Beach, Los Coyotes, Whittier Narrows, San Jose Creek East/San Jose Creek West, Pomona, Saugus, Valencia and Lancaster (Figure 15).

The group is under the direction of a Laboratory Supervisor along with a supervising chemist and two chemists. Each treatment plant laboratory has a senior laboratory technician and one or more laboratory technicians, and is staffed seven days a week.

The TPLs are primarily concerned with the daily process control of the water reclamation plants. Special research projects in conjunction with process control modifications are

also conducted in the laboratories. Additional duties of the TPLs include daily, weekly, bi-weekly, monthly, and semi-annual monitoring pursuant to NPDES discharge permits.

5. Quality Assurance / Sample Receiving

The Supervisor of the Quality Assurance and Sample Receiving oversees a group composed of one senior chemist, one chemist, one senior laboratory technician, four laboratory technicians, and one laboratory attendant (Figure 16). Quality Assurance personnel are responsible for improving and maintaining the validity and reliability of data produced in the Laboratories Section. The Sample Receiving personnel are responsible for collecting samples for NPDES monitoring and research projects, and receiving and handling all other samples submitted to the laboratories for analysis.

6. Laboratory Services

The Laboratory Services group is made up of a Laboratory Supervisor, one Laboratory Storekeeper, one Stock Clerk, and one General Services Worker (Figure 17). The stockroom staff maintains the inventory of laboratory supplies, prepares the laboratory order requisition forms, receives deliveries, and coordinates payment of invoices for the items and services received. The group is also responsible for evaluating and authorizing the maintenance and repairs to the laboratory facilities, providing for the proper disposal of the laboratory hazardous waste, and maintaining the MSDS files at the SJCWQL.

7. Job Description and Responsibilities of Key Staff

7.1 Manager of Laboratories

The Manager of Laboratories receives directions from the Technical Services Departmental Engineer. The Manager of Laboratories plans, organizes, and directs the overall activities of the Districts' water quality and process control laboratories. He exercises administrative direction and technical guidance over professional scientific, technical laboratory, and clerical employees.

Other duties and responsibilities involve managing and coordinating the activities of the Laboratories Section to provide chemical, bacteriological, biological, and physical testing of environmental samples related to the operation of Districts' water reclamation plants and landfills. The Manager directs the preparation of reports regarding the effect of Districts' operation on the environment and demonstrated compliance with Federal and State standards, initiates specialized testing and analyses, studies, and research projects, and analyzes laboratory data and reports. He also prepares the laboratory budget and authorizes expenditures; recommends and approves improvements in procedures, equipment and materials; represents the laboratories at meetings and conferences; recommends and consults

regarding the design of the laboratories; formulates and implements laboratory policies; is responsible for the Laboratory safety program; recommends personnel actions; evaluates the work of subordinates; and performs related duties as required.

7.2 Assistant Manager of Laboratories

The Assistant Manager of Laboratories position is currently vacant.

7.3 Superintendent of San Jose Creek Water Quality Laboratory

The Superintendent of SJCWQL reports to the Manager of Laboratories. She directs, coordinates, and evaluates the work of subordinate laboratory supervisors, prepares and reviews laboratory reports and correspondence, and reviews laboratory data. She also participates in the planning of new projects with engineering and other technical staff, coordinates interdisciplinary scientific projects, implements laboratory policies and recommends personnel actions.

7.4 Superintendent of the Joint Water Pollution Control Plant Water Quality Laboratory

The Superintendent of the JWPCPWQL reports to the Manager of Laboratories. She insures the validity of, and approves data generated by the laboratory. She is involved in the automation of laboratory tasks and computerization of all data handling, and developing the laboratory capabilities to include the most current analytical methodologies.

7.5 Supervisor of Quality Assurance/Sample Receiving

The Supervisor of the Districts' quality assurance program for the laboratories also oversees the operation of the sample receiving group at the San Jose Creek facility. She is responsible for obtaining and maintaining the accreditation of the laboratories and ensuring that the data is produced following standard operational procedures and meets the end user's reporting criteria. She also supervises the sample receiving personnel to ensure the samples are properly logged-in, stored, and distributed to the correct laboratory analytical groups. The collection of samples related to the discharge permits of the Districts' wastewater treatment plants is also under her supervision.

7.6 Supervisor of Treatment Plant Laboratories

The Supervisor of Treatment Plant Laboratories supervises professional and non-professional laboratory personnel at eight Districts treatment plant laboratories. He evaluates data generated at the laboratories and provides technical assistance pertaining to laboratory and treatment plant problems.

7.7 Supervisor of Laboratory Services

The Supervisor of Laboratory Services provides technical assistance pertaining to the proper operation of the District laboratories, ensuring that all aspects of the facilities are fully functional. He evaluates any problems and authorizes the maintenance or repairs, whether by District personnel or outside contractors, to make certain that all needed utilities are available as needed for the laboratory. He also supervises the operation and personnel of the laboratory stockroom.

7.8 Group Supervisors, SJCWQL

7.8.1 The Supervisor of the Instrumentation Group at SJCWQL provides supervision to a group responsible for the analysis of trace heavy metals, pesticides and PCBs, PAHs, volatile organic compounds, and base/neutral/acid extractables. He insures that proper sample handling and holding times are observed and appropriate methods are being used in performing the analyses; checks that the prescribed QA/QC protocols are being followed, and confirms that all analysts have the necessary training to perform analytical tasks safely and accurately. He is also responsible for checking the validity and integrity of data generated by his group.

7.8.2 The Supervisor of the Analytical Chemistry Group at SJCWQL takes charge of analytical laboratory operations dealing with analysis of samples for conventional constituents in wastewater, soil, sludge, and sediments. He is responsible for the analysts' training, performance evaluations, data quality, work distribution with chain of custody provision, and updating methodologies in compliance with requisites of regulatory agencies. He also offers consulting services to interlaboratory groups and other agencies.

7.8.3 The Supervisor of the Microbiology Group at SJCWQL is responsible for environmental research and program management, specifically in the public health aspects of water reclamation, water reuse, and waste solids recycling. He coordinates the activities of a scientific staff of microbiologists with engineering projects, and is responsible for managing the microbiology phase of research programs in public health aspects of water reclamation and reuse and sludge utilization. The group performs analyses and studies in areas of indicator and pathogenic bacteriology, parasitology, mycology, and virology.

7.8.4 The Supervisor of the Biology Group at SJCWQL directs the work of biologists and technicians in marine and fresh aquatic biology. He supervises the collection of water samples for chemical and biological analyses, maintains a state-certified bioassay laboratory such that all bioassay requirements by the State Water Resources Control Board are met. He coordinates, performs, and/or supervises the various aspects of routine and research bioassay testing, trains, assigns, and supervises biologists and laboratory technicians in the performance of chemical and biological testing,

and consults with the Manager of Laboratories and engineering groups on investigative projects.

7.8.5 The Supervisor of Research at SJCWQL supervises a group that is responsible for conducting research in areas related to wastewater treatment and testing, development and validation of new test protocols, the initial setup of new instruments to be used by Districts laboratories and conducting non-routine analyses on an as-requested basis. He also provides technical expertise and analytical support to the County District Attorney's Environmental Crimes and OSHA Division.

7.9 Group Supervisors, JWPCPWQL

7.9.1 The Supervisor of Inorganic Chemistry at JWPCPWQL supervises the work of three subgroups: Wet Chemistry, Process Control, and Metals. He troubleshoots and investigates methods and problematic samples, and implements QA/QC in the group's daily operations. He reviews all data generated by the group, and evaluates laboratory performance of the analysts he supervises. He reports to the Superintendent of JWPCPWQL.

7.9.2 The Supervisor of Organic Chemistry at JWPCPWQL is responsible for the activities and operations of the group which analyzes air and gas samples for toxic organic components, sulfur compounds and permanent gases, wastewater, well water, sludge and sediment samples for pesticides, and fish samples for pesticides, PCBs, lipids, and moisture. He also supervises the analysis for surfactants (MBAS) and phenols. He is responsible for insuring that all analysts in the group observe proper QA/QC practices to insure the quality and validity of results, and reports to the Superintendent of JWPCPWQL.

7.9.3 The Supervisor of Microbiology at JWPCPWQL coordinates a staff responsible for bacteriological monitoring as required by the JWPCP-NPDES and biosolids reuse permits. Other NPDES required testing include the daily analysis of the Districts' outfall for total chlorine residual. Additional work may include method analysis and treatment plant process monitoring related to biological reactors and digesters. The supervisor is responsible for evaluating the laboratory performance including QA/QC practices and reporting verified data to the Superintendent of JWPCPWQL.

7.9.4 The Supervisor of Research at JWPCPWQL directs research and analytical methods development work related to environmental chemistry and pollution control. Most of this work has been concerned with the field of air pollution chemistry, but some projects have involved water pollution and solid waste issues. He also coordinates the activities of his group with the other scientific and engineering groups in order to troubleshoot problems and develop better analytical techniques. He evaluates the performance of the laboratory staff,

acts as a technical consultant to the engineering staff, and writes technical reports and proposals.

III. **Quality Assurance Procedures**

1. **The Quality Assurance Group**

1.1 The Quality Assurance staff is charged with the responsibility of monitoring the validity and reliability of data generated by the Districts' laboratories to comply with the requisites of the California State Water Resources Control Board, California Department of Health Services and the U.S. Environmental Protection Agency. The group's main concern is to improve and maintain the laboratories' performance by:

1.1.1 Reviewing and updating the Quality Assurance Document and making necessary changes in the program to continually improve the quality of data that the laboratories generate.

1.1.2 Managing the Laboratories Section's written Standard Operating Procedures, starting from sample collection and log-in through sample flow and storage to analysis and data reporting.

1.1.3 Establishing guidelines on intra-laboratory quality assurance practices including, but not limited to, the use of sample and reagent blanks and daily calibration standards, laboratory control standards, duplicate and matrix spike samples (or matrix spike duplicates if applicable) to assess precision and accuracy.

1.1.4 Maintaining an on-going inter-laboratory quality control program by the preparation and distribution of QA reference standards, split samples and blind samples, where feasible.

1.1.5 Organizing the Laboratories Section's participation in proficiency testing to comply with the California Environmental Laboratory Accreditation Program (ELAP) and the USEPA Discharge Monitoring Report-Quality Assurance (DMR-QA) requirements.

1.1.6 Ensuring that samples are collected and analyzed according to the laboratory Standard Operating Procedures and that all data are calculated and reported in units comparable and consistent with the regulatory agencies' requirements.

1.1.7 Reviewing control charts and acceptable performance limits for both precision and accuracy for analytes determined in the laboratories.

1.1.8 Affirming that corrective action is performed and documented whenever the

analysis of blanks, laboratory control standards, laboratory duplicates or spikes is out of control.

1.1.9 Requiring contract laboratories to provide a QA/QC data package for samples submitted for specific programs and projects to ensure that required quality criteria are met.

1.1.9 Performing periodic audits of the laboratories to ensure that the Quality Assurance Document is followed.

2. Sampling Procedures and Chain of Custody, Including Sample Control and Sample Flow

2.1 Special instructions for sample collection, the correct types of sample bottles, methods of sample preservation if needed, and holding periods are given to sample collection personnel and analysts. (Table 1).

2.2 Sample request forms, sample tags and labels, and other sample tracking documentation are included during sample submittal. Figures 18A to 18G show copies of these forms.

2.3 Sample containers and chemical preservatives are supplied by the sample receiving station at SJCWQL.

2.4 Sample chain of custody employed varies from facility to facility within the Laboratories Section. At each facility, it is specifically tailored to produce efficient sample handling and to insure sample integrity.

2.5 Treatment Plant Laboratories

2.5.1 Routine composite samples are collected in refrigerated automatic samplers.

2.5.2 Each sampler contains six buckets on a platform that rotates 60 degrees every four hours.

2.5.3 There is pump-driven or gravity flow through the sampler constantly to keep lines clear.

2.5.4 The flow is briefly diverted into the sample bucket every fifteen minutes.

2.5.5 The six four-hour composites are manually flow-composited by the TPL technician each morning.

2.5.6 The bottles used for sampling are previously marked with permanent identification and are washed and reused everyday.

2.5.7 The chain of custody is simple: The technician removes the sample from the sampler, makes a flow composite, transfers the sample to a marked sample bottle, carries the bottles to the laboratory, and performs the analyses.

2.5.8 The same chain of custody applies to grab samples for special tests (pH, temperature, chlorine residual, etc.). The technician collects, transports, and analyzes the samples.

2.5.9 Samples that are exported to other laboratories have a formal chain of custody. This is generated at the TPL and accompanies the samples to SJCWQL, where they are relinquished to Sample Receiving.

2.6 Joint Water Pollution Control Plant Water Quality Laboratory (JWPCPWQL)

2.6.1 Midnight to midnight 24-hour composite samples are collected for daily, weekly, and monthly testing. Grab samples are also collected for daily testing.

2.6.2 Liquid samples are collected as flow-weighted composites by refrigerated automatic samplers. Sludge and cake composite samples are collected as discrete grab samples throughout the period by plant operators. These grab samples are placed in permanently marked containers and refrigerated.

2.6.3 At midnight, plant operators change sample containers and move the composites to refrigerated storage, either in the laboratory's walk-in cold room or in refrigerators located throughout the treatment plant.

2.6.4 The JWPCPWQL has a designated sample receiving station staffed by one laboratory attendant. The attendant is responsible for introducing samples into the laboratory's sample control system.

2.6.5 In the morning, the laboratory attendant collects the samples and transports them to the laboratory. Since the buckets are permanently marked, and there is only one sample per day from each sampler, there can be no confusion regarding sample identity.

2.6.6 Each routine plant sample is uniquely identified in the TDJ database. A permanent number is given to each sample, and it is also designated by location code, sub-location code, and sample type. The sample date is also part of the permanent data record, distinguishing one day's sample from that of another day. (See Appendix 2 for description of TDJ database.)

2.6.7 Analyses of all routine samples are done the day the samples are brought into the laboratory, and most of the samples are discarded on the same day. Any samples that must be saved are poured into appropriate sample containers,

labeled, and placed in the laboratory walk-in refrigerator for storage.

2.6.8 Composite samples that require more extensive testing (e.g. monthly NPDES permit monitoring) are logged into the Districts' LABDATA database by the laboratory attendant. Each sample is identified by a unique log number starting with JW, followed by five digits.

2.6.9 Additional non-routine samples may be collected by engineering aides and others and are submitted to the laboratory for various analyses. The samples are accompanied by sample request sheets or memos indicating analyses desired. These samples are also logged-in to the LABDATA database by the laboratory attendant.

2.6.10 Some JWPCP samples are analyzed at other laboratories. The JWPCPWQL sample receiving station transfers control of these samples to the SJCWQL sample receiving station. The samples are then either analyzed at SJCWQL or at a contract laboratory.

2.7 San Jose Creek Water Quality Laboratory (SJCWQL)

2.7.1 The sample receiving station at SJCWQL is under the direction of the Quality Assurance supervisor. Direct oversight of the station is provided by a Senior Chemist. The station is staffed with one senior technician, three technicians, and one attendant. The staff conducts field sampling and also accepts a wide variety of samples submitted to the laboratory by other personnel.

2.7.2 Treatment plant and receiving water samples for process control and NPDES permit monitoring are collected by sample receiving staff or TPL technicians. Depending on the test parameters, these samples are analyzed at the TPLs or at other laboratories. The samples designated for SJCWQL, JWPCPWQL, or commercial laboratories are transported to the SJCWQL sample receiving station for log-in.

2.7.4 A variety of other samples may be submitted to SJCWQL by non-laboratory personnel from the Districts' other departments (Sewerage, Solid Waste, Industrial Waste, etc.) or from Hazardous Materials investigators.

2.7.5 All samples submitted to the SJCWQL sample receiving station are assigned unique ID numbers and are electronically logged in. A description of the Laboratories Section's LABDATA data system can be found in Appendix 1 of this document.

2.7.6 Samples taken for possible legal action are subjected to specialized chain of custody procedures, and stored by evidence sample custodians in dedicated, locked refrigerators.

2.7.7 All samples submitted to the SJCWQL use sample submission forms that are filled out by the sample collectors. Sample tags and labels are also included when samples are submitted to the Sample Receiving station.

2.7.8 The approval of the samples' analytical requests by the Laboratory Superintendent is required before analysis commences. Samples that require immediate analyses are delivered to the appropriate analyst. The remainders are properly stored and delivered to the analysts on the next working day.

2.7.9 Work assignment sheets are issued to each analyst daily, showing all pertinent identification information and the required tests.

3. Instructions for Use of Proper Sample Containers, Preservation and Storage of Samples and Holding Periods

3.1 Guidelines are provided to sample collectors and analysts in the use of proper sampling containers and sample preservation to maintain the integrity of the samples.

3.2 Holding periods are specified and must be adhered to.

3.3 Sample containers are chosen to minimize changes in the sample after it is taken. Characteristics that the containers must possess are: a) must resist attack by the sample or the preservative; b) must not absorb constituents of interest nor allow them to escape; c) must not add contamination which will appear in later analyses.

3.4 Appropriate sample containers are purchased from reputable laboratory suppliers who are required to provide certification of the cleaning procedures the containers undergo. Before being issued to sample collectors, each new batch of sample containers received is lot tested for contaminants that might compromise analytical results.

3.5 Suitable containers for sample collection include glass or polyethylene bottles and jars. Glass bottles or vials with TFE-lined caps are required for most samples collected for trace organic analyses.

3.6 Preservation techniques can be utilized for some samples to retard the chemical and biological changes that inevitably continue after the sample is removed from the source.

3.7 Methods of preservation are relatively limited and are intended generally to a) retard biological action, b) retard hydrolysis of chemical compounds and complexes, and c) reduce volatility of constituents.

3.8 Preservation methods are generally limited to pH control, chemical addition and refrigeration. Table 1 lists the various collection procedures, containers, and preservatives that may be used to retard changes in samples, and holding periods.

3.9 The acids used for preservation (hydrochloric acid, nitric acid, sulfuric acid) are lot tested for interfering contaminants prior to use.

4. Sources of Standards and Reagents

4.1 The use of reagent grade or better quality reagent chemicals is emphasized. Sources of chemicals and reagents include Fisher, EM, J.T. Baker, AccuStandard, Ultra Scientific, and other reputable manufacturers.

4.2 Chemicals and reagents are purchased through a single centralized stockroom supervised by the Laboratory Services Supervisor.

4.3 Stockroom personnel utilize an inventory system for reagents and chemicals which are stored and issued on a "first in, first out" rotating basis.

4.4 A record is kept of each reagent indicating chemical name, descriptive information, maximum stock level, and amount in stock. Inventory records are adjusted as goods are received or issued.

4.5 Certain materials are routinely screened before use. New lots of organic solvents used for extraction and analysis are tested for interfering contaminations prior to use. New lots of acids used for certain trace metals analyses are also checked before using.

