QUALITY MANUAL

ENVIRONMENTAL AND CHEMICAL LABORATORY SERVICES

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DATA QUALITY POLICIES, OBJECTIVES AND DEFINITIONS

1.1 MANAGEMENT POLICY

It is the policy of the Environmental and Chemical Laboratory Service (ECLS) to generate environmental laboratory data of known and documented quality and to maintain the quality systems necessary to generate this data. This is accomplished through two separate actions. The first is the verification that management and the analysts are free from any undue influences that could possibly affect the objectivity of their actions. This is documented by the completion of the employee Attestation Form, **Appendix 15**. The second is by adopting and implementing the standards and quality systems, as delineated in this manual, as the operating procedures for ECLS. Management and the Quality Assurance Officer (QAO) have developed the requisite standards and quality systems and have communicated these systems to the analysts. This is documented by the employee's acknowledgement that s/he has received this version of the Quality Manual, **Appendix 5.** Management has also provided the analysts with all the tools necessary to successfully fulfill the requirements contained in this document.

Furthermore, ECLS will maintain the appropriate certifications and/or accreditations necessary to demonstrate compliance with all the rules and regulations applicable to the types of analytical analyses being conducted. These certifications and/or accreditations are prominently displayed in the lobby of the Public Health, Environmental and Agricultural (PHEAL) building, with a binder at the Security desk with lists of analytes and certified methods.

1.2 DATA QUALITY OBJECTIVES

The objective of this manual is to define the quality systems and standard operating procedures that are employed in the generation of environmental laboratory data. This manual establishes the minimum quality standards that the resultant data must meet. Through the establishment of the quality systems and operating procedures, it is ECLS's goal to produce data that are accurate and precise as well as comparable to data generated by other nationally accredited laboratories. ECLS ensures the quality of all reported data through the strict adherence to the policies and procedures contained in this manual.

The laboratory's procedures and QA/QC practices are listed in the subsequent chapters.

The implementation and management of all the quality systems and procedures contained in this manual are the responsibility of the QAO. To that end, the QAO performs proactive and preventive actions such as conducting internal system and performance audits; participating in regularly scheduled management staff meetings or conducting QAO staff meetings (see section 2.5) to explain the QA/QC requirements to the analysts; by providing senior management with written reports, as needed, on the status of the QA Program.

Since the quality of the data reported by ECLS is only as good as the samples provided to ECLS, copies of this manual are made available to the clients providing samples to ECLS so that they are fully aware of ECLS's current policies regarding the collection, submission, acceptance, and rejection of samples. A record of whom the manuals were distributed to and the date sent is maintained by the QAO.

CHAPTER ONE

DATA QUALITY POLICIES, OBJECTIVES AND DEFINITIONS

ECLS Management is committed to making whatever changes are necessary to the quality systems to maintain the quality of the data generated and provide sufficient documentation in support of that data. Therefore, at the beginning of the new year, prior to the scheduled yearly review of the QM, QAO will meet with management to discuss the current state of the QA Program. The attendees will consist of the ECLS Director, the PHEL Policy Planning and Regulatory Compliance (PPRC) Director, the ECLS QAO, and Program Managers. The basis of the meetings will be to review OQA activities, to discuss issues affecting the QA Program, and to resolve any potential problems in the QA Program. The QAO will present to management proposed changes that are necessary to keep ECLS certification status current with DEP and EPA protocols along with an explanation as to why they are necessary and how possibly to implement those changes with a minimum of inconvenience to laboratory operation. Pertinent outcomes of the meeting will be included in the next revised SOP.

The minutes of all meetings will be documented, posted on the Q drive and forwarded to all attendees.

1.3 QUALITY ASSURANCE PROJECT PLAN (QAPP)

ECLS strives to meet any additional data quality requirements that our clients may want associated with a specific set of samples. The client informs ECLS of the changes from the ECLS routine data quality practices that they want to institute, prior to the submittal of samples, most likely at the time of sample scheduling. In those instances, the specifics may be detailed in a Quality Assurance Project Plan, QAPP and conveyed to the analysts.