5. Instrument/Equipment Operation and Maintenance

5.1 Operational procedure references.

5.2.1 A copy of the manufacturer's manual for operating each instrument is maintained and is accessible to any user. The manual is always consulted when a new analyst is being trained to correlate the manufacturer's guidelines with hands-on training. New analysts are encouraged to examine the manual at their leisure. This manual is also consulted any time problems arise.

5.2.2 Specific instructions on instrument set-up, operation and maintenance are also provided in the appropriate procedure in the laboratory manual. Where instruments find broad application, as in the case of pH meters, the QA group issues use and care guidelines to all laboratories.

5.3 Documentation of instrument/equipment calibration, inspection and maintenance.

5.3.1 Service contracts are provided for a number of major instruments. Copies of the contract and the scheduled maintenance are kept in the files of the supervisor responsible for the instrument. Instruments included are balances, gas and liquid chromatographs, mass spectrometers, plasma, flame or furnace spectrophotometers, etc. In addition, logbooks are maintained that contain the calibration and maintenance information for each instrument, including those performed by in-house personnel.

5.3.2 Spare parts for some instruments are kept on hand and stored in the laboratory using the instrument. Other parts are kept in stock at the central stockroom.

5.3.3 The QA group administers a thermometer calibration program. Thermometers used for ovens, incubators, water baths, effluent/sampling, and refrigerators are compared at multiple temperatures to certified thermometers traceable to NIST. A number is assigned to each thermometer and a record of all calibrated thermometers and their assignments or distribution is kept in the computer in logbook form. Any correction to the temperature reading is noted and passed on to the analyst during distribution.

5.3.4 Temperatures of ovens, incubators, refrigerators, and other ancillary equipment are monitored daily. The corrected temperature readings and any temperature adjustments are documented.

5.3.5 Colorimeters are calibrated for wavelength and absorbance by the issuance of a primary standard (cobalt ammonium sulfate solution).

6. **Measurements/Analyses**

6.1 The County Sanitation Districts of Los Angeles County has an in-house laboratory manual titled "Laboratories Section Procedures for the Characterization of Water and Wastes" prepared for use in the Districts' laboratories. The Quality Assurance group is currently uploading updated versions of the procedures to the Districts' document management system (CyberDOCS®). This will eventually replace the all-inclusive manual with an electronic version that allows immediate access to new or updated procedures to all authorized laboratory supervisors and analysts. With CyberDocs, Quality Assurance will be able to maintain the security and version control of the documents. CyberDOCS is accessed through the Districts' intranet.

6.2 All procedures used routinely for wastewater and hazardous waste analyses, and some non-routine analyses, are included in the manual or in CyberDOCS.

6.3 Approved references are used for the laboratory procedures. These include:

6.3.1 Standard Methods for the Examination of Water and Wastewater, 18th Edition 1992, 19th Edition 1995, and 20th Edition 1998.

6.3.2 U.S. Environmental Protection Agency, Methods for Chemical Analyses of Water and Wastes, Rev. 1983.

6.3.3 U.S. Environmental Protection Agency, Test Methods for Evaluating Solid Waste Physical/ Chemical Methods, SW-846, 3rd edition, 1986 and later updates.

6.3.4 Federal Register 40 CFR Part 136, Oct. 26, 1984, Guidelines Establishing Test Procedures for the Analysis of Pollutants under the Clean Water Act.

6.3.5 Title 22, Div. 4, Ch 30, California Administrative Code, "Criteria for Identification of Hazardous and Extremely Hazardous Wastes", 1985.

6.3.6 Methods for the Determination of Metals in Environmental Samples, EPA/600/4-91/010

6.3.7 1976 Annual Book of ASTM Standards, Part 31.

6.3.8 AOAC Manual, 14th edition, 1984.

6.3.9 Static Acute Bioassay Procedures for Hazardous Waste Samples, Polisini and Miller, California Department of Fish and Game Water Pollution Control Laboratory, 1988.

6.3.10 Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms, EPA/600/4-85/013.

6.3.11 Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, EPA/600/4-90/027F.

6.3.12 Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. EPA/600/4-91/002.

6.3.13 Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms, EPA/600/4-91/003.

6.3.14 Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA/600/R-95/136.

6.4 Methods currently used in Districts laboratories are shown in Tables 2-A and 2-B.

6.5 All testing that requires a calibration using one or more standards must follow the

calibration requirements of the written procedure.

6.5.1 For many procedures, the calibration defines the working range of the analysis. The extrapolation of sample results above or below the concentration of the highest or lowest calibration standard is not acceptable for reporting purposes.

7. Data Reduction, Validation and Reporting

7.1 The County Sanitation Districts of L.A. County utilizes two in-house customized data systems for data processing that run on the Districts' mainframe. A detailed description of their capabilities can be found in Appendix 1 and Appendix 2 of this document.

7.2 Some instruments are equipped with built-in data processing systems or are interfaced with personal computers.

7.3 The mainframe, on-line data systems and personal computer interfaces are used for data reduction, storage and data reporting for samples that are logged in via the LABDATA and TDJ systems. This combination of systems is capable of performing the following:

7.3.1 Provide sample inventory in the form of a list of samples identified by means of log-in numbers assigned as the samples are received. These numbers are also used in tracking and monitoring sample flow.

7.3.2 Generate a work assignment sheet showing sample identity and analysis required for work scheduling.

7.3.3 For data verification and final approval. All analytical results are subjected to review by two levels of supervision prior to reporting. This review consists of tracing the analysis from the work assignment sheet to acquisition of raw data to QA/QC requirements to final calculation and data reporting. Final approval by a Laboratory Superintendent also takes place via the LABDATA system.

7.3.4 Maintain records containing all relevant data for a specified period of time, which currently is three years, after which they are archived and stored in a secured area for historical access.

7.4 In all laboratories, a system is followed from sample log-in to data reduction, validation, and reporting, irrespective of whether the samples are logged-in using the LABDATA system (as for SJCWQL and JWPCPWQL) or not (as for routine process control samples at the TPLs).

7.4.1 At SJCWQL and JWPCPWQL, computerized logbooks are kept showing

sample identity and time. The collector's name is recorded on the request sheet and the analyst's name is recorded on the laboratory bench sheets.

7.4.2 In the TPLs, the collector is the same as the analyst and his name appears on the bench sheet. This bench sheet, preprinted with routine sample identification, serves the function of a logbook. The samples are taken from the same source at the same time daily; exceptions are noted on the bench sheet.

7.4.3 All research programs are recorded in detail in bound research notebooks issued to project scientists for that purpose. Hazardous crime evidence analyses are recorded in separate notebooks issued for that purpose.

7.4.4 Bench results are recorded by analysts in all laboratories on pre-printed forms. Some books are designed specifically for the analyses performed at that bench. Others are of general format adaptable to a variety of analyses. In either case, the analyst enters all pertinent information directly into the book.

7.4.5 The technicians complete bench sheets in the TPLs, designed specifically for each laboratory.

7.5 The calculation of results, the units of analysis for reporting, and recommended number of significant figures are included in the "Calculations" section of each procedure. With some instruments equipped with on-line processing systems or interfaced with microcomputers, programs are available that are used to automatically calculate results to the desired reporting units. Where computer capabilities are not available, calculations are performed manually with the aid of electronic calculators. The calculated results from the bench sheets or instrument data systems are transferred to the LABDATA database either manually or electronically. At the JWPCPWQL, bench books are used. Bench books are customized bench sheets that are bound together for each test. The books are kept where the tests are performed; when full they are filed by test. At the TPLs, the laboratory technician transfers his results, after calculations, to the Monthly Summaries of Operations (MSO) and files the bench sheet.

7.6 The group supervisors or supervising professionals verify all results, followed by approval by the laboratory Superintendent before final reports are issued. In some sections, a peer analyst review of the results is performed prior to the supervisory verification.

7.7 Data reports are issued from the laboratories in the form of computer-generated hard copy in standard format for all samples logged in electronically. The method detection limits are stated where appropriate. The sample identification is shown in sufficient detail to uniquely identify it. All necessary identification information is codified for ease of computer storage and retrieval.

7.8 All charts, graphs, and GC/LC/IC chromatograms created in connection with reports are archived electronically and can be retrieved when needed.

7.9 All routine laboratory records pertaining to the analyses performed, including bench sheets and error resolution forms, are stored for ten years. Routine and special reports are filed at each facility. Monthly Summaries of Operations for JWPCP and the inland plants are permanently filed in the Sewerage Department at the Joint Administration Office. In addition, a copy of each is retained at the plant for ten years (for the inland plants) and for three years at SJCWQL. The State Water Resource Control Board reports are kept in the Monitoring section at JAO permanently.

8. **Internal Quality Control Checks and Calibration Procedures**

8.1 Intra-laboratory quality control

8.1.1 Initial Demonstration of Proficiency: When a new or rotated analyst is assigned to a bench, the analyst must show an initial demonstration of proficiency before analyzing actual samples. After initial training on safety, instrumentation, and methodology, the analyst is required to analyze four replicates of laboratory control standards. The recovery and precision obtained from the analyses must be acceptable before the analyst can work with the real samples.

8.1.2 Determination of MDL: Whenever a new method detection limit must be determined, the analyst follows guidelines in the Federal Register, Vol. 49, Oct. 26, 1984.

8.1.3 All reagent preparations are recorded in a notebook with information on manufacturer, lot number, expiration date, preparation procedure and date, and preparer's initials included.

8.1.4 A reagent or method blank is routinely analyzed with each batch of samples to check for contamination of glassware, apparatus, instrumentation, chemicals or reagents.

8.1.5 Laboratory control standards (LCS), analyte-spiked reagent water or clean soil, sand, or reference samples, are also analyzed where feasible, one for each sample batch or as dictated in the analytical procedure. The LCS provides an indication of whether the analytical process was performed correctly.

8.1.6 Analyst self-checks at the bench level are conducted by duplicating and matrix spiking. For most samples, the duplicating and matrix spiking are performed with each sample batch of ten or less or as specified in the analytical procedure. For process control samples, the duplicating and matrix

spiking are performed each week, or every twenty samples. For samples that are usually below detection limits at natural concentrations, duplicate spikes are analyzed. Relative percent differences (RPDs) and percent recoveries assess precision and accuracy of the analysis. This guideline is included in the QA Guidelines section of all laboratory procedures.

8.1.7 Calibration standards are analyzed as required by each procedure. For some tests, especially those without time restraint limitations due to long analytical runs, multi-point calibrations are performed on each day of analysis.

8.1.8 For organic analyses, an initial multi-point calibration curve is prepared using three or more standard concentration levels, depending on the procedure. On each successive day of analysis, a calibration check standard is used to verify that the initial calibration curve is still valid. These check solutions have a concentration at or near the mid-point of the calibration curve. If the results of the check standard do not meet the method specific criteria, a new initial calibration curve must be prepared. The lowest and highest points on the curve establish the working range for the analysis. The reporting of results outside the working range is not allowed without a clear notation that these results are 'estimated' values.

8.1.9 For some organic testing, system monitoring compounds and/or internal standards are added to every standard, sample, and blanks. Acceptance limits are established for these compounds.

8.1.10 For GC/MS analyses, several QC self-checks are utilized: a) establishment of 3 to 5 point initial calibration curves and calculations of response factors; b) mass calibration check performed monthly; c) daily GC/MS performance tests to meet the required ion abundance criteria, resolution and peak symmetry; d) daily check standard(s) to compare the relative response to the initial calibration curve; e) the use of internal standards and system monitoring compounds; f) the use of duplicates, matrix spikes and matrix spiked duplicates; g) the use of QC check recovery standards; h) and the use of blanks.

8.1.11 Microbiology QA/QC measures observed internally by the Microbiology Group are described in the Quality Assurance section of the Microbiology SOPs.

8.1.12 The Biology Group also has written guidelines on intralaboratory QA/QC to assure validity of bioassay data generated in the laboratory. These are found in the Appendix Section of the Districts' Procedures Manual.

8.2 Inter-laboratory quality control

8.2.1 The Districts' laboratories participate in laboratory proficiency testing

programs. Included are samples for chemistry, microbiology, and aquatic bioassay. The samples are purchased from an approved provider and analyzed for parameters employing procedures used for routine samples. The laboratories' results are evaluated by the provider in comparison with other participating laboratories or EPA criteria. A copy of the evaluation is sent to the Districts, the EPA regional office in California, and the California Water Resources Control Board.

8.2.2 All of the Districts' laboratories participate in the California Environmental Laboratory Accreditation Program (ELAP) proficiency testing studies in accord with the California Department of Health Services' mandate for the environmental laboratory certification program.

8.2.3 The QA group issues quality control check samples to the laboratories throughout the year. These are either prepared in-house or are purchased from an approved provider. The results are sent to the QA group for evaluation. The QA group tabulates the results and sends summary reports to management, supervisors, and analysts.

8.2.3 The QA group also issues split samples collected from the water reclamation plant to assess analysis on a real environmental matrix. Results of these analyses are also submitted to the QA group for statistical evaluation.

8.2.4 Where feasible, double blind samples are submitted to be tested for constituents. This program differs from the QA check sample program in that a QA sample is included with a batch of samples to make it appear like a regular sample. The laboratory's performance is then assessed based on the result of the analysis.

8.2.5 Membrane filter coliform standards and multiple-analyst plate counts are distributed to all the microbiology laboratories on a monthly basis.

8.2.6 The two major laboratory subsections, SJCWQL and JWPCPWQL, may participate in round robin testing conducted by other agencies.

9. **Routine Procedures Used to Assess Data Precision (Analytical Spread) and Accuracy (Analytical Error)**

9.1 Precision and Accuracy Criteria (Acceptance Limits) from duplicate measurements and spike recoveries.

9.1.1 Different control limits are established based on types of sample matrices. The acceptance limits are kept in tabulated forms and are available from each bench or from control charts established for each analyte and accessible via computers.

9.1.2 For wastewater and soil samples, initial limits for some parameters as established by EPA according to Federal Register 40CFR Part 136 and SW-846 were used. Most of the current acceptance limits were established based on accumulated data obtained from analyses of past samples for various parameters.

9.1.3 The laboratories have demonstrated the capability to analyze these parameters and have passed the established criteria.

9.1.4 As an on-going quality control program and to establish the laboratories' own limits, duplicates and matrix spikes and/or duplicate matrix spikes, one set for every batch or every ten samples (10%), are run to assess precision and accuracy for most sample types. For landfill Subtitle D, hazardous waste, and process control samples, that frequency is at least 5%. The average relative percent difference, average % recovery and standard deviation are calculated and are used in the establishment or updating of acceptance limits and construction of control charts for each laboratory.

9.1.5 For the construction of the precision control chart, data from at least 20 duplicate measurements are collected. The difference between duplicates, the average of the duplicates and relative percent difference (mathematically expressed as the difference between duplicates divided by the average of the duplicates multiplied by 100) are calculated. From these data, the average RPD is used to set the control limits using the following formula: The control limit (CL) = D4 X RPD_{Avg} where D_4 is a statistical factor that for duplicate samples is 3.27. The warning limit (WL) is calculated using the formula RPD_{Avg} + 2/3((D4 X RPD_{Avg}) - RPD_{Avg}).

The equivalent precision limit calculations for duplicate samples or duplicate spike analyses:

$$UCL = RPD_{Avg} \times 3.27$$

$$WL = RPD_{Avg} + \tfrac{2}{3}(UCL - RPD_{Avg})$$

9.1.6 The criteria for accuracy is determined by a statistical treatment of at least 20 spike recoveries. The mean ($\bar{X}$) and the standard deviation (s) of the recoveries are calculated and the warning limits are set at the recovery mean $\pm$2 standard deviations and the control limits at the recovery mean $\pm$3 standard deviations.

The calculation of the upper and lower accuracy limits:

$$UCL = \bar{X} + 3s$$
$$UWL = \bar{X} + 2s$$
$$LWL = \bar{X} - 2s$$
$$LCL = \bar{X} - 3s$$

9.1.7 For each analysis where duplicate and spike measurements are made, results are entered into control charts stored in a computer. Hard copies of the control charts are created for review (Figure 19).

9.1.8 The charts are constantly reviewed by the analyst, the supervisor or supervising professional, and the QA Supervisor to evaluate if the analyses are in control. If results of duplicate and spike recoveries are not acceptable, corrective action is initiated and documented.

9.1.9 If a noticeable trend in results is obtained, e.g., 7 consecutive data constantly falling above or below the mean, showing a continuous upward or downward trend, corrective action is initiated and documented.

9.1.10 The limits are updated when necessary.

9.2 Precision and Accuracy Criteria for QA check samples and split samples

9.2.1 Most constituents prepared in-house have established control limits. All others are allowed a percent relative error of 10%. QA check samples from outside sources are provided with information on the acceptable range at the 95% confidence interval. A tabulated summary is prepared by the QA group and distributed to participating laboratories, the supervisors, and laboratory management. Any result that is outside the acceptance range is followed up for corrective action. Another QA reference sample is reissued for analysis. The follow-up is continued until satisfactory results are obtained. This may include a QA chemist working at the bench with the analyst to evaluate and correct any analytical problems. See Section 10 for details.

9.2.2 The results of split samples are statistically analyzed and limits set at the mean +/- two standard deviations. Any result outside the limits is considered an outlier. Follow-up for corrective action is performed as described above.

9.2.3 Completed coliform testing is run by each laboratory on a quarterly basis. Results are recorded and documented.

9.2.4 Assessment of precision and accuracy for coliform testing is done by means of interlaboratory MF coliform standards distributed by the QA group.

Precision criteria for coliform analyses are established by following the procedure described in Standard Methods for the Examination of Water and Wastewater, 18th edition, 1992. Data to calculate the precision criteria are randomly selected from an entire data set using a computer random number program. All statistical calculations are performed using log (10) transformed data. Duplicate 50 mL MF standard samples are analyzed for coliform bacteria. After transforming the duplicate counts to the base 10 logarithm, the

difference between the transformed values is taken, the average calculated, and the acceptance limit established by multiplying the average by 3.267. Performance of each laboratory for precision is evaluated when results of the monthly coliform standard sample are submitted to the QA group. Any result outside the precision criterion is considered an outlier.

Accuracy limits are established using the "test for outliers" described in the EPA Microbiological Methods Manual. The data are transformed to log (10) and the average of the set of logarithms (from 10 laboratories) and the standard deviation are calculated. The extreme T value is then calculated by taking the absolute difference between the extreme value and the mean, and dividing the result by the standard deviation of the logs. A critical T value is determined for the data set at 1% significance level. This value is taken from a table found in ASTM Part 31, p.24 (1981) and is dependent upon the number of data used. If the calculated extreme T value is greater than the critical T, the data point is considered an outlier.

9.3 Performance and System Audits

9.3.1 The QA group conducts periodic performance checks on all laboratories. This may include the issuance of QA check samples and a review of the precision and accuracy of the measurement systems. The laboratory may also be required to participate in all other interlaboratory round-robin studies.

10. **Corrective Action**

10.1 Corrective action is mandated when any of the following occurs:

10.1.1 When any irregularity in the sample submitted to the sample receiving station is discovered. This may include labeling errors, missing labels, improper sample containers, leaks, or damaged samples.

10.1.2 Recommended sample preservation is not practiced and/or the holding periods are exceeded.

10.1.3 Instruments are not working according to specifications.

10.1.4 Proper analytical methodology is not followed.

10.1.5 Results of blanks, laboratory control standards, duplicates, matrix spike and/or matrix spike duplicates, and reference samples (where performed) fall outside acceptance range.

10.1.6 Results of analysis on interlaboratory check samples issued by the QA Group are out-of-control.

10.2 When any of the above situations occur, the responsible supervisor is informed and corrective action initiated.

10.3 When the situation listed in 10.1.1 or 10.1.2 occurs, the sample collector is informed by the supervisor involved, proper instructions are given to the sample collector, and if it is still appropriate, analysis is performed, but a notation of the irregularity is written on the analyst's bench sheet.

10.4 When a problem with an instrument occurs, in-house expertise for troubleshooting is initially attempted. Most of the major instruments are covered by service contracts, so if the problem persists, company service engineers are called. When the instrument is down for an extended period of time, samples are sent to commercial laboratories for analysis.

10.5 Repeat analysis is performed whenever the proper analytical methodology is not used.

10.6 When results of an LCS, duplicate, spike, or interlaboratory check sample analyses are questionable or are outside the acceptance range, the supervisor is notified and the analysis of samples is put on hold while the following course of action is followed and appropriate corrective measures are made:

10.6.1 Data entry and calculations are reviewed and examined for transcription errors.

10.6.2 Reagents and standards are checked to see if they were prepared correctly and that they have not exceeded their recommended expiration dates.

10.6.3 The equipment is examined for proper performance. The calibration and maintenance record is reviewed.

10.6.4 The methodology used is reviewed to make sure that it was properly applied.

10.6.5 Sampling and sample handling are checked to verify that the sample was collected properly, that there was no irregularity, and that recommended preservation and holding times were observed.

10.6.6 An error resolution form is completed and sent to the supervisor and the QA group for review.

10.7 If the result for the LCS is acceptable but the spike result is unacceptable, the samples (duplicate samples and spiked sample, or sample and duplicate spiked samples) are re-analyzed. If the same results are obtained with the repeat analysis, matrix interference is the probable cause of the discrepancy. Results for the sample batch are reported with an accompanying explanation of possible

matrix interference. If the results for the spiked sample improve and are in control, the results of the sample batch containing the initial spiked sample are reported. If circumstances such as insufficient sample or excess holding period exists, the first results are reported accompanied by a qualifying statement of the circumstances that happened in the initial and repeat analyses.

10.8 If the result for the LCS or interlaboratory QA check sample is unsatisfactory, the LCS analysis is repeated, or an additional QA check sample is issued to insure that corrective measures from Steps 10.6.1 - 10.6.6 resolved the error. Once the problem is resolved, the entire analytical batch is reanalyzed.

10.9 If the result for the method blank is unsatisfactory, the blank analysis is repeated, to insure that corrective measures from Steps 10.6.1 - 10.6.6 resolved the error. Once the problem is resolved, the entire analytical batch is reanalyzed.

11. **Personnel Training**

11.1 New and rotated personnel are trained initially by the immediate supervisor (or principal analyst) on analysis, SOPs, and quality assurance practices. The new employee then works with another analyst experienced in the required tests. The analyst must perform and pass an initial demonstration of proficiency (see paragraph 8.1.1). QA reference samples, if available, are given for analysis before a new analyst is allowed to run tests on routine samples.

11.2 A training checklist is often used to ensure that important points are not overlooked. At the completion of the training, the new analyst and the supervisor review and sign the checklist to confirm that all the items were explained or demonstrated adequately.

11.2 Technical personnel are encouraged to join recognized professional societies and attend conventions and seminars of those societies. The Districts' has a dues reimbursement policy for this purpose. All analysts are encouraged to attend local conferences and presentations.

11.3 To encourage communication on scientific matters, monthly reports are prepared by each group supervisor. Meetings are held within and among laboratory groups whenever subjects of common interest arise. Section staff members have published approximately 100 scientific papers in journals and meeting proceedings since 1972.

11.4 Books and journals in specialty areas are kept in the office of the supervisor concerned with that area. In addition, a small technical library is maintained at each of the two water quality laboratories. The Districts also maintain a joint technical library at the Joint Administration Office with over 100 technical publications and several thousand technical references.

IV. **Quality Assurance Reports to Management**

1. Results of the periodic assessment of measurement data precision, accuracy and completeness performed by the QA group is submitted to the Laboratory Manager. The report includes significant problems encountered and steps taken and/or recommendations to resolve the problem. Copies of the reports are provided to the supervisors and personnel involved.

2. If, after the performance and system audit, the QA group finds that a particular QA practice is not working effectively, a decision may be made to drop the practice and adopt something that may prove better.

Table 1. REQUIRED CONTAINERS, PRESERVATION TECHNIQUES AND HOLDING TIMES.

Parameter/Test	Container[1]	Preservation	Max. Storage Regulatory[2]
Aquatic Toxicity Tests			
Acute and chronic	P, G	$deCl_2$ with Na_2SO_3, Cool, 4EC	36 h initial use, 72 h for sample renewal[4]
Bacterial Tests			
Coliform, fecal and total	P, G	0.008% $Na_2S_2O_3$. Cool, 4EC	6 h[3]
Fecal Streptococci	P, G	0.008% $Na_2S_2O_3$. Cool, 4EC	6 h[3]
Chemistry Tests			
Alkalinity	P, G	Cool, 4EC	14 d
BOD	P, G	Cool, 4EC	48 h
Boron	P	Cool, 4EC	6 mos.
Bromide	P, G	Cool, 4EC	28 d
Carbon, organic, total	G(A)	Analyze immed. or add H_2SO_4 to pH <2; Cool, 4EC	28 d
COD	P, G	Analyze ASAP, or add H_2SO_4 to pH <2;Cool, 4EC	28 d
Chloride	P, G	Cool, 4EC	28 d
Chlorine, residual	P, G	Analyze immediately	Stat
Color	P, G	Cool, 4EC	48 h
Conductivity	P, G	Cool, 4EC	28 d

Table 1. REQUIRED CONTAINERS, PRESERVATION TECHNIQUES AND HOLDING TIMES - cont'd

Parameter/Test	Container[1]	Preservation	Max.Storage Regulatory[2]
Cyanide			
Total	P, G	NaOH to pH>12; add $Na_2S_2O_3$ when ox. agents present. Cool, 4EC	14 d; 24 h if $S^=$ present
Amenable to Chlorination	P, G	Add 100 mg $Na_2S_2O_3$/L Cool, 4EC	14 d; 24 h if $S^=$ present
Fluoride	P	Cool, 4EC	28 d
Hardness	P, G	Add HNO_3 to pH <2	6 mos.
Metals			
General, total	P(A), G(A)	Add HNO_3 to pH <2. Cool, 4EC	6 mos.
General, soluble	P(A), G(A)	Filter in field or as soon as possible. Add HNO_3 to pH<2. Cool, 4EC	6 mos.
Chromium VI (colorimetric)	P(A), G(A)	Cool, 4EC	24 h
Chromium VI (IC)	P(A), G(A)	Filter in field or as soon as possible. Add $(NH_4)_2SO_4$-NH_4OH buffer to pH 9-9.5, Cool 4°C	24 h
Mercury	P(A), G(A)	Add HNO_3 to pH <2. Cool, 4EC	28 d

Table 1. REQUIRED CONTAINERS, PRESERVATION TECHNIQUES AND HOLDING TIMES - cont'd

Parameter/Test	Container[1]	Preservation	Max. Storage Regulatory[2]
Nitrogen			
Ammonia	P, G	Analyze ASAP or add H_2SO_4 to pH <2, Cool, 4EC	28 d
Nitrate	P, G	Analyze ASAP or Cool, 4EC	48 h
$NO_3 + NO_2$	P, G	H_2SO_4 to pH <2, Cool, 4EC	28 d
Nitrite	P, G	Analyze ASAP or Cool, 4EC	48 h
Org., Kjeld.	P, G	Analyze ASAP or add H_2SO_4 to pH <2, Cool, 4EC	28 d
Oil and Grease	G, wide-mouthed	1:1 HCl to pH <2, Cool, 4EC	28 d
Organic Compounds			
Dioxins/Furans	G, PTFE-lined cap	$Na_2S_2O_3$; Cool, 4EC	30 d until extr.; 45 d after extr.[5]
PAHs	G(A), PTFE-lined cap	$Na_2S_2O_3$; Cool, 4EC	7 d until extr.; 40 d after extr.[3]
Pesticides & PCBs	G, PTFE-lined cap	Cool, 4EC	7 d until extr. 40 d after extr.
Semi-volatile organics	G, PTFE-lined cap	$Na_2S_2O_3$; Cool, 4EC	7 d until extr.; 40 d after extr.
Total Organic Carbon (TOC)	G(A), PTFE-lined cap	Add H_2SO_4 to pH <2, Cool, 4EC	28 d

Table 1. REQUIRED CONTAINERS, PRESERVATION TECHNIQUES AND HOLDING TIMES - cont'd

Parameter/Test	Container[1]	Preservation	Max. Storage Regulatory[2]
Organic Compounds cont'd.			
Total Organic Halides (TOX)	G(A), PTFE-lined cap	Add H_2SO_4 to pH <2, Cool, 4EC	28 d[5]
Total Petroleum Hydrocarbons	G(A), PTFE-lined cap	Add HCl to pH <2, Cool, 4EC	28 d
Volatile Organics	G, PTFE-lined cap	Cool, 4°C	14 d
Oxygen, dissolved			
Electrode	G, BOD bottle	Analyze immediately	Stat
Winkler		Titration may be delayed after acidification	8 h
Hydrogen Ion (pH)	P, G	Analyze ASAP	Stat
Phenols	P, G	Add H_2SO_4 to pH <2, Cool, 4EC	28 d
Phosphate, Ortho-	G	For sol. PO_4, filter immed. Cool, 4EC.	48 h
Phosphorus (Total)	P, G	Add H_2SO_4 to pH <2	28 d

Table 1. REQUIRED CONTAINERS, PRESERVATION TECHNIQUES AND HOLDING TIMES - cont'd

Parameter/Test	Container[1]	Preservation	Max. Storage Regulatory[2]
Residue			
Total	P, G	Cool, 4EC	7 d[3]
Filterable (TDS)	P, G	Cool, 4EC	7 d
Non-filterable (TSS)	P, G	Cool, 4EC	7 d
Settleable	P, G	Cool, 4EC	48 h[3]
Volatile	P, G	Cool, 4EC	7 d
Sulfate	P, G	Cool, 4EC	28 d
Sulfide	P, G	Add 4 drops 2N ZnAc/100 mL; NaOH to pH >9 Cool, 4EC	7 d
Sulfite	P, G	Cool <50EC, add 1 mL EDTA/100 mL sample	Stat
Surfactants			
MBAS	P,G	Cool, 4EC	48 h
NID	P,G	Cool, 4EC	48 h
Temperature	P, G	Analyze immed.	Stat
Turbidity	P, G	Analyze same day; store in dark up to 24 h; refrigerate	48 h

Table 1. REQUIRED CONTAINERS, PRESERVATION TECHNIQUES AND HOLDING TIMES - cont'd

Parameter/Test	Container[1]	Preservation	Max. Storage Regulatory[2]
Radiological Tests			
Gross beta	P, G	HNO_3 to pH <2	48 hrs.[6]
Gross alpha	P, G	HNO_3 to pH <2	6 mos.[3]
Radium (226+228)	P, G	HNO_3 to pH <2	6 mos.[5]

NOTES:

[1] P = Polyethylene; G = Glass; (A) = Rinsed with 1+1 nitric acid. Appropriate-sized containers are purchased with the suppliers' certification that the products were tested and meet or exceed the analyte specifications of OSWER Directive 9240.0-05A (EPA 540/R-93/051) "Specifications and Guidance for Contaminant-Free Sample Containers 12/92". Each new lot of containers is also checked for contaminants in-house before the lot is made available to sample collectors.

[2] Standard Methods for the Examination of Water and Wastewater, 18th Edition 1992, 19th Edition 1995, 20th Edition 1998.

[3] EPA - 40 Code of Federal Regulations (CFR) Part 136. Guidelines Establishing Test Procedures for the Analysis of Pollutants, Chapter 1 (7-1-01 Edition).

[4] EPA - 40 Code of Federal Regulations (CFR) Part 136. Whole Effluent Toxicity: Guidelines Establishing Test Procedures for the Analysis of Pollutants, Technical Corrections (Federal Register, February 2, 1999; Vol. 64, Number 21, pp. 4975-4978).

[5] EPA – SW-846. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Chapter Two, Revision 3, December 1996.

[6] As required in NPDES permits for the County Sanitation Districts of Los Angeles County.

Stat - no storage allowed, analyze immediately

TABLE 2-A. TESTS/PARAMETERS AND METHODS FOR WASTEWATER USED BY THE SANITATION DISTRICTS LABORATORIES

TEST/PARAMETER	METHOD USED		
	EPA	STANDARD METHODS, 20th Edition	OTHERS
Microbiology			
Heterotrophic Plate Count		9215B	
Total Coliform in Wastewater by MTF		9221B	
Fecal Coliform in Wastewater by MTF		9221E	
Total Coliform in Wastewater by MF		9222B	
Fecal Coliform in Wastewater by MF		9222D	
Fecal Streptococci or Enterococci by MTF		9230B	
Fecal Streptococci or Enterococci by MF		9230C	
Salmonella in Biosolids	1682		
Enterococci in Recreational Water by MF	1600		
Aquatic Toxicity Bioassays			
Hazardous waste bioassay using fathead minnow (*Pimephales promelas*)			Title 22, CCR 66261.24
Acute testing with juvenile fathead minnow (*Pimephales promelas*)	600/4-85/013		
Acute testing with juvenile silverside minnow (*Menidia beryllina*)	600/4-85/013		
Acute testing with larval fathead minnow (*Pimephales promelas*)	600/4-90/027F		
Acute testing with larval silverside minnow (*Menidia beryllina*)	600/4-90/027F		
Acute testing with larval topsmelt (*Atherinops affinis*)	600/4-90/027F		
Marine chronic testing with giant kelp (*Macrocystis pyrifera*)	600/R-95/136		
Freshwater chronic testing with larval fathead minnow (*Pimephales promelas;* method 1000.0)	600/4-91/002		
Freshwater chronic testing with water fleas (*Ceriodaphnia dubia*; method 1002.0)	600/4-91/002		
Freshwater chronic testing with green algae (*Selenastrum capricornutum*; method 1003.0)	600/4-91/002		
Marine chronic testing with silverside minnow (*Menidia beryllina*; method 1006.0)	600/4-91/003		
Marine chronic testing with Atlantic *mysid (Mysidposis bahia*; method 1007.0)	600/4-91/003		
Marine chronic testing with larval topsmelt (*Atherinops affinis*)	600/R-95/136		
Marine chronic testing with echinoderms (*Strongylocentrotus purpuratus* fertilization)	600/R-95/136		

TABLE 2-A. TESTS/PARAMETERS AND METHODS FOR WASTEWATER USED BY THE SANITATION DISTRICTS LABORATORIES - cont'd

TEST/PARAMETER	METHOD USED		
	EPA	STANDARD METHODS, 20th Edition	OTHERS
Wastewater Inorganic Chemistry, Nutrients, and Demand			
Acidity		2310B	
Algal Biomass as Chlorophyll a	445.0		
Alkalinity		2320B	
Ammonia		4500-NH_3 D	
Biochemical Oxygen Demand		5210B	
Boron		4500-B B	
Bromide	300.0		
Calcium	200.7, 215.1		
Carbonaceous BOD		5210B	
Chemical Oxygen Demand	410.0	5220B, C	
Chloride	300.0	4500-Cl^- B	
Chlorine Residual, Total		4500-Cl C	
Cyanide		4500-CN C,D,E	
Cyanide Amenable to Chlorination		4500-CN C,G,E	
Fluoride	300.0	4500-F C	
Hardness	200.7	2340C	
Magnesium	200.7	3111B	
Kjeldahl-N		4500-N_{org} , 4500-NH_3 B,D	
Nitrate	300.0	4500-NO_3 E	
Nitrite	300.0	4500-NO_2 B	
Oil & Grease	1664A	5520B	
Organic Carbon		5310C	
Organic Nitrogen		4500-N_{org} B, 4500-NH_3 B,E	
Oxygen, Dissolved		4500-O C, G	
pH		4500-H^+ B	
Phenols	420.1		
Phosphate, ortho	300.0	4500-P E	
Phosphorus, Total		4500-P B, E	
Potassium	258.1	3500-K D, 3111B	
Residue, Total		2540B	
Residue, Flterable (Total Dissolved Solids)		2540C	
Residue, Nonfilterable (Total Suspended Solids)		2540 D	
Residue, Settleable		2540 F	
Residue, Volatile	160.4	2540 E	
Silica	200.7		
Sodium	200.7	3111 B	
Specific Conductance		2510 B	
Sulfate	300.0, 375.4		
Sulfide (includes total & soluble)		4500-$S^=$ D	
Sulfite		4500-$SO_3^=$ B	
Surfactants (MBAS)		5540 C	
Surfactants (NID)		5540 D	
Turbidity		2130 B	

TABLE 2-A. TESTS/PARAMETERS AND METHODS FOR WASTEWATER USED BY THE SANITATION DISTRICTS LABORATORIES - cont'd

TEST/PARAMETER	METHOD USED		
	EPA	STANDARD METHODS, 20th Edition	OTHERS
Toxic Chemical Elements in Wastewater			
Aluminum	200.7	3111 D	
Antimony	204.2, SW-846 7062		
Arsenic	206.2	3114 B	
Barium	200.7	3111 D	
Beryllium	210.2, 200.7	3111 D	
Cadmium	213.1, 213.2	3111 B	
Chromium VI		3500-Cr D	
Chromium, Total	218.1, 218.2, 200.7	3111 B	
Cobalt	200.7, 219.1, 219.2	3111 B	
Copper	200.7	3111 B	
Iron	200.7	3111 B	
Lead	200.7, 239.1, 239.2	3111 B	
Manganese	200.7	3112 B	
Mercury	245.1, 245.2	3111 D	
Molybdenum	200.7	3111 B	
Nickel	200.7	3114 B	
Selenium	270.2, 270.3	3111 B	
Silver	272.1, 272.2, 200.7	3111 B	
Thallium	279.1, 279.2	3111 B	
Tin	200.7	3111 D	
Vanadium	200.7, 286.1	3111 B	
Zinc	200.7, 289.1	3111 B	
Organic Chemistry of Wastewater (measurements by GC/MS combination)			
Acid and Base/Neutral Compounds	Method 625		
Volatile Organic Compounds	Method 624		
Organic Chemistry of Wastewater (excluding measurements by GC/MS combination)			
Acrolein and Acrylonitrile	Method 603		
Aromatic Volatiles	Method 602		
Benzidine	Method 605		
Formaldehyde	SW-846 8315A		
Halogenated Volatiles	Method 601		
Organochlorine Pesticides and PCBs	Method 608	6630 B	
Polynuclear Aromatic Hydrocarbons	Method 610		.
Total Organic Halides		5320 B	
Total Recoverable Petroleum Hydrocarbons by IR	418.1		

TABLE 2-B. TESTS/PARAMETERS AND METHODS FOR HAZARDOUS WASTES USED BY THE SANITATION DISTRICTS LABORATORIES

TEST/PARAMETER	METHOD USED		
	EPA	STANDARD METHODS, 20th Edition.	OTHERS
Physical Properties Testing of Hazardous Waste			
Ignitability by Flashpoint Determination	SW-846 1010		
Corrosivity - pH Determination	SW-846 9040B, 9045C		
Inorganic Chemistry and Toxic Chemical Elements of Hazardous Waste			
Aluminum	SW-846 7020, 6010B		
Antimony	SW-846 7041, 7062		
Arsenic	SW-846 7060A, 7062		
Barium	SW-846 7080A, 7081, 6010B		
Beryllium	SW-846 7090, 7091, 6010B		
Cadmium	SW-846 7130, 7131A, 6010B		
Chromium, total	SW-846 7190, 7191, 6010B		
Chromium (VI)	SW-846 7196A		
Cobalt	SW-846 7200, 7201, 6010B		
Copper	SW-846 7210, 7211, 6010B		
Lead	SW-846 7420, 7421, 6010B		
Mercury	SW-846 7470A, 7471A		
Molybdenum	SW-846 7480, 7481, 6010B		
Nickel	SW-846 7520, 6010B		
Selenium	SW-846 7740, 7742		
Silver	SW-846 7760A, 7761, 6010B		
Thallium	SW-846 7840, 7841		
Tin	SW-846 7870, 6010B		
Vanadium	SW-846 7910, 7911, 6010B		
Zinc	SW-846 7950, 6010B		
Cyanide	SW-846 9010B		
Fluoride	340.2, SW-846 9056		
Br^-, Cl^-, F^-, NO_3^-, NO_2^-, o-PO_4-P, $SO_4^=$	SW-846 9056		

TABLE 2-B. TESTS/PARAMETERS AND METHODS FOR HAZARDOUS WASTES USED BY THE SANITATION DISTRICTS LABORATORIES - cont'd.