Sometimes a client may desire to prepare a Quality Assurance Project Plan for specialized projects and/or routine sampling events. When a client desires ECLS to perform analytical work that is outside ECLS's normal analytical capabilities, a QAPP must be prepared prior to initiating sampling. The following items are addressed by ECLS and the client when preparing a QAPP:

- Type of samples being submitted e.g., potable water, waste-water, etc.
- The suggested method to be used along with an acknowledgement as to the deficiencies/shortcomings of the method. If the client has a specific analytical method in mind, this should be made available to ECLS since this could shorten the time needed by ECLS to validate the method.
- Requested MDL values. These values will be a driving force to see if ECLS can validate the method at the level of recovery that is being sought.
- MCL or other action levels. If the MCL is too close to the achievable MDL, the method may be inappropriate for the expressed purpose.
- Intended data usage. This is necessary to determine the level of QC that is necessary to be run during the analyses. If enforcement is the objective, then one type of QC would be required. If preliminary information gathering is the objective, then perhaps a less strenuous QC protocol could be used. This determination would influence the type of method validation that would have to be performed.
- Types of QC required. The requested QC may be inappropriate for the intended data usage.
- Whether chain of Custody is requested.

- Turnaround time. This turnaround time is for responding back to the client with data from analytical runs performed on field samples.
- Sampling frequency.
- Date of sampling event initiation. Again, this would play into determining the amount of method validation that is necessary.
- Extent of the event.
- Sampling dates.
- Projected number of samples. If the projected number of samples is too low, it may not be economically feasible to pursue the project.
- Data reporting format. If a format is requested that ECLS currently does not have available, that could have a large impact on the possibility of going forward in a short period of time.
- Listing of any other ECLS and/or submitting agency requirements.
- Agency submitting QAPP.
- Contact person.
- Billing information.
- Sign off by the contact person and the ECLS Laboratory Manager or his designee.
- The QAO will maintain a copy as well as post copies of all QAPPs to the Q drive.

However, the most likely information that is referred to the analysts deals with sample scheduling and the specifics of the various projects being run by DEP. Informing the analysts of sampling schedules allows them to prepare for the sampling events and to determine if those events would overwhelm the analytical capacity of the laboratory. Informing the analysts of project requirements makes them aware of any additional information that the analysts would need to be in a position to handle the project, e.g., knowing that a certain project is scheduled to come in next week and that it will consist of 20 samples that will have to be analyzed according to total and dissolved procedures. The analysts must then prepare for forty analyses on the twenty submitted samples.

PROCEDURE

1. When ECLS Management has been informed of the specifics of a planned project or has signed off on a QAPP the information is forwarded by the ECLS Director or his designee, to the ECLS Program Managers for them to inform their staff.
2. This notification is to consist of a copy of the QAPP or a copy of the correspondence describing the project or a summary of the project specifics. If a project is already underway, then a re-construction of the project specifics must be prepared and distributed.
3. The analysts keep this information for subsequent referrals.
4. When Sample Receiving reviews the collector's paperwork during the sample acceptance process, they must make sure that when samples are submitted under a defined project, that the project name is specified on the submittal forms. *ALL REQUESTED ANALYSES MUST BE DOCUMENTED ON EACH OF THE SAMPLE SUBMITTAL FORMS AND IN ACCORDANCE WITH THE PROCEDURES DESCRIBED IN THE ECLS SAMPLE RECEIVING SOP (ECLS-SR-1).*

5. Sample Receiving must then inform the analysts that samples have been received under a specific project. This notification can be accomplished by posting the information in Sample Receiving, by emailing the analytical supervisors, by verbally informing the affected analysts, or if possible, by clearly defining certain batch numbers as specific to a project.