TEST/PARAMETER	METHOD USED		
	EPA	STANDARD METHODS, 20th Edition.	OTHERS
Extraction Tests of Hazardous Waste			
California Waste Extraction Test			CCR, Chapter 11, Article 5, Appendix II
Toxicity Characteristic Leaching Procedure	SW-846 1311		
Organic Chemistry of Hazardous Waste (measurements by GC/MS)			
Semi-Volatile Organics	SW-846 8270C		
Volatile Organics	SW-846 8260B		
Organic Chemistry of Hazardous Waste (excluding measurements by GC/MS combination)			
Acrylamide, Acrolein, Acrylonitrile	SW-846 8316		
Halogenated and Aromatic Volatiles	SW-846 8021B		
Organochlorine Pesticides/PCBs	SW-846 8081A, 8082		
Total Petroleum Hydrocarbons – Gasoline	SW-846 8015B, Mod. 8015B		
Total Petroleum Hydrocarbons – Diesel	SW-846 Mod. 8015B		
Total Recoverable Petroleum HC screening by IR	418.1		

VII. **Text References**

1. Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, EPA-600/4-83-004.

2. Quality Assurance for Environmental Measurements, J. K. Taylor and T. W. Stanley, Eds., 1983.

3. Industrial Hygiene Laboratory Quality Control, NIOSH, U. S. Department of Health and Human Services.

4. Test Methods for Evaluating Solid Waste, EPA SW-846, 3rd Edition, Nov., 1986 and later updates.

5. Standard Methods for the Examination of Water and Wastewater, 18th Edition 1992, 19th Edition 1995, 20th Edition 1998.

APPENDIX 1
COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
LABORATORY DATA SYSTEM

The Sanitation Districts laboratory data system is an in-house designed database system that runs on the Districts' mainframe computer. The system is known as LABDATA, and access to the system is via a network of personal computers. The laboratory superintendents of the SJCWQL and the JWPCPWQL are each the system manager for the half of LABDATA which links their respective groups to the database. Several layers of protection govern this mirror-image system.

LABDATA runs in an environment where user access is restricted to operation from fixed, standardized programs. Data entry is accepted only in standardized format from authorized users (those with correct passwords). Most of the laboratory results are transferred to LABDATA directly from computer calculated and formatted results. This minimizes the potential for transcription errors of manually entered results. The database is backed up daily to protect against catastrophic loss. The data has a three- year residence time on-line. Older data may be accessed via the archived backups on an as-needed basis.

Every sample that arrives at the sample receiving station is assigned a unique identification number during the log-in process. This number and all of the location and sample collection information and required tests are added to the LABDATA database. (Location, collection, and tests carry Districts specified codes so that the sample record may be retrieved by either its log number or by code information such as location, sample type, date, and/or test). It is from this permanent information entered at log-in that analysts receive their daily work assignments and enter analytical data.

The log-in process is performed using a Districts designed program called TDQ. TDQ provides a more familiar and flexible Windows® environment for entering the sample information to the mainframe database. TDQ is also used to create analysis reports for the samples that have specific data requirements and report formats required by some regulatory agencies. Access to TDQ is restricted to authorized personnel.

Data reporting in the form of a final standardized laboratory reporting format is accomplished from the LABDATA database after the results are verified by the group supervisor, which is followed by approval by the laboratory superintendent or authorized laboratory supervisor. A preliminary data hardcopy may be generated via a "screen dump" command, but no statistical or test manipulation of on-line data is possible for reporting. Laboratory users may perform statistical analysis and generate customized reports and graphics from a parallel database, which is updated daily from LABDATA, but these processes can not alter the LABDATA information. Once the group supervisor verifies a result, any changes will require another verification. Once a sample is approved by the laboratory superintendent or authorized supervisor, further changes can only be performed by the laboratory superintendent or authorized laboratory supervisor. An amended report will then be generated and the requestor(s) of the tests will be notified.

APPENDIX 2
COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
JOINT WATER POLLUTION CONTROL PLANT
TDJ TECHNICAL DATABASE SYSTEM

The Joint Water Pollution Control Plant TDJ technical database system is an in-house customized system that runs on the District's mainframe computer. The system is known as "TDJ", and is utilized for both laboratory and operational data entry and manipulation. The system is accessed through a network of personal computers. The Superintendent of the JWPCP Laboratory and the JWPCPWQL Inorganics Group Supervisor act as system managers for the laboratory data portion of the TDJ system.

TDJ runs in an environment where user access is restricted to operation from fixed, standardized programs. Data entry is accepted only in standardized format from authorized users (those with correct passwords). Data is backed up daily to protect against catastrophic loss. Data may be viewed on-line by laboratory staff and other District's personnel at any time, except when on-line customized reports are being run (this closes the files temporarily).

Each sample is uniquely identified in the TDJ system by a permanent three-digit sample number, location code, sub-location code, sample type code, and a designation of composite or grab sample. For each sample, a list of tests is generated. Only the system managers can add or change the sample numbers, location codes, etc., and only the system managers can add test codes and designate the tests for each sample number.

The sample date is a permanent part of the sample record and it is the sample date (rather than a unique log number) that distinguishes one day’s samples from any other day's samples.
The location codes, sub-location codes, sample types, and test codes are the same as those used in the LABDATA system, so that users can browse freely through either system without confusion. However, in the TDJ system, once a default unit has been assigned to a test code, that unit cannot be changed. (For example, in TDJ all Total Solids are reported as % Total Solids, and they cannot be reported as mg/L.)

Data verification is done by generation of a special four-page report each day that contains all data entered into the database during that day. The chemist in the Process Control sub-group reviews this report and checks any unusual data entries. When the chemist has verified the data, Operations is called and told that they can run their program which uses the new data to generate a multi-page report that is used for making plant changes and for operational control.

The monthly data is reviewed and verified by the Inorganics, Organics, and Microbiology supervisors. Summary reports of the results are created and forwarded to the Superintendent of the JWPCP Laboratory for final approval.

APPENDIX 3

GLOSSARY OF QUALITY ASSURANCE TERMS

Accuracy	The degree of agreement between an observed value and an accepted reference value.
Analytical batch	A group of samples, including quality control samples, which are processed together with the same method, the same lot of reagents, and with manipulations common to each sample within the same time period, or in continuous sequential time periods. Samples in each batch should be of similar composition. In wastewater analysis, an analytical batch is composed of ten samples or less; in hazardous waste analysis, of twenty samples or less.
Bias	The systematic or persistent distortion of a measurement process which deprives the result of representativeness (i.e., the expected sample measurement is different than the sample's true value.)
Blank	A clean sample or a sample of matrix processed so as to measure artifacts in the measurement (sampling and analysis) process. For aqueous samples, reagent water may be used as a blank matrix. For solid samples, clean sand is often used as a blank matrix. The blank is taken through all steps of the procedure and analysis.
Blind sample	A sample submitted for analysis with the concentration and identity known to the submitter but unknown to the analyst and used to test the analyst's or laboratory's proficiency in the execution of the measurement process. Also referred to as a "double-blind sample".
Calibrate	To determine, by measurement or comparison with a standard, the correct response of an instrument.
Calibration check	A standard or set of standards used for the verification of an instruments ability to provide a correct response within the limits of the analytical method used. Calibration check solutions are typically made from stock solutions different from the stock used to prepare the calibration standard.
Check standard	A substance or reference material obtained from a source independent from the source of the calibration standard.

Control chart	Test or analytical data are displayed in a form that graphically compares the variability of the test results with the average or expected variability of small groups of data.
Control limit	A specified boundary on a control chart that, if exceeded, indicates a process that is out of statistical control.
Environmental sample	A representative collection of any material (aqueous, non-aqueous, or multimedia) collected from any source, for which the determination of composition or contamination is requested or required.
Equipment blank	A clean sample (e.g., reagent water) that is opened in the field and the contents are poured appropriately over or through the sample collection device, collected, then returned to the laboratory as a sample. Equipment blanks are a check on the sampling device's cleanliness.
F-Test	A statistical method used to evaluate the difference in the variances between two sets of data.
Field blank	A clean sample (e.g., reagent water), carried to the sampling site, exposed to sampling conditions and returned to the laboratory and treated as an environmental sample. Field blanks are used to check for analytical artifacts and/or background contamination by sampling and analytical procedures.
Interference	A positive or negative effect on a measurement caused by a variable other than the one being investigated.
Interlaboratory calibration	The process, procedures, and activities for standardizing a given measurement system to ensure that laboratories participating in the same program can produce comparable data.
Internal standard	A pure compound added to a sample prior to instrumental analysis to permit correction for inefficiencies.
Laboratory control standard	An uncontaminated sample matrix spiked with known amounts of analytes from a source independent from the calibration standards. It is generally used to establish intralaboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.
Matrix spike/duplicate	In matrix spike/duplicate analysis, samples are split into

	duplicates and spiked with predetermined quantities of stock solutions of certain analytes prior to sample extraction/digestion and analysis. Percent recoveries are calculated for each of the analytes detected. The concentration of the spike should be at the regulatory standard level, the estimated or actual method quantification limit, or as specified in the analytical method.
Maximum holding time	The length of time a sample can be kept under specified conditions without undergoing significant degradation of the analytes(s) or property of interest.
MDL	The Method Detection Limit is a statistically derived value representing the minimum concentration of a substance, in a given matrix, that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.
ML	The Minimum Level represents the lowest standard concentration in the calibration curve for a specific analytical technique after the application of appropriate method-specific factors.
MQL	The Method Quantification Limit is the minimum concentration of a substance that can be measured and reported.
Outlier	An observed value that does not appear to fall within the expected distribution for a particular data set.
PQL	The practical quantitation limit is the lowest level that can be reliably achieved within limits of precision and accuracy during routine laboratory operating conditions.
Precision	The measurement of agreement of a set of replicate results among themselves without assumption of any prior information as to the true result. Precision is assessed through duplicate and replicate sample analyses.
Proficiency testing	A systematic program in which one or more standardized samples is analyzed by laboratories to determine the capability of each participant.
Quality control	The system of activities designed to generate the quality of data necessary to meet the needs of the laboratory and the data user.

Quality assurance	An integrated system of activities designed to evaluate the effectiveness of the laboratory's quality control program.
Range	Range is the difference between the highest and lowest values.
Reference material	A material or substance, one or more properties of which are sufficiently well established to be used for the calibration of an apparatus, the assessment of a measurement method, or assigning values to materials.
Relative Percent Difference	For duplicate measurements, RPD is mathematically expressed as the range multiplied by 100, then divided by the average of the two measurements.
Replicate sample	Two or more samples representing the same population characteristic, time, and place, which are independently carried through all steps of the sampling and measurement process in an identical manner. It also can be defined as a sample that is prepared by dividing it into two or more separate aliquots. Duplicate samples are considered to be two replicates.
Standard curve	A plot of the concentration of known analyte standard versus the instrument response to the analyte.
Standard Deviation	A measure of the dispersion of observed values. It is defined as the positive square root of the variance.
Surrogate	A pure substance with properties similar to the analytes(s) of interest. It is unlikely to be found in environmental samples and is added to blanks, standards, samples, and matrix spiked samples prior to analysis for quality control purposes.
t-Test	A statistical method used to evaluate the difference in the means between two sets of data.
Trip blank	A clean sample (e.g., reagent water) that is carried to the sampling site and transported to the laboratory with the collected samples for analysis without having been exposed to sampling procedures.
Type I (alpha) error	The probability of deciding a constituent is present when it actually is absent; a false positive decision.
Type II (beta) error	The probability of not detecting a constituent when it actually is present; a false negative decision.

Variance	A measure of the dispersion of a set of values. Variance (s^2) is calculated as $s^2 = \Sigma (x - \bar{x})^2 / (n - 1)$
Warning limit	A specified boundary on a control chart that indicates a process may be going out of statistical control.

CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

SAN JOSE CREEK WATER QUALITY LABORATORY **Lab Phone** (562) 699-7411
COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
1965 SOUTH WORKMAN MILL ROAD
WHITTIER, CA 90601

Certificate No: 1052 **Renew Date: 11/30/2003**

Field of Testing: 01 - Microbiology of Drinking Water and Wastewater			
01.05	01	Heterotrophic Plate Count	SM9215B
01.06	01	Total Coliform	SM9221B
01.07	01	Fecal Coliform	SM9221C,E
01.08	01	Total Coliform	SM9222B
01.09	01	Fecal Coliform	SM9222D
Field of Testing: 08 - Aquatic Toxicity Bioassays			
08.01.01		Fathead Minnow (P. promelas)	Polisini & Miller (CDFG 1988)
08.03.01		Fathead Minnow (P. promelas)	EPA 600/4-85/013, Static
08.03.07		Silverside (Menidia spp.)	EPA 600/4-85/013, Static
08.18.01		Fathead Minnow (P. promelas)	EPA 600/4-90/027F, Static
08.18.07		Silverside (Menidia spp.)	EPA 600/4-90/027F, Static
08.18.21		Topsmelt (A. affinis)	EPA 600/4-90/027F
08.19		Fathead Minnow (P. promelas)	EPA 1000 (EPA/600/4-91/002)
08.20		Daphnid (C. dubia)	EPA 1002 (EPA/600/4-91/002)
08.21		Selenastrum Capricornutum	EPA 1003 (EPA/600/4-91/002)
08.22.07		Silverside (Menidia spp.)	EPA 1006 (EPA/600/4-91/003)
08.22.08		Atlantic mysid (M. bahia)	EPA 1007 (EPA/600/4-91/003)
08.23.10		Giant kelp (M. pyrifera)	EPA 600/R-95/136 CAWRCB 96-1WQ
08.23.12		Purple sea urchin (S. purpuratus)	EPA 600/R-95/136 CAWRCB 96-1WQ
08.23.21		Topsmelt (A. affinis)	EPA 600/R-95/136 CAWRCB 96-1WQ
08.99		Chlorophyll	EPA 445.0
Field of Testing: 09 - Physical Properties Testing of Hazardous Waste			
09.01	01	Ignitability	EPA 1010
09.02	01	Corrosivity - pH Determination	EPA 9040B
Field of Testing: 10 - Inorganic Chemistry and Toxic Chemical Elements of Hazardous Waste			
10.01	01	Antimony	EPA 7040
10.02	01	Arsenic	EPA 7060A
10.03	01	Barium	EPA 7080A
10.04	01	Beryllium	EPA 7090
10.05	01	Cadmium	EPA 7130
10.06	01	Chromium, Total	EPA 7190
10.07	01	Cobalt	EPA 7200
10.08	01	Copper	EPA 7210
10.09	01	Lead	EPA 7420
10.10	01	Mercury	EPA 7470A
10.11	01	Molybdenum	EPA 7480
10.12	01	Nickel	EPA 7520
10.13	01	Selenium	EPA 7740
10.14	01	Silver	EPA 7760A
10.15	01	Thallium	EPA 7840
10.16	01	Vanadium	EPA 7910
10.17	01	Zinc	EPA 7950
10.18	01	Chromium (VI)	EPA 7195

Figure 1. ELAP-Certified Analytes for SJCWQL

SAN JOSE CREEK WATER QUALITY LABORATORY

Certificate No: 1052
Renew Date: 11/30/2003

10.19	01	Cyanide	EPA 9012A
10.20	01	Fluoride	EPA 9056
Field of Testing:		11 - Extraction Tests of Hazardous Waste	
11.01	01	Waste Extraction Test (WET)	CCR Chapter11, Article 5, Appendix II
11.03	01	Toxicity Characteristic Leaching Procedure (TCLP)	EPA 1311
Field of Testing:		12 - Organic Chemistry of Hazardous Waste by GC/MS	
12.03A	01	Extractable Organics	EPA 8270C
12.06A	01	Volatile Organic Compounds	EPA 8260B
Field of Testing:		13 - Organic Chemistry of Hazardous Waste (excluding GC/MS)	
13.15B	01	Total Petroleum Hydrocarbons - Gasoline	EPA 8015B
13.16B	01	Total Petroleum Hydrocarbons - Diesel	EPA 8015B
13.17	01	TRPH Screening	EPA 418.1
13.19A	01	Halogenated Volatiles	EPA 8021B
13.19B	01	Aromatic Volatiles	EPA 8021B
13.24C	01	PCBs	EPA 8082
13.25C	01	Organochlorine Pesticides	EPA 8081A
13.28	01	Acrylamide, Acrylonitrile, Acrolein	EPA 8316
13.99		Total Halides	EPA 9020B
13.99		Total Organic Carbon	EPA 9060
Field of Testing:		16 - Wastewater Inorganic Chemistry, Nutrients and Demand	
16.01	01	Acidity	SM2310B (4a)
16.02	01	Alkalinity	SM2320B
16.03	01	Ammonia	SM4500-NH3 B,C
16.04	01	Biochemical Oxygen Demand	SM5210B
16.05	01	Boron	SM4500-B B
16.06	01	Bromide	EPA 320.1
16.07	01	Calcium	SM3111B
16.08	01	Carbonaceous BOD	SM5210B
16.09	01	Chemical Oxygen Demand	SM5220C
16.10	01	Chloride	SM4500-Cl B
16.11	01	Chlorine Residual, Total	SM4500-Cl D
16.12	01	Cyanide	SM4500-CN C,D
16.13	01	Cyanide, amenable	SM4500-CN C,G
16.14	01	Fluoride	SM4500-F B,C
16.15	01	Hardness - Total as CaCO3	SM2340C
16.17	01	Magnesium	SM3111B
16.18	01	Nitrate	EPA 352.1
16.19	01	Nitrite	SM4500-NO2
16.20	01	Oil and Grease	SM5520B
16.20	03	Oil and Grease	EPA 1664
16.21	01	Total Organic Carbon	SM5310B, C, D
16.22	01	Oxygen,dissolved	SM4500-O C
16.23	01	pH	SM4500-H+ B
16.24	01	Phenols	EPA 420.1
16.25	01	Phosphate, Ortho	EPA 365.3
16.26	01	Phosphorus, Total	EPA 365.4
16.27	01	Potassium	SM3111B
16.28	01	Residue, Total	SM2540B
16.29	01	Residue, Filterable	SM2540C
16.30	01	Residue, Non-filterable	SM2540D
16.31	01	Residue, Settleable	SM2540F
16.32	01	Residue, Volatile	EPA 160.4