The majority of ECLS clients do not require any additional QC information beyond that which is routinely generated by ECLS. In the absence of any notification to the contrary, ECLS will perform its routine QC practices on all the samples submitted.

1.4 DEFINITIONS OF TERMS

Refer to **Appendix 1** for the definitions of all terms used within this Quality Manual.

APPENDIX 15

EMPLOYEE ATTESTATION STATEMENT

This form is to be completed at the time of the analyst's Data Integrity (DI) training.

This is to certify that I am free from any commercial, financial, interdepartmental, or other undue pressures that could interfere with the quality of my work. I also understand that should my status change in regard to this matter, I will immediately inform management of such a change. I also understand that if I purposely am not truthful in signing this statement, or I purposely withhold from management any subsequent change in my status, that I am in violation of the Environmental and Chemical Laboratory Service Data Integrity Policy. In the absence of any written requests for an explanation of this Policy, within 30 days of receipting DI training it is understood that I fully understand this Policy and I will strictly adhere to this Policy.

ANALYST (Print): _____

SIGNATURE: _____

SIGNING DATE: _____

APPENDIX 5

ANALYST RECEIPT OF ECLS QUALITY MANUAL

This form is required to be completed at the time the analyst receives his/her copy of the latest version of the Quality Manual.

ANALYST (PRINT): _____

This is to certify that I have received my personal copy of the QM and that I realize that I am to adhere to the policies and requirements contained therein. It also indicates that I will review the QM within 45 days of receipt of the QM and that I will address any requests, in writing, for clarification to the QAO through the Technical Supervisor. As part of my education concerning the QM and the changes that exist in this version of the QM when compared to the last version, there will be a set of 3 meetings, one of which I am required to attend, that will be scheduled for approximately 2 weeks after distribution, so that the changes in requirements can be brought to the analyst's attention. This will also allow me the opportunity to seek clarification on the requirements contained in the QM. In the absence of any written requests, it is understood that I fully understand the QM requirements and that I will strictly adhere to the protocols contained therein.

EFFECTIVE DATE OF QM RECEIVED: _____

DATE RECEIVED: _____

SIGNATURE: _____

APPENDIX 1

DEFINITIONS

ACCEPTANCE CRITERIA: specified limits on the characteristics of an item, process, or service defined in requirement documents.

ACCURACY: the degree of agreement between an observed value and a reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components that are due to sampling and analytical operations; a data quality indicator.

AMERICAN PUBLIC HEALTH ASSOCIATION (APHA): publisher of "Standard Methods for the Examination of Water and Wastewater."

ANALYST: the designated individual who performs the "hands-on" analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality control measures designed to meet the required level of quality.

ANALYTE: any compound or element, which can be detected and quantified by a particular method.

APPROVED ANALYTICAL METHODS: methods, where applicable, which are mandated by State and/or Federal regulations for use during analyses conducted for compliance with State and/or Federal laws.

ASSESSMENT: the evaluation process used to measure or establish the performance, effectiveness, and conformance of an organization and/or its systems to defined criteria.

ATOMIC ABSORPTION SPECTROSCOPY: term applied to one of the instrumental methods generally used to analyze environmental samples for metals. The prepared sample is introduced via cold vapor, flame, or furnace techniques and atomized. A light beam from a hollow cathode lamp, whose cathode is made of the element to be determined, or an electrodeless discharge lamp, is directed through the vapor onto a monochromater, and into a detector that measures the amount of light absorbed. Absorption depends upon the presence of free unexcited ground state atoms in the vapor. Since the wavelength of the light beam is characteristic of only the metal being determined, the light energy absorbed is a measure of the concentration of that metal in the sample.

AUDIT: a systematic evaluation to determine the conformance to quantitative and qualitative specifications of some operational function or activity.