Figure 1. ELAP-Certified Analytes for SJCWQL (Cont'd)

16.33	01	Silica, Dissolved	SM4500-Si D
16.34	01	Sodium	SM3111B
16.35	01	Conductivity	SM2510B
16.36	01	Sulfate	EPA 375.1
16.37	01	Sulfide	SM4500-S= E
16.38	01	Sulfite	SM4500-SO3 B
16.39	01	Surfactants	SM5540C
16.41	01	Turbidity	SM2130B
16.44	01	Total Recoverable Petroleum Hydrocarbons	EPA 418.1
16.45	01	Total Organic Halides	SM5320B
Field of Testing:		17 - Toxic Chemical Elements in Wastewater	
17.01	01	Aluminum	SM3111D
17.02	01	Antimony	SM3111B
17.03	01	Arsenic	EPA 206.5
17.04	01	Barium	SM3111D
17.05	01	Beryllium	SM3111D
17.06	01	Cadmium	SM3111B
17.07	01	Chromium (VI)	SM3111C
17.08	01	Chromium, Total	SM3111B
17.09	01	Cobalt	SM3111B
17.10	01	Copper	SM3111B
17.13	01	Iron	SM3111B
17.14	01	Lead	SM3111B
17.15	01	Manganese	SM3111B
17.16	01	Mercury	SM3112B
17.17	01	Molybdenum	SM3111D
17.18	01	Nickel	SM3111B
17.24	01	Selenium	SM3113B
17.25	01	Silver	SM3111B
17.27	01	Thallium	SM3111B
17.28	01	Tin	SM3111B
17.30	01	Vanadium	SM3111D
17.31	01	Zinc	SM3111B
Field of Testing:		18 - Organic Chemistry of Wastewater by GC/MS	
18.01A	01	Halogenated Hydrocarbons	EPA 624
18.01B	01	Aromatic Compounds	EPA 624
18.01C	01	Oxygenates	EPA 624
18.01D	01	Other Volatile Organics	EPA 624
18.02A	01	Pesticides	EPA 625
18.02B	01	PCBs	EPA 625
18.02D	01	Adipates	EPA 625
18.02E	01	Phthalates	EPA 625
Field of Testing:		19 - Organic Chemistry of Wastewater (excluding GC/MS)	
19.01	01	Halogenated Volatiles	EPA 601
19.02	01	Aromatic Volatiles	EPA 602
19.03	01	Acrolein, Acrylonitrile	EPA 603
19.05	01	Benzidine	EPA 605
19.08A	01	Organochlorine Pesticides	EPA 608
19.10	01	Polynuclear Aromatics	EPA 610

Figure 1. ELAP-Certified Analytes for SJCWQL (Cont'd)

CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

JOINT WATER POLLUTION CONTROL WATER QUALITY LAB **Lab Phone** (310) 830-2400
COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
24501 SOUTH FIGUEROA STREET
CARSON, CA 90745

Certificate No: 1034 **Renew Date: 10/31/2003**

Field of Testing: 01 - Microbiology of Drinking Water and Wastewater			
01.05	01	Heterotrophic Plate Count	SM9215B
01.06	01	Total Coliform	SM9221B
01.07	01	Fecal Coliform	SM9221C,E
01.08	01	Total Coliform	SM9222B
01.09	01	Fecal Coliform	SM9222D
01.11	01	Fecal Streptococci/Enterococci	SM9230C
Field of Testing: 09 - Physical Properties Testing of Hazardous Waste			
09.02	01	Corrosivity - pH Determination	EPA 9040B
09.02	02	Corrosivity - pH Determination	EPA 9045C
Field of Testing: 10 - Inorganic Chemistry and Toxic Chemical Elements of Hazardous Waste			
10.01	03	Antimony	EPA 7062
10.02	03	Arsenic	EPA 7062
10.03	01	Barium	EPA 7080A
10.04	01	Beryllium	EPA 7090
10.05	01	Cadmium	EPA 7130
10.06	01	Chromium, Total	EPA 7190
10.07	01	Cobalt	EPA 7200
10.08	01	Copper	EPA 7210
10.09	01	Lead	EPA 7420
10.10	01	Mercury	EPA 7470A
10.10	02	Mercury	EPA 7471A
10.11	01	Molybdenum	EPA 7480
10.12	01	Nickel	EPA 7520
10.13	03	Selenium	EPA 7742
10.14	01	Silver	EPA 7760A
10.15	01	Thallium	EPA 7840
10.16	01	Vanadium	EPA 7910
10.17	01	Zinc	EPA 7950
10.18	02	Chromium (VI)	EPA 7196A
10.19	03	Cyanide	EPA 9014
10.20	02	Fluoride	EPA 9214
10.99	01	Tin	EPA 7870
10.99	01	Aluminum	EPA 7020
Field of Testing: 13 - Organic Chemistry of Hazardous Waste (excluding GC/MS)			
13.24C	01	PCBs	EPA 8082
13.25C	01	Organochlorine Pesticides	EPA 8081A
Field of Testing: 16 - Wastewater Inorganic Chemistry, Nutrients and Demand			
16.02	01	Alkalinity	SM2320B
16.03	03	Ammonia	SM4500-NH3 B,E
16.04	01	Biochemical Oxygen Demand	SM5210B
16.05	01	Boron	SM4500-B B
16.07	02	Calcium	EPA 215.1
16.08	01	Carbonaceous BOD	SM5210B
16.09	01	Chemical Oxygen Demand	SM5220C
16.09	02	Chemical Oxygen Demand	EPA 410.1

Figure 2. ELAP-Certified Analytes for JWPCPWQL

16.10	01	Chloride	SM4500-Cl B
16.11	05	Chlorine Residual, Total	SM4500-Cl C
16.12	01	Cyanide	SM4500-CN C,D
16.12	02	Cyanide	SM4500-CN C,E
16.14	01	Fluoride	SM4500-F B,C
16.15	01	Hardness - Total as CaCO3	SM2340C
16.15	06	Hardness - Total as CaCO3	SM3111B
16.16	01	Kjeldahl Nitrogen	SM4500-NH3 B,C,E
16.17	01	Magnesium	SM3111B
16.18	02	Nitrate	SM4500-NO3 E
16.19	01	Nitrite	SM4500-NO2
16.20	01	Oil and Grease	SM5520B
16.20	03	Oil and Grease	EPA 1664
16.22	01	Oxygen,dissolved	SM4500-O C
16.22	03	Oxygen,dissolved	SM4500-O G
16.23	01	pH	SM4500-H+ B
16.24	01	Phenols	EPA 420.1
16.25	02	Phosphate, Ortho	SM4500-P E
16.26	02	Phosphorus, Total	SM4500-P B5, E
16.27	01	Potassium	SM3111B
16.28	01	Residue, Total	SM2540B
16.29	01	Residue, Filterable	SM2540C
16.30	01	Residue, Non-filterable	SM2540D
16.31	01	Residue, Settleable	SM2540F
16.32	01	Residue, Volatile	EPA 160.4
16.34	01	Sodium	SM3111B
16.35	01	Conductivity	SM2510B
16.36	04	Sulfate	EPA 375.4
16.37	01	Sulfide	SM4500-S= E
16.37	03	Sulfide	SM4500-S= D
16.39	01	Surfactants	SM5540C
16.41	01	Turbidity	SM2130B
Field of Testing: 17 - Toxic Chemical Elements in Wastewater			
17.01	01	Aluminum	SM3111D
17.03	02	Arsenic	SM3114B 4,d
17.04	01	Barium	SM3111D
17.05	01	Beryllium	SM3111D
17.06	01	Cadmium	SM3111B
17.07	03	Chromium (VI)	SM3500-Cr D
17.08	02	Chromium, Total	EPA 218.1
17.09	01	Cobalt	SM3111B
17.10	01	Copper	SM3111B
17.13	01	Iron	SM3111B
17.14	01	Lead	SM3111B
17.15	01	Manganese	SM3111B
17.16	01	Mercury	SM3112B
17.17	01	Molybdenum	SM3111D
17.18	01	Nickel	SM3111B
17.24	05	Selenium	SM3114B
17.25	01	Silver	SM3111B
17.27	01	Thallium	SM3111B
17.28	01	Tin	SM3111B
17.30	01	Vanadium	SM3111D
17.31	01	Zinc	SM3111B
17.99	01	Antimony	EPA 7062
Field of Testing: 19 - Organic Chemistry of Wastewater (excluding GC/MS)			

Figure 2. ELAP-Certified Analytes for JWPCPWQL (Cont'd)

JOINT WATER POLLUTION CONTROL WATER QUALITY LAB

Certificate No: 1034
Renew Date: 10/31/2003

19.08A	01	Organochlorine Pesticides	EPA 608
19.08A	02	Organochlorine Pesticides	SM6630B
19.08B	01	PCBs	EPA 608
19.08B	02	PCBs	SM6630B

Figure 2. ELAP-Certified Analytes for JWPCPWQL (Cont'd)

CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

LOS COYOTES TREATMENT PLANT LABORATORY **Lab Phone** (562) 860-2390
COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
16515 PIUMA AVENUE
CERRITOS, CA 90701

Certificate No: 1031 **Renew Date: 10/31/2003**

Field of Testing:	01 - Microbiology of Drinking Water and Wastewater		
01.06	01	Total Coliform	SM9221B
01.07	01	Fecal Coliform	SM9221C,E
01.08	01	Total Coliform	SM9222B
01.09	01	Fecal Coliform	SM9222D
Field of Testing:	16 - Wastewater Inorganic Chemistry, Nutrients and Demand		
16.03	00	Ammonia	
16.04	00	Biochemical Oxygen Demand	
16.08	00	Carbonaceous BOD	
16.09	00	Chemical Oxygen Demand	
16.10	00	Chloride	
16.11	00	Chlorine Residual, Total	
16.16	00	Kjeldahl Nitrogen	
16.18	00	Nitrate	
16.19	00	Nitrite	
16.22	00	Oxygen,dissolved	
16.23	00	pH	
16.29	00	Residue, Filterable	
16.30	00	Residue, Non-filterable	
16.31	00	Residue, Settleable	
16.32	00	Residue, Volatile	
16.36	00	Sulfate	
16.39	00	Surfactants	
16.41	00	Turbidity	

Figure 3. ELAP-Certified Analytes for Los Coyotes Treatment Plant Laboratory

CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

SAN JOSE CREEK TREATMENT PLANT LABORATORY **Lab Phone** (562) 699-7411
COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
1965 SOUTH WORKMAN MILL ROAD
WHITTIER, CA 90601

Certificate No: 1032 **Renew Date: 10/31/2003**

Field of Testing:	01 - Microbiology of Drinking Water and Wastewater		
01.06	01	Total Coliform	SM9221B
01.08	01	Total Coliform	SM9222B
01.09	01	Fecal Coliform	SM9222D
Field of Testing:	16 - Wastewater Inorganic Chemistry, Nutrients and Demand		
16.03	00	Ammonia	
16.04	00	Biochemical Oxygen Demand	
16.08	00	Carbonaceous BOD	
16.09	00	Chemical Oxygen Demand	
16.10	00	Chloride	
16.11	00	Chlorine Residual, Total	
16.16	00	Kjeldahl Nitrogen	
16.18	00	Nitrate	
16.19	00	Nitrite	
16.22	00	Oxygen,dissolved	
16.23	00	pH	
16.29	00	Residue, Filterable	
16.30	00	Residue, Non-filterable	
16.31	00	Residue, Settleable	
16.32	00	Residue, Volatile	
16.35	00	Conductivity	
16.36	00	Sulfate	
16.39	00	Surfactants	
16.41	00	Turbidity	
16.99		Non-ionic Surfactants as CTAS	

Figure 4. ELAP-Certified Analytes for San Jose Creek Treatment Plant Laboratory

CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

LONG BEACH TREATMENT PLANT LABORATORY **Lab Phone** (562) 421-8612
COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
7400 WILLOW STREET
LONG BEACH, CA 90815

Certificate No: 1033 **Renew Date: 10/31/2003**

Field of Testing:	01 - Microbiology of Drinking Water and Wastewater		
01.06	01	Total Coliform	SM9221B
01.07	01	Fecal Coliform	SM9221C,E
01.08	01	Total Coliform	SM9222B
01.09	01	Fecal Coliform	SM9222D
Field of Testing:	16 - Wastewater Inorganic Chemistry, Nutrients and Demand		
16.03	00	Ammonia	
16.04	00	Biochemical Oxygen Demand	
16.08	00	Carbonaceous BOD	
16.09	00	Chemical Oxygen Demand	
16.10	00	Chloride	
16.11	00	Chlorine Residual, Total	
16.16	00	Kjeldahl Nitrogen	
16.18	00	Nitrate	
16.19	00	Nitrite	
16.22	00	Oxygen,dissolved	
16.23	00	pH	
16.29	00	Residue, Filterable	
16.30	00	Residue, Non-filterable	
16.31	00	Residue, Settleable	
16.32	00	Residue, Volatile	
16.36	00	Sulfate	
16.39	00	Surfactants	
16.41	00	Turbidity	

Figure 5. ELAP-Certified Analytes for Long Beach Treatment Plant Laboratory

CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

WHITTIER NARROWS TREATMENT PLANT LABORATORY **Lab Phone** (626) 443-2954
COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
301 NORTH ROSEMEAD BOULEVARD
EL MONTE, CA 91733

Certificate No: 1036 **Renew Date: 12/31/2003**

Field of Testing: 01 - Microbiology of Drinking Water and Wastewater			
01.06	01	Total Coliform	SM9221B
01.07	01	Fecal Coliform	SM9221C,E
01.08	01	Total Coliform	SM9222B
Field of Testing: 16 - Wastewater Inorganic Chemistry, Nutrients and Demand			
16.03	00	Ammonia	
16.04	00	Biochemical Oxygen Demand	
16.08	00	Carbonaceous BOD	
16.09	00	Chemical Oxygen Demand	
16.10	00	Chloride	
16.11	00	Chlorine Residual, Total	
16.12	00	Cyanide	
16.16	00	Kjeldahl Nitrogen	
16.18	00	Nitrate	
16.19	00	Nitrite	
16.22	00	Oxygen,dissolved	
16.23	00	pH	
16.29	00	Residue, Filterable	
16.30	00	Residue, Non-filterable	
16.31	00	Residue, Settleable	
16.32	00	Residue, Volatile	
16.36	00	Sulfate	
16.39	00	Surfactants	
16.41	00	Turbidity	

Figure 6. ELAP-Certified Analytes for Whittier Narrows Treatment Plant Laboratory

CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

SAUGUS TREATMENT PLANT LABORATORY **Lab Phone** (661) 259-6846
COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
26200 SPRINGBROOK AVENUE
SAUGUS, CA 91350

Certificate No: 1040 **Renew Date: 11/30/2003**

Field of Testing: 01 - Microbiology of Drinking Water and Wastewater			
01.06	01	Total Coliform	SM9221B
01.07	01	Fecal Coliform	SM9221C,E
01.08	01	Total Coliform	SM9222B
01.09	01	Fecal Coliform	SM9222D
Field of Testing: 16 - Wastewater Inorganic Chemistry, Nutrients and Demand			
16.03	01	Ammonia	SM4500-NH3 B,C
16.04	01	Biochemical Oxygen Demand	SM5210B
16.08	01	Carbonaceous BOD	SM5210B
16.09	01	Chemical Oxygen Demand	SM5220C
16.10	01	Chloride	SM4500-Cl B
16.11	01	Chlorine Residual, Total	SM4500-Cl D
16.16	01	Kjeldahl Nitrogen	SM4500-NH3 B,C,E
16.18	01	Nitrate	EPA 352.1
16.19	01	Nitrite	SM4500-NO2
16.22	01	Oxygen,dissolved	SM4500-O C
16.23	01	pH	SM4500-H+ B
16.29	01	Residue, Filterable	SM2540C
16.30	01	Residue, Non-filterable	SM2540D
16.31	01	Residue, Settleable	SM2540F
16.32	01	Residue, Volatile	EPA 160.4
16.36	01	Sulfate	EPA 375.1
16.39	01	Surfactants	SM5540C
16.41	01	Turbidity	SM2130B

Figure 7. ELAP-Certified Analytes for Saugus Treatment Plant Laboratory

CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

VALENCIA TREATMENT PLANT LABORATORY
COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
28185 THE OLD ROAD
VALENCIA, CA 91335

Lab Phone (661) 257-2575

Certificate No: 1041 **Renew Date: 11/30/2003**

Field of Testing:	01 - Microbiology of Drinking Water and Wastewater		
01.06	01	Total Coliform	SM9221B
01.07	01	Fecal Coliform	SM9221C,E
01.08	01	Total Coliform	SM9222B
01.09	01	Fecal Coliform	SM9222D
Field of Testing:	16 - Wastewater Inorganic Chemistry, Nutrients and Demand		
16.02	01	Alkalinity	SM2320B
16.03	03	Ammonia	SM4500-NH3 B,E
16.04	01	Biochemical Oxygen Demand	SM5210B
16.08	01	Carbonaceous BOD	SM5210B
16.09	02	Chemical Oxygen Demand	EPA 410.1
16.10	01	Chloride	SM4500-Cl B
16.11	05	Chlorine Residual, Total	SM4500-Cl C
16.16	01	Kjeldahl Nitrogen	SM4500-NH3 B,C,E
16.18	02	Nitrate	SM4500-NO3 E
16.19	01	Nitrite	SM4500-NO2
16.22	01	Oxygen,dissolved	SM4500-O C
16.23	01	pH	SM4500-H+ B
16.28	01	Residue, Total	SM2540B
16.29	01	Residue, Filterable	SM2540C
16.30	01	Residue, Non-filterable	SM2540D
16.31	01	Residue, Settleable	SM2540F
16.32	01	Residue, Volatile	EPA 160.4
16.36	04	Sulfate	EPA 375.4
16.39	01	Surfactants	SM5540C
16.41	01	Turbidity	SM2130B

Figure 8. ELAP-Certified Analytes for Valencia Treatment Plant Laboratory

CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

LANCASTER TREATMENT PLANT LABORATORY **Lab Phone** (805) 723-8537
COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
1865 WEST AVENUE D
LANCASTER, CA 93534

Certificate No: 1051 **Renew Date: 12/31/2003**

Field of Testing:	01 - Microbiology of Drinking Water and Wastewater		
01.06	01	Total Coliform	SM9221B
01.07	01	Fecal Coliform	SM9221C,E
01.08	01	Total Coliform	SM9222B
Field of Testing:	16 - Wastewater Inorganic Chemistry, Nutrients and Demand		
16.02	00	Alkalinity	
16.03	00	Ammonia	
16.04	00	Biochemical Oxygen Demand	
16.08	00	Carbonaceous BOD	
16.09	00	Chemical Oxygen Demand	
16.10	00	Chloride	
16.11	00	Chlorine Residual, Total	
16.15	01	Hardness - Total as CaCO3	SM2340C
16.16	00	Kjeldahl Nitrogen	
16.18	00	Nitrate	
16.19	00	Nitrite	
16.22	00	Oxygen,dissolved	
16.23	00	pH	
16.28	00	Residue, Total	
16.29	00	Residue, Filterable	
16.30	00	Residue, Non-filterable	
16.31	00	Residue, Settleable	
16.32	00	Residue, Volatile	
16.36	00	Sulfate	
16.39	00	Surfactants	
16.41	00	Turbidity	
16.99	01	Non-ionic Surfactants as CTAS	SM5540D

Figure 9. ELAP-Certified Analytes for Lancaster Treatment Plant Laboratory

CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

POMONA TREATMENT PLANT LABORATORY **Lab Phone** (909) 623-6721
COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY
295 HUMANE WAY
POMONA, CA 91766

Certificate No: 1068 **Renew Date: 12/31/2003**

Field of Testing:	01 - Microbiology of Drinking Water and Wastewater		
01.06	01	Total Coliform	SM9221B
01.07	01	Fecal Coliform	SM9221C,E
01.08	01	Total Coliform	SM9222B
01.09	01	Fecal Coliform	SM9222D
Field of Testing:	16 - Wastewater Inorganic Chemistry, Nutrients and Demand		
16.03	00	Ammonia	
16.04	00	Biochemical Oxygen Demand	
16.08	00	Carbonaceous BOD	
16.09	00	Chemical Oxygen Demand	
16.10	00	Chloride	
16.11	00	Chlorine Residual, Total	
16.16	00	Kjeldahl Nitrogen	
16.18	00	Nitrate	
16.19	00	Nitrite	
16.22	00	Oxygen,dissolved	
16.23	00	pH	
16.29	00	Residue, Filterable	
16.30	00	Residue, Non-filterable	
16.31	00	Residue, Settleable	
16.32	00	Residue, Volatile	
16.36	00	Sulfate	
16.39	00	Surfactants	
16.41	00	Turbidity	

Figure 10. ELAP-Certified Analytes for Pomona Plant Laboratory

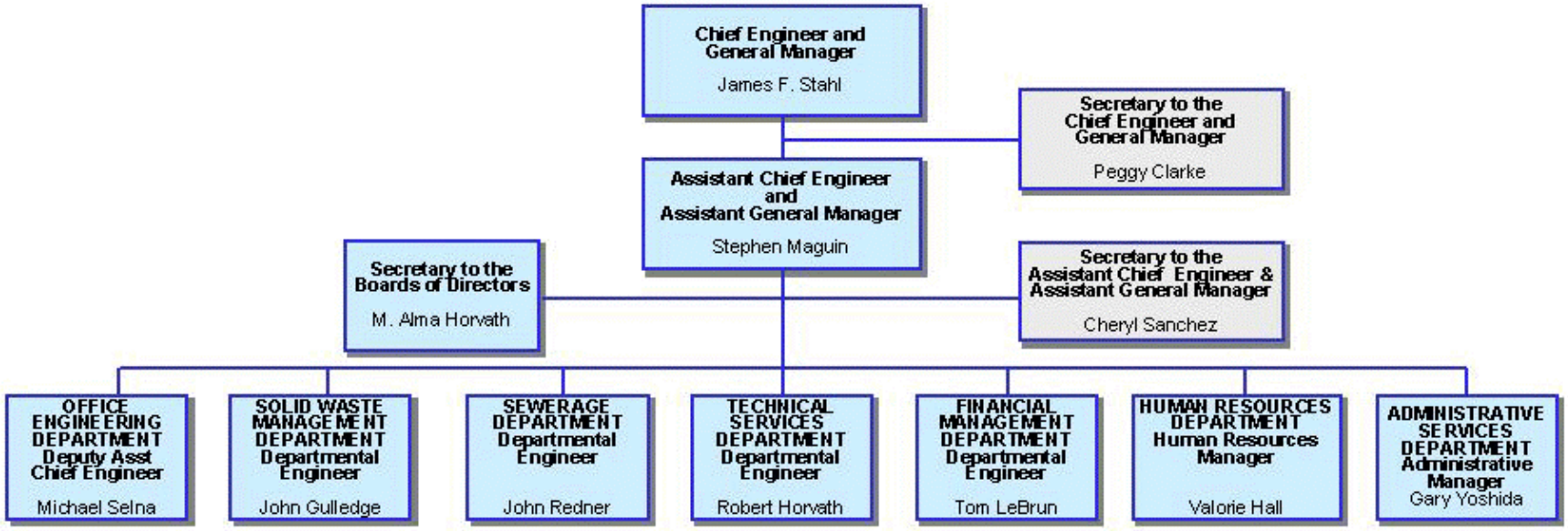


Figure 11A. Table of Organization of the County Sanitation Districts of Los Angeles County

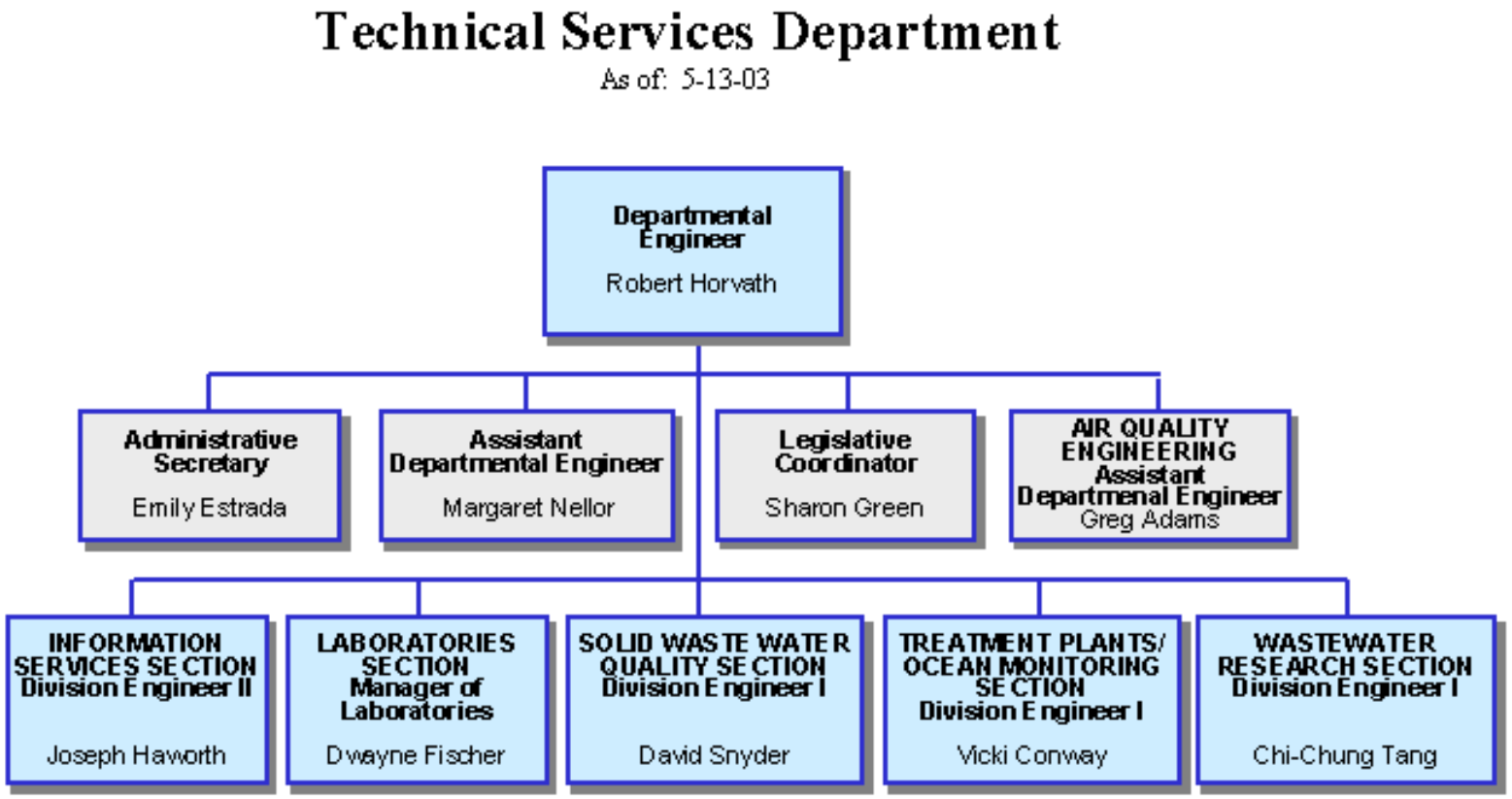


Figure 11B. Table of Organization of the Technical Services Department

TECHNICAL SERVICES DEPARTMENT
LABORATORIES SECTION
JULY 15, 2003

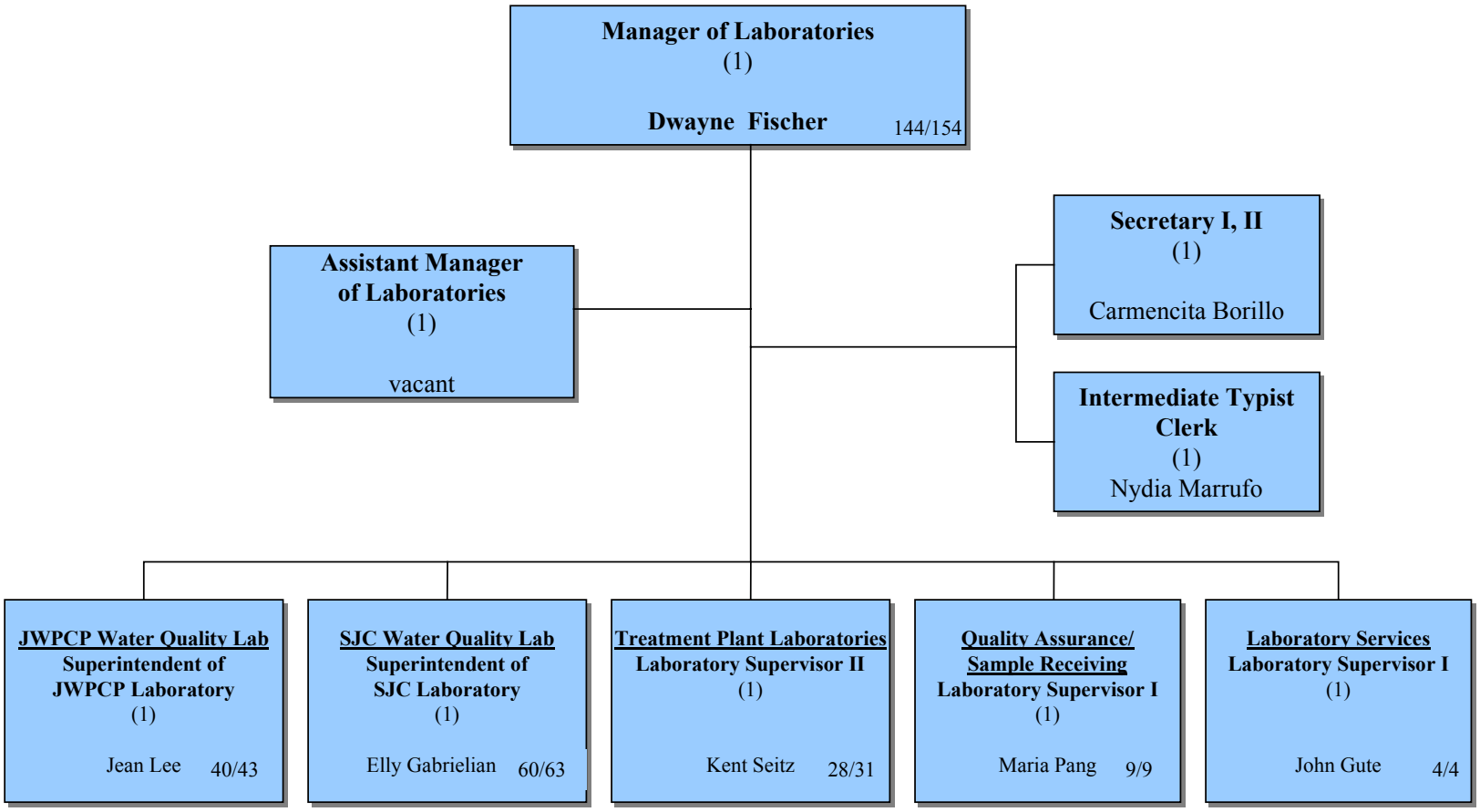


Figure 12. Table of Organization of the Laboratories Section

TECHNICAL SERVICES DEPARTMENT
LABORATORIES SECTION
SJCWQL
JULY 15, 2003

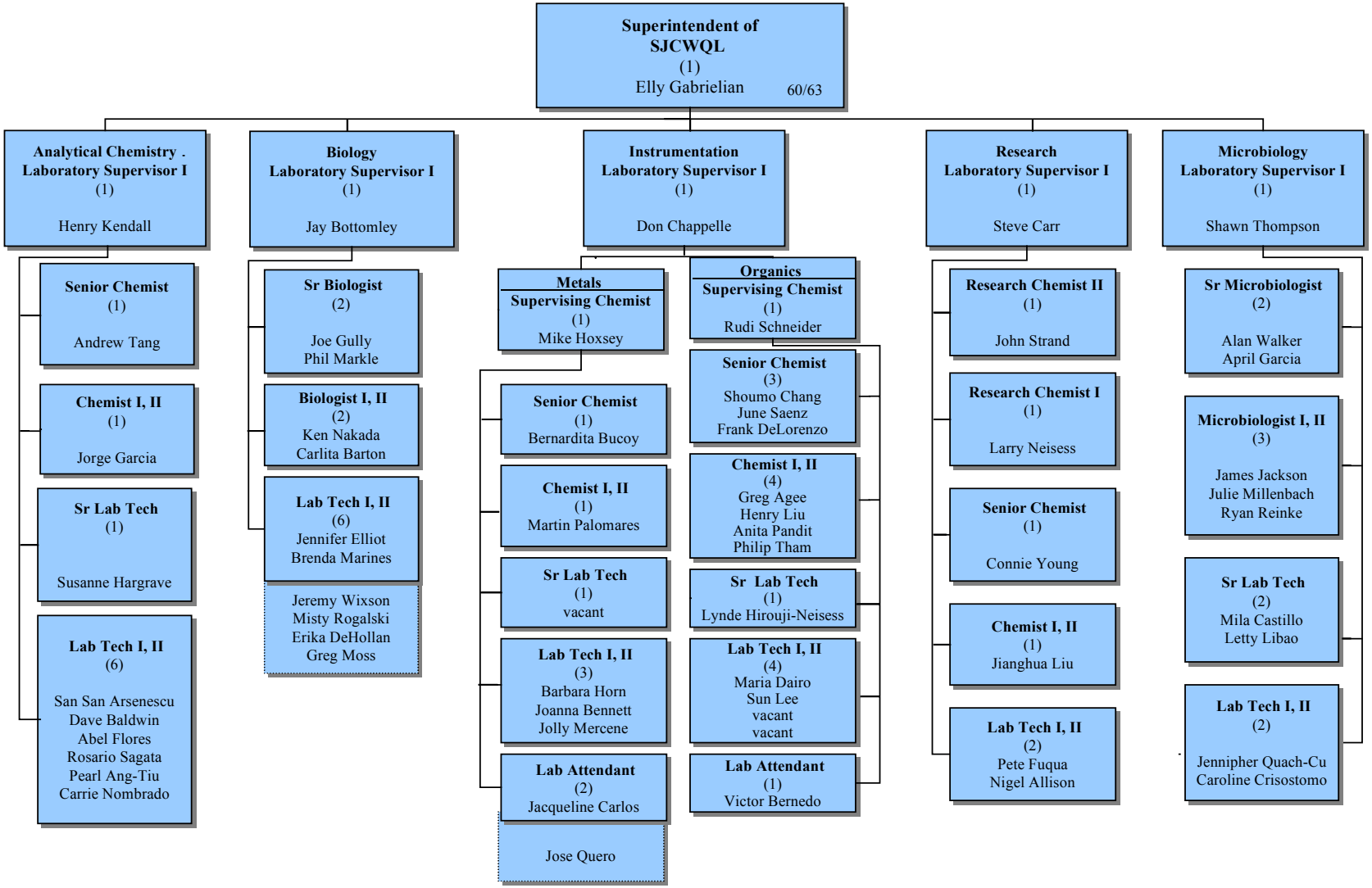


Figure 13. Table of Organization of the San Jose Creek Water Quality Laboratory

TECHNICAL SERVICES DEPARTMENT
LABORATORIES SECTION
JWPCP WQL
JULY 15, 2003

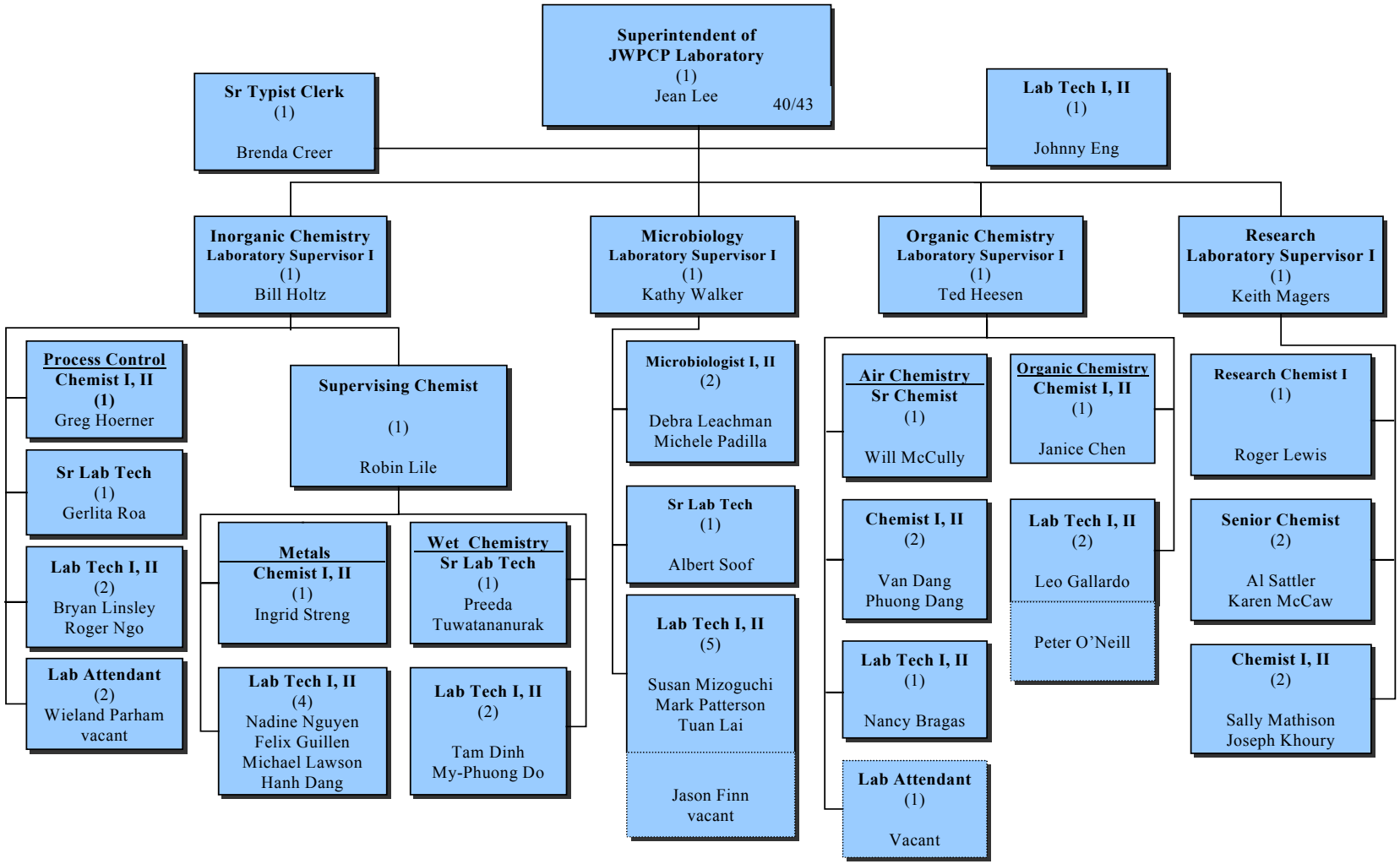


Figure 14. Table of Organization of the Joint Water Pollution Control Plant Water Quality Laboratory