BATCH: environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A "preparation batch" is usually, but not always, composed of 1 to 20 samples of the same defined matrix, meeting the above-mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours. A "submission batch" is composed of the samples that a particular sampler delivers to ECLS. It can consist of as few as one sample and is open ended on the other side. An "analytical batch" is composed of prepared samples, extracts, digestates, or concentrates that are analyzed together as a group. An analytical batch can include prepared samples originating from various environmental matrices and submission batches.

APPENDIX I

DEFINITIONS

BLANK: an aliquot of laboratory grade water, free of the analytes of interest that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis. The blank is subjected to the usual analytical and measurement process to establish a zero background value and is sometimes used to adjust or correct routine analytical results. Blanks include:

EQUIPMENT BLANK: a sample of analyte free matrix, which has been used to rinse common sampling equipment to check the effectiveness of decontamination procedures.
FIELD BLANK: blank prepared in the field by filling a clean container with pure distilled/de-ionized water and the appropriate preservative, if any, for the specific sampling activity being undertaken.
INSTRUMENT BLANK: a clean sample (e.g. distilled or deionized water) processed through the instrumental steps of the measurement process; used to determine instrument contamination.
METHOD BLANK: a sample of a matrix similar to the batch of associated samples (when available) that is free from the analytes of interest and is processed simultaneously with, and under the same conditions as, samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations that impact the analytical results. Since it is usually not possible to obtain a "matrix similar to the batch matrix," an in-house matrix is substituted for the batch matrix. This results in the method blank, being equivalent to the reagent blank.
LABORATORY REAGENT BLANK (LRB): a sample consisting of laboratory de-ionized water and reagents, without the target analyte or sample matrix, subjected to the same processes as the samples and used to determine the contribution of the reagents to the instrument readings.
TRIP BLANK: a container of laboratory pure water that is taken into the field to experience the conditions that samples undergo during sampling and transportation back to the laboratory. This serves as an indicator of potential sample contamination.

BLIND SAMPLE: a sample submitted for analysis with a composition known only to the submitter, usually the QAO. The analyst/laboratory may know the identity of the sample but not its concentration. It is used to test the analyst's or laboratory's proficiency in the execution of the measurement and reporting processes. See also Performance Audit.

CALIBRATION: to determine, by measurement or comparison with a standard, the correct value of each scale reading on a meter, instrument, or other device. The levels of the applied calibration standard bracket the range of planned or expected sample measurements.

CALIBRATION CURVE: the graphical relationship between the known values, such as concentrations, of a series of calibration standards and their instrument responses.

CALIBRATION METHOD: a defined technical procedure for performing a calibration.

CALIBRATION STANDARD: a substance or reference material used to calibrate an instrument.

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CERTIFIED REFERENCE MATERIAL (CRM): a reference material, one or more of whose property values are certified by a technically valid procedure, accompanied by, or traceable to, a certificate or other documentation issued by a certifying body.

COEFFICIENT of DETERMINATION: a measure of the amount of variation in the dependent variable that is accounted for by the independent variable and is designated as R^2.

COMPLAINT: statement made by a client that expresses, directly or indirectly, dissatisfaction with the services provided by ECLS. Examples of a complaint could be: a request to "validate" reported results; reported results do not match historical data; a request for a partial list of results after the expected reporting timeline has been exceeded; etc. Further determinations as to what constitutes a complaint will be made by the QAO.

CONFIRMATION: verification of the identity of a component through the use of an approach employing a different scientific principle from the original method. These may include, but are not limited to: second column confirmation, alternative wavelength, derivatization, mass spectral interpretation, alternative detectors, or additional cleanup procedures.

CONFORMANCE: an affirmative indication or judgment that a product or service has met the requirements of the relevant specifications, contract, or regulation; also the state of meeting the requirements.

CONTINUING CALIBRATION CHECK (CCC): a term generally used in organic analyses. It is not practical to daily perform an initial calibration of the instruments used in these analyses due to the length of the calibration process. The initial calibration establishes a response factor for the individual parameters. The parameter values generated by the CCC are compared against those response factors and, if they are within acceptable limits, the instrument is judged to still be calibrated.