TECHNICAL SERVICES DEPARTMENT
LABORATORIES SECTION
TREATMENT PLANT LABORATORIES
JULY 15, 2003

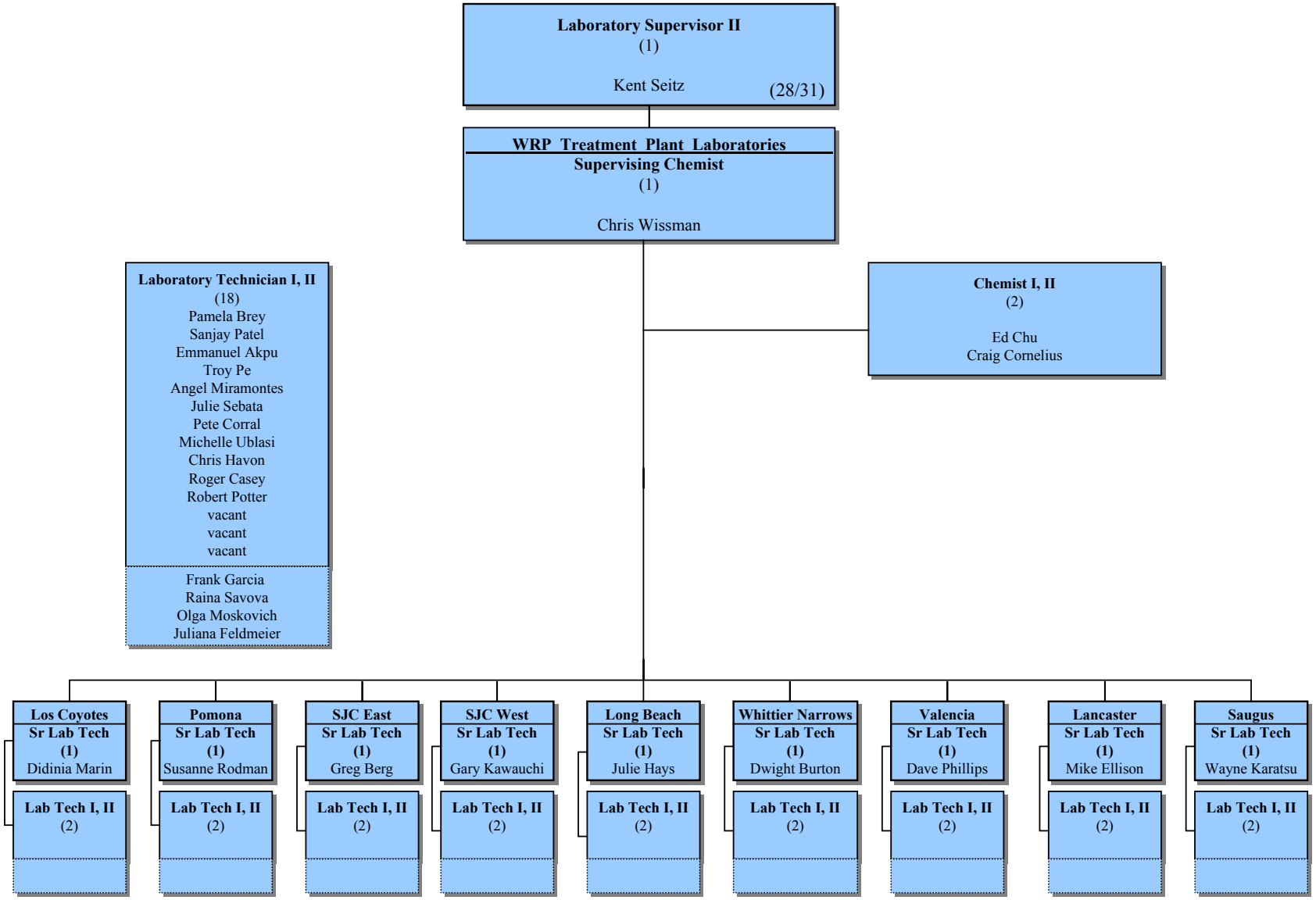


Figure 15. Table of Organization of the Treatment Plant Laboratories

TECHNICAL SERVICES DEPARTMENT
LABORATORIES SECTION
QUALITY ASSURANCE/SAMPLE RECEIVING
JULY 15, 2003

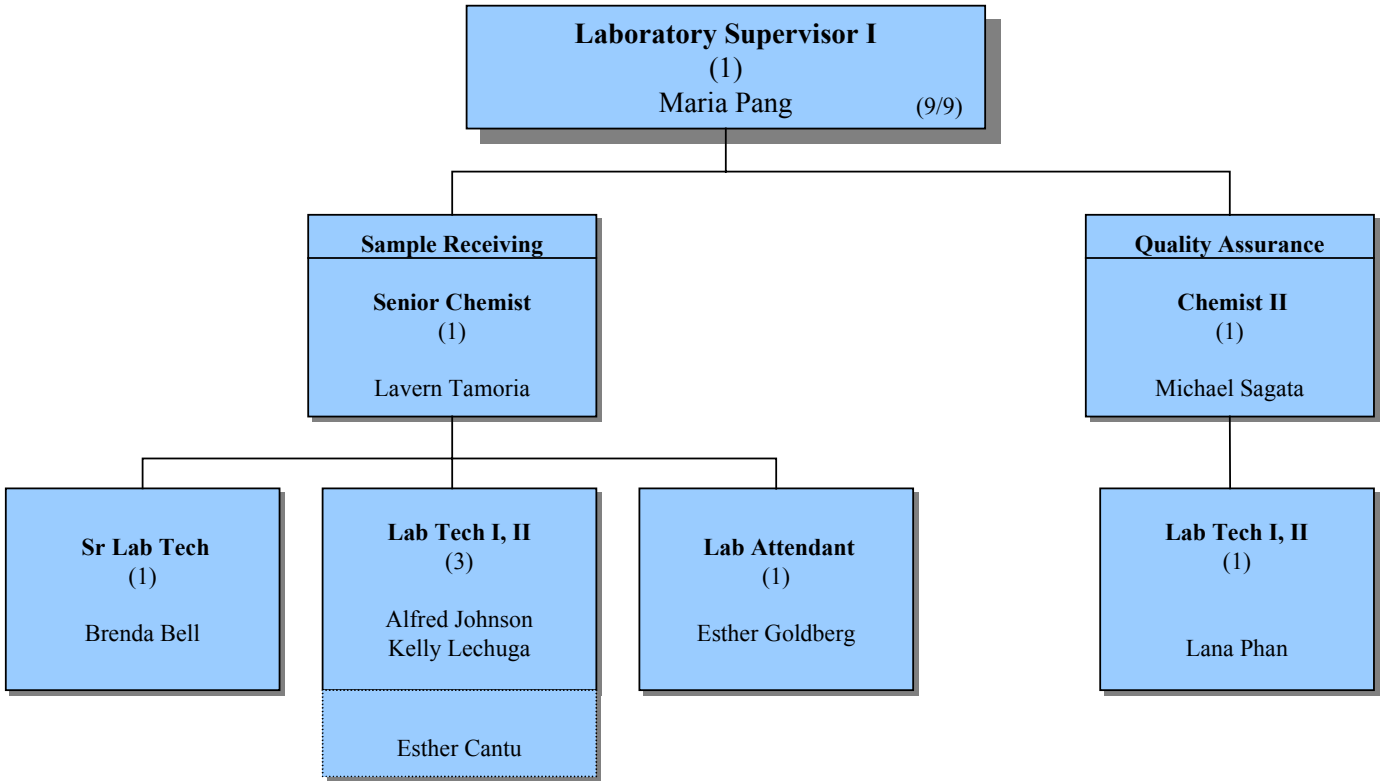


Figure 16. Table of Organization of the Quality Assurance / Sample Receiving Sub-section

TECHNICAL SERVICES DEPARTMENT
LABORATORIES SECTION
LABORATORY SERVICES
JULY 15, 2003

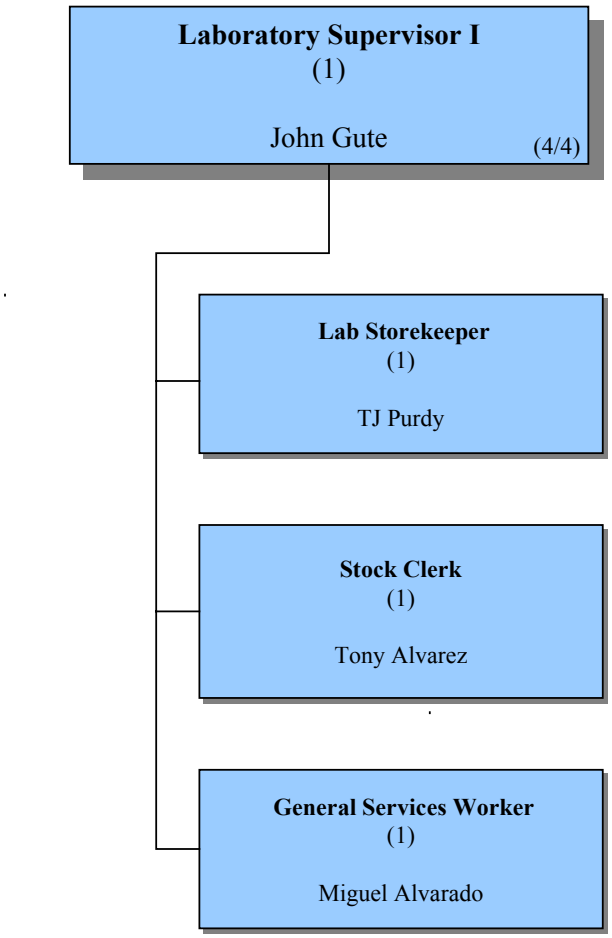


Figure 17. Table of Organization of the Laboratory Services Sub-section

Received in Sample Room By: _____

Time Received in Laboratory: _____

LABORATORY JOB NUMBER: _____

PRIORITY:
☐ Routine (0) ☐ Expedite, 1 hr. (X)
☐ Rush, 1 day (R) ☐ Upset, 1 wk. (U)

PRIORITY AUTHORIZATION _____
Ext. _____

JAMES F. STAHL
Chief Engineer and General Manager

SANITATION DISTRICTS OF LOS ANGELES COUNTY
P.O. Box 4998 Whittier, California 90607

For additional information regarding
this analysis call (562) 699-7411 x 2900

INDUSTRIAL WASTE MONITORING RESULTS

SAMPLE IDENTIFICATION | Surcharge Account Number: | I.W. Permit Number:

Sample Source or Company Name: _____

Address: _____

Reason For Sampling: ☐ Routine ☐ Phase 1 ☐ Treatment Plant Upset ☐ Sewer System Problem ☐ Other: _____

Monitoring Requested By: *Martyn/Burch* _____

Accounting Charges: ☐ For Routine Samples Taken By Inspectors: TS14905 BI ☐ For Routine Samples Taken By IWMC: TS14905 BM
☐ For All Special Investigation Samples: TS14905 B_____

SAMPLE COLLECTION INFORMATION:

* Sample Point:
☐ Sample Box ☐ Clarifier
☐ Manhole ☐ _____
☐ Valve ☐ CN Sample Point
☐ Clean-out ☐ _____

* Sample Method:
☐ Grab
☐ Composite-Timed With _____ minute intervals
☐ Composite-Flow With _____ x _____ gallons
Test aliquot volume_____/_____ml.
Tot aliquot_____

* Sample Date:
At/or ☐ A.M.
From _____ (HR. MIN.) ☐ P.M._____ 20___ (MONTH DAY YEAR)
☐ A.M.
To _____ ☐ P.M._____ 20___

* Observations: _____

* Sampled By:_____ * Submitted to Laboratory By:_____ * Contact Name:_____ * Title: _____

* Total Quantity of Sample Collected:_____ * Sample Container(s) Used: ☐ C/c_____Other: _____

* Quantity Submitted to Lab _____

* Sample Preservation Used: ☐ Ice ☐ No Cl_2 ☐ Sodium Thiosulfate ☐ NaOH ☐ HNO_3 Other: _____

Sample given to company: Y N (Refused)
Sample given to: ☐ Contact Other_____
Sample: ☐ Split ☐ Concurrent ☐ Consecutive

Flow When Sampled:

COMPOSITE SAMPLE	GRAB SAMPLE
Period of Composite:_____hours Totalizer Readings: Final: _____ Initial: _____ Difference: _____ Multiplier: _____ Total Flow: _____ gallons	Flow Rate at Time of Sample: (905)pH_____ s/u_____gpm (905)pH_____ p/u_____gpm
* Obtained From: ☐ Visual Estimate, ☐ Effluent Flow Meter, ☐ Influent Water Meter, ☐ Impossible To Tell If Flow Existed When Sampled	

FIELD TEST RESULTS

* pH (905)_____ * Color_____ * Temperature_____ * Cyanide _____

* Odor _____

* Total Sulfide_____ * Dissolved Sulfide_____ * Other _____

LABORATORY TESTS NOTES TO ANALYSTS: _____

	CONSTITUENT	CODE
	pH	101
	SUSPENDED SOLIDS, mg/l	151
	SUSPENDED SOLIDS (@ pH 7), mg/l	150
	COD, mg/l O	403
	TOTAL DISS., SOLIDS (TDS), mg/l	155
	TOTAL DISS., SOLIDS (@ 550°C), mg/l	166
	AMMONIA NITROGEN, mg/l N	201
	SOLUBLE SULFIDE, mg/l S	252
	THIOSULFATE SULFUR, mg/l S	253
	SULFITE SULFUR, mg/l S	254
	SULFATE, mg/l SO_4	257
	TOTAL MERCAPTANS, mg/l S	258
	TOTAL PHENOLS, mg/l C_6H_5OH	312

	CONSTITUENT	CODE
	OIL AND GREASE, mg/l	408
	OIL AND GREASE (NON-POLAR), mg/l	414
	TOTAL CYANIDE, mg/l CN	206
	CYANIDE AMENABLE TO Cl_2	210
	TOTAL CADMIUM, mg/l Cd	708
	TOTAL CHROMIUM, mg/l Cr	709
	TOTAL COPPER, mg/l Cu	712
	TOTAL LEAD, mg/l Pb	714
	TOTAL NICKEL, mg/l Ni	718
	TOTAL SILVER, mg/l Ag	722
	TOTAL ZINC, mg/l Zn	724
	TOTAL ARSENIC, mg/l As	705
	TOTAL MERCURY, mg/l Hg	717

	CONSTITUENT	CODE
	MBAS, mg/l LAS	315
	NID, mg/l	316
	BENZENE, ug/l	620
	TOLUENE, ug/l	621
	ETHYL BENZENE, ug/l	624
	o-XYLENE, ug/l	629
	m+p-XYLENE, ug/l	695
	PC	
	EPA	

DISTRIBUTION: Return this sheet to Industrial Waste Section Head after log-in.
* All information to be filled in by Field Collection Personnel.

Figure 18A. Industrial Waste Monitoring Report Form

LOGGED IN BY:_____ LABORATORY JOB NUMBER: SJE_____

CHARLES W. CARRY
Chief Engineer and General Manager

SANITATION DISTRICTS OF LOS ANGELES COUNTY
P.O. Box 4998 Whittier, California 90607

For additional information regarding this analysis call (310) 699-7411 x 2900

EVIDENCE SAMPLE - CHAIN OF CUSTODY RECORD

SAMPLE IDENTIFICATION | Surcharge Account Number: | I.W. Permit Number:

Sample Source or Company Name: _____

Address: _____

Reason For Sampling: ☐ Phase 1 ☐ Pretreatment ☐ Sewer System Problem ☐ Other: _____

Evidence Sampling Authorized By: *Martyn* _____

Accounting Charges: ☐ For Routine Samples Taken By Inspectors: TS14905 BM ☐ For routine Samples Taken By - IWMC: TS14905 BM

☐ For All Special Investigation Samples: TS14905 B_____ ☐ Other: _____

SAMPLE COLLECTION INFORMATION:

Sample Taken From:
- ☐ Sample Box
- ☐ Clarifier
- ☐ Clean-out
- ☐ Other_____

Sample Method:
- ☐ Grab
- ☐ Composite-Timed With _____ minute intervals
- ☐ Composite-Flow With _____ gallon intervals

Sample Grab or Composite Times:

At/or ☐ A.M.

From _____ (HR. MIN.) ☐ P.M._____ (MONTH DAY) 19____ (YEAR) ☐ A.M.

To _____ (HR. MIN.) ☐ P.M._____ (MONTH DAY) 19____ (YEAR)

Condition of Clarifier, Sample Box, Other Observations: _____

Company Contact: Name:_____ Title: _____

Sample By (Signature):_____ Container Lot Number: _____

Total Quantity of Sample Collected:_____ Total Quantity of Composite Prepared:_____ Total Quantity Submitted to Lab: _____

Sample Preservation Used:_____ Sample Split With Company?: Y N Name: _____

Flow When Sampled:

_____ Hour Composite - Total Flow During Composite Period:_____ Grab Sample - Flow Rate At Time of Sample: _____

Obtained From: ☐ Visual Estimate, ☐ Effluent Flow Meter, ☐ Influent Water Meter, ☐ Impossible To Tell If Flow Existed When Sampled

FIELD TEST RESULTS

pH (905)_____ Flammability_____ Redox_____ Cyanide _____

Odor_____ Other _____

Sulfide_____ Other_____ Other _____

LABORATORY TESTS Check Tests Requested

	CONSTITUENT	CODE
	pH	101
	TOTAL CYANIDE, mg/l CN	206
	TOTAL ARSENIC, mg/l As	705
	TOTAL CADMIUM, mg/l Cd	708
	TOTAL CHROMIUM, mg/l Cr	709
	TOTAL COPPER, mg/l Cu	712
	TOTAL LEAD, mg/l Pb	714
	TOTAL MERCURY, mg/l Hg	717
	TOTAL NICKEL, mg/l Ni	718
	TOTAL SILVER, mg/l Ag	722
	TOTAL ZINC, mg/l Zn	724
	FLASH POINT °C	105
	TOTAL PHENOLS, mg/l C_6H_5 OH	312

CONSTITUENT	CODE

CUSTODY RECORD

Relinquished by: (Signature)	Time/Date	Received by: (Signature)
Relinquished by: (Signature)	Time/Date	Received by: (Signature)
Relinquished by: (Signature)	Time/Date	Received by: (Signature)
Relinquished by: (Signature)	Time/Date	Received by: (Signature)
Relinquished by: (Signature)	Time/Date	Received by: (Signature)

Figure 18B. Evidence Sample Chain of Custody Record

LOGGED IN BY:_____ LABORATORY JOB NUMBER: SJS_____

CHARLES W. CARRY
Chief Engineer and General Manager

SANITATION DISTRICTS OF LOS ANGELES COUNTY
P.O. Box 4998 Whittier, California 90607

For additional information regarding
this analysis call (562) 699-7411 x 2900

SURVEILLANCE PROGRAM - CHAIN OF CUSTODY RECORD

SAMPLE IDENTIFICATION | Surcharge Account Number: | I.W. Permit Number:

Sample Source or Company Name: _____

Address: _____

Reason For Sampling: ☐ **Phase 1** ☐ Pretreatment ☐ Sewer System Problem ☐ Other: _____

Evidence Sampling Authorized By: *Martyn/Burch* _____

Accounting Charges: ☐ For Routine Samples Taken By IWMC: TS14905 BM

☐ For All Special Investigation Samples: TS14905 B_____ ☐ Other: _____

SAMPLE COLLECTION INFORMATION: Test aliquot Volume_____/_____ml. Interval____/____min. Estimated Flow Rate_____gpm.

Sample Taken From:
- ☐ d/s Manhole
- ☐ u/s Manhole
- ☐ d/s Only Manhole
- ☐ Other:

* Sample Method:
- ☐ Composite - Single Container
- ☐ Individual Bottles _____ hr/bottle
- ☐ Individual Bottles - Composited
- ☐ Grab

* Sample Date:

At/or ☐ A.M.

From _____ (HR. MIN.) ☐ P.M._____ 20____ (MONTH DAY YEAR) ☐ A.M.

To _____ ☐ P.M._____ 20____

Condition of Manhole, Other Observations: _____

Sampled By (Signature): _____

Total Quantity of Sample Collected:_____ Quantity submitted to lab_____ Sample Container(s) Used: ☐C/c Other: _____

Sample Preservation Used: ☐Ice ☐No Cl_2 ☐Sodium Thiosulfate ☐NaOH ☐HNO_3 Other: _____

Composite Sample Data: pH (905)_____ Color:_____Other: _____

Individual Bottle Data: pH/Color/Vol.

1. _____	6. _____	11. _____	17. _____	23. _____
2. _____	7. _____	12. _____	18. _____	24. _____
3. _____	8. _____	13. _____	19. _____	25. _____
4. _____	9. _____	14. _____	20. _____	26. _____
5. _____	10. _____	15. _____	21. _____	27. _____
		16. _____	22. _____	28. _____

Bottle Nos. Composited: _____

Bottle Nos. Submitted to Lab: _____

LABORATORY TESTS NOTES TO ANALYSTS: _____

	CONSTITUENT	CODE
	pH	101
	SUSPENDED SOLIDS, mg/l	151
	COD, mg/l O	403
	TOTAL CYANIDE, mg/l CN	206
	CYANIDE AMENABLE TO Cl_2	210
	TOTAL CADMIUM, mg/l Cd	708
	TOTAL CHROMIUM, mg/l Cr	709
	TOTAL COPPER, mg/l Cu	712
	TOTAL LEAD, mg/l Pb	714
	TOTAL NICKEL, mg/l Ni	718
	TOTAL SILVER, mg/l Ag	722
	TOTAL ZINC, mg/l Zn	724

	CONSTITUENT	CODE

CUSTODY RECORD

Relinquished by:	Print Name	Time/Date	Received by:	Print Name
Relinquished by:	Print Name	Time/Date	Received by:	Print Name
Relinquished by:	Print Name	Time/Date	Received by:	Print Name
Relinquished by:	Print Name	Time/Date	Received by:	Print Name

Figure 18C. Surveillance Program Chain of Custody Record

LOGGED IN BY:_____ LABORATORY JOB NUMBER: SJP_____

CHARLES W. CARRY
Chief Engineer and General Manager

SANITATION DISTRICTS OF LOS ANGELES COUNTY
P.O. Box 4998 Whittier, California 90607

For additional information regarding
this analysis call (310) 699-7411 x 2900

PRETREAMENT PROGRAM - CHAIN OF CUSTODY RECORD

SAMPLE IDENTIFICATION | Surcharge Account Number: | I.W. Permit Number:

Sample Source or Company Name: _____

Address: _____

Reason For Sampling: ☐ Phase 1 ☐ Pretreatment ☐ Sewer System Problem ☐ Other: _____

Monitoring Requested By: *Martyn/Burch* _____

Accounting Charges: ☐ For Routine Samples Taken By IWMC: TS14905 BM

☐ For All Special Investigation Samples: TS14905 B_____ ☐ Other: _____

SAMPLE COLLECTION INFORMATION:

* Sample Point:
- ☐ Sample Box ☐ Clarifier
- ☐ Manhole ☐ _____
- ☐ Valve ☐ CN Sample Point
- ☐ Clean-out ☐ _____

* Sample Method:
- ☐ Grab
- ☐ Composite-Timed With _____ minute intervals
- ☐ Composite-Flow With _____ x _____ gallons

Test aliquot volume_____ml.

Tot aliquot_____

* Sample Date:

At/or _____ (HR. MIN.) ☐ A.M. ☐ P.M._____ 19____ (MONTH DAY YEAR)

From _____ ☐ A.M.

To _____ ☐ P.M._____ 19____

* Observations: _____

* Sampled By:_____ * Submitted to Laboratory By:_____ * Contact Name:_____ * Title: _____

* Total Quantity of Sample Collected:_____ * Sample Container(s) Used: ☐ C/c_____Other:_____ * Split with Company? Y N

* Quantity Submitted to Lab:_____ * Split given to: ☐ Contract

* Sample Preservation Used: ☐ Ice ☐ No Cl_2 ☐ Sodium Thiosulfate ☐ NaOH ☐ HNO_3 Other: _____

FIELD TEST RESULTS

pH (905) _____ Sulfide _____

Color _____ Flammability _____

Cyanide _____ Odor _____

Redox _____ Other _____

FLOW METER INFORMATION

Totalizer Readings: _____

Final: _____

Initial: _____

Difference: _____

Multiplier: _____

Total Flow: _____ gal.

Flow Rate at Time of Sample:

(905)ph_____ s/u_____gpm

(905)ph_____ s/u_____gpm

☐ Visual Estimate

☐ Effluent Flow Meter

☐ Influent Water Meter

☐ Estimate Impossible

LABORATORY TESTS NOTES TO ANALYSTS: _____

	CONSTITUENT	CODE
	pH	101
	SUSPENDED SOLIDS, mg/l	151
	COD, mb/l 0	403
	TOTAL DISS. SOLIDS (TDS), mg/l	155
	AMMONIA NITROGEN, mg/l N	201
	TOTAL PHOSPHATE, mg/l PO_4	310
	TOTAL FLUORIDE, mg/l F	313
	TOTAL PHENOLS, mg/l C_6H_5OH	312
	OIL AND GREASE, mg/l	408
	OIL AND GREASE (NON-POLAR), mg/l	414

	CONSTITUENT	CODE
	TOTAL CYANIDE, mg/l CN	206
	CYANIDE AMENABLE TO C12	210
	TOTAL CADMIUM, mg/l Cd	708
	TOTAL CHROMIUM, mg/l Cr	709
	TOTAL COPPER, mg/l Cu	712
	TOTAL LEAD, mg/l Pb	714
	TOTAL NICKEL, mg/l Ni	718
	TOTAL SILVER, mg/l Ag	722
	TOTAL ZINC, mg/l Zn	724
	TOTAL ARSENIC, mg/l As	705
	TOTAL MAGANESE, mg/l Mn	716
	TOTAL ANTIMONY, mg/l Sb	725

	CONSTITUENT	CODE
	PROJECT CODE 631	T06
	ACROLEIN	654
	ARCYLONITRILE	655
	PROJECT CODE:	
	EPA	
	TOTAL GOLD, mg/l Au	730
	TOTAL PLATINUM, mg/l Pt	M01
	TOTAL PALLADIUM, mg/l Pd	M02

CUSTODY RECORD

Relinquished by:	Print Name	Time/Date	Received by:	Print Name
Relinquished by:	Print Name	Time/Date	Received by:	Print Name
Relinquished by:	Print Name	Time/Date	Received by:	Print Name
Relinquished by:	Print Name	Time/Date	Received by:	Print Name
Relinquished by:	Print Name	Time/Date	Received by:	Print Name

Figure 18D. Pretreatment Program Chain of Custody Record

SJCWQL SAMPLE REQUEST FORM

LAB JOB NOS.: 1) SJ 2) SJ 3) SJ 4) SJ

CHARGE NOS.: 1: _____ B _____ 2: _____ B _____ 3: _____ B_____

REQUESTED BY: _____ SAMPLED BY: _____

REPORT TO: 1) _____ 2)_____ 3)_____

DATE AND TIME - GRAB SAMPLES: 1) / / : 2) / / :

3) / / : 4) / / :

COMPOSITE SAMPLES: 1) FROM: / / : / / :
2) FROM: / / : / / :
3) FROM: / / : / / :
4) FROM: / / : / / :

SAMPLE LOCATION: 1) - - TYPE: VOLUME LITER
2) - - TYPE: VOLUME LITER
3) - - TYPE: VOLUME LITER
4) - - TYPE: VOLUME LITER

DESCRIPTION: 1) _____
2) _____
3) _____
4) _____

PROJ. NO.: NO. OF SAMPLES: LOCATIONS: 1) 2) 3) 4)
PROJECT TITLE:

TESTS REQUIRED:

CODE:	TEST NAME:	CODE:	TEST NAME:
1) _____	- _____	16) _____	- _____
2) _____	- _____	17) _____	- _____
3) _____	- _____	18) _____	- _____
4) _____	- _____	19) _____	- _____
5) _____	- _____	20) _____	- _____
6) _____	- _____	21) _____	- _____
7) _____	- _____	22) _____	- _____
8) _____	- _____	23) _____	- _____
9) _____	- _____	24) _____	- _____
10) _____	- _____	25) _____	- _____
11) _____	- _____	26) _____	- _____
12) _____	- _____	27) _____	- _____
13) _____	- _____	28) _____	- _____
14) _____	- _____	29) _____	- _____
15) _____	- _____	30) _____	- _____

NOTES TO ANALYST:

==========

CUSTODY RECORD

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	/ / AM/PM	

Figure 18E. SJCWQL Sample Request Form

SANITATION DISTRICTS OF LOS ANGELES COUNTY
SURVEILLANCE PROGRAM CUSTODY TAG

Sample Source: _____

This is #_____of_____Splits.

LOT NUMBER: PRESERVATIVE ADDED:	Time	Date	Sampled By: (Signature)
☐ ACID:	Time	Date	Relinquished By: (Signature)
☐ BASE:	Time	Date	Received By: (Signature)
☐ OTHER:	Time	Date	Relinquished By: (Signature)
☐ AMOUNT: ml/g	Time	Date	Received By: (Signature)

LAB JOB NO. SJS

SANITATION DISTRICTS OF LOS ANGELES COUNTY
PRETREATMENT PROGRAM CUSTODY TAG

Sample Source: _____

This is #_____of_____Splits.

LOT NUMBER: PRESERVATIVE ADDED:	Time	Date	Sampled By: (Signature)
☐ ACID:	Time	Date	Relinquished By: (Signature)
☐ BASE:	Time	Date	Received By: (Signature)
☐ OTHER:	Time	Date	Relinquished By: (Signature)
☐ AMOUNT: ml/g	Time	Date	Received By: (Signature)

LAB JOB NO. _____

Figure 18F. Surveillance and Pretreatment Programs Custody Tags

SANITATION DISTRICTS OF LOS ANGELES COUNTY

EVIDENCE SAMPLE—CUSTODY TAG

Sample Source: _____

This is #_____ of _____ Splits. See over for preservative.

CONTAINER LOT NUMBER:	Time	Date	Sampled By: (Signature)
Relinquished By: (Signature)	Time	Date	Received: By: (Signature)
Relinquished By: (Signature)	Time	Date	Received: By: (Signature)
Relinquished By: (Signature)	Time	Date	Received: By: (Signature)
Relinquished By: (Signature)	Time	Date	Received: By: (Signature)

LAB JOB NO. SJE _____

FRACTION # _____ **OF** _____ **SPLITS**

Preservative Added:	Preserved By: (Signature)
	Stored By: (Signature)
☐ ACID: _____	Retrieved By: (Signature)
☐ BASE: _____	Stored By: (Signature)
☐ OTHER: _____	Retrieved By: (Signature)
☐ AMOUNT: _____ml/g	Stored By: (Signature)

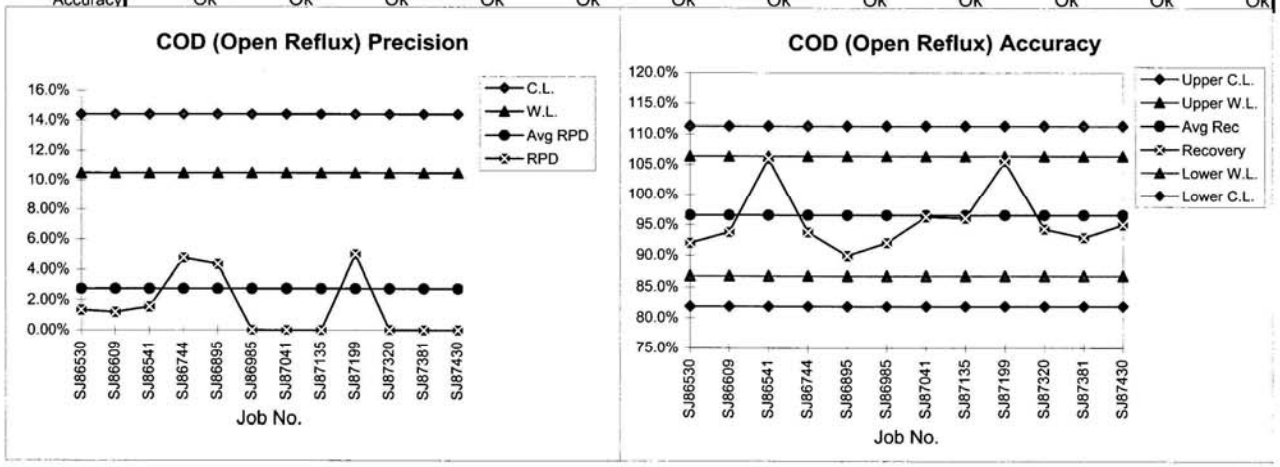
Figure 18G. Evidence Sample Custody Tag

Batch No. contains Date of Analysis and File Name

COD (OPEN REFLUX) CONTROL CHART FOR SJC LAB

7/8/03

Sequence#	1558	1559	1560	1561	1562	1563	1564	1565	1566	1567	1568	1569
Batch No.	030507C	030509A	030509B	030509C	030514A	030514B	030516A	030516B	030520A	030520B	030522A	030522B
Job No.	SJ86530	SJ86609	SJ86541	SJ86744	SJ86895	SJ86985	SJ87041	SJ87135	SJ87199	SJ87320	SJ87381	SJ87430
Calc Date	05/08/03	05/09/03	05/09/03	05/09/03	05/14/03	05/14/03	05/19/03	05/19/03	05/21/03	05/21/03	05/23/03	05/23/03
Dup1 Mg/l	74	83	64	21	23	28	< 10	98	19	< 10	< 10	27
Dup2 Mg/l	73	82	63	20	22	28	< 10	98	20	< 10	< 10	27
Average Mg/l	74	83	64	21	23	28	< 10	98	20	< 10	< 10	27
Differ. Mg/l	1	1	1	1	1	0	0	0	1	0	0	0
RPD	1.4%	1.2%	1.6%	4.8%	4.3%	0.0%	0.0%	0.0%	5.0%	0.0%	0.0%	0.0%
Dup1 Mg	3.710	4.126	3.204	1.026	1.156	1.406	0.412	4.918	0.953	0.290	0.104	1.354
Dup2 Mg	3.668	4.084	3.162	0.984	1.115	1.406	0.370	4.897	1.016	0.269	0.104	1.354
Average Mg	3.689	4.105	3.183	1.005	1.1355	1.406	0.391	4.9075	0.9845	0.2795	0.104	1.354
Spk Smpl Mg	8.290	8.796	8.482	5.696	5.635	6.010	5.206	9.712	6.259	4.995	4.750	6.104
Spk Add Mg	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Spike Rec. %	92.0%	93.8%	106.0%	93.8%	90.0%	92.1%	96.3%	96.1%	105.5%	94.3%	92.9%	95.0%
Precision	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok
Accuracy	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok



Control Limit=14.4%
Warning Limit=10.5%
Average RPD=2.75%

Ave Recov=96.6%
Std Dev=4.9%

111.3% Up Cntrl Lim
106.4% Up Warn Lim
86.8% Lo Warn Lim
81.9% Lo Cntrl Lim

Figure 19. Example of a Control Chart for Precision and Accuracy