CONTINUOUS FLOW ANALYSIS: a colorimetric method of analysis performed by pumping samples through a closed system and having the reagents added and the analysis conducted automatically. (See Flow Injection Analysis and Segmented Flow Analysis).

CONTROL LIMITS: a range that delineates acceptable performance for the analysis of a given analyte. The term applies to calibration check, surrogate, duplicate, control samples, and matrix spike results.

CORRECTIVE ACTION: the action taken to eliminate the causes of an existing nonconformity, defect or other situation in order to prevent recurrence.

CORRELATION COEFFICIENT: a measure of the linear relationship between 2 variables and is designated as R.

DATA AUDIT: a qualitative and quantitative evaluation of the documentation and procedures associated with environmental measurements to verify that the resulting data are of acceptable quality (i.e., that they meet specified acceptance criteria or that conformance has been achieved).

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DATA PACKAGE REVIEW: the process of verifying data packages for completeness of required analytical information and spot checking the accuracy of the reported analytical results.

DATA REDUCTION: the process of transforming raw data by arithmetic or statistical calculations, standard curves, concentration factors, etc. and collating it into a more useable form.

DEFICIENCY: an unauthorized deviation from acceptable procedures or practices, or a defect in an item.

DEMONSTRATION OF CAPABILITY: a procedure used to establish the ability of an analyst to generate acceptable accuracy and precision for a specific analysis.

DETECTION LIMIT: the lowest concentration or amount of the target analyte that can be identified, measured, and reported with 99% confidence that the analyte concentration is not a false positive value.

DOCUMENT CONTROL: the act of ensuring that documents (and revisions thereto) are proposed, reviewed for accuracy, approved for release by authorized personnel, distributed properly and controlled to ensure use of the correct version at the location where the prescribed activity is performed.

ELEMENT: The ECLS Laboratory Information Management System (LIMS).

EXTERNAL CHAIN OF CUSTODY FORM: a record that documents the possession of the samples from the time of collection to receipt in the laboratory, including the transfer of samples from the sample collector to a courier for delivery to the laboratory. This record generally recorded in a Sample Submittal Form and includes: the number and types of containers; the mode of collection; collector; time of collection; and requested analyses.

FIELD DUPLICATE: an individual environmental sample that is collected at a sampling point and is then aliquoted into two different containers at the time of sample collection. The two samples are generally not identified to the laboratory as duplicates and therefore the laboratory can not calculate the relative percent difference (RPD). The data user may calculate the RPD as a measure of sampling technique consistency or matrix homogeneity. The laboratory analyzes and handles field duplicates as routine samples.

FLOW INJECTION ANALYSIS: a technique whereby a small, fixed volume of a liquid sample is injected as a discrete zone using an injection device into a liquid carrier which flows through a narrow bore tube or conduit. The sample zone is progressively dispersed into the carrier, initially by convection and later by axial and radial diffusion, as it is transported along the conduit under laminar flow conditions. Reagents may be added at various confluence points and these mix with the sample zone under the influence of radial dispersion, to produce reactive or detectable species which can be sensed by any one of a variety of flow-through detection devices. The height or area of the peak-shaped signal thus obtained can be used to quantify the analyte after comparison with peaks obtained for solutions containing know concentrations of the analyte.

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FLUORESCENCE SPECTROSCOPY: analytical technique that measures the emitted radiation of a target analyte. The analyte is subjected to a radiation source causing the analyte to absorb the radiation. The analyte then emits radiation usually at a longer wavelength than the absorbed radiation. The measure of this emitted radiation indicates the amount of the analyte present in the sample. This technique is used to analyze for low levels of mercury.

GAS CHROMATOGRAPHY: an analytical technique for separating organic substances by percolating an inert gas stream over an inert, adsorptive stationary phase contained in a column.

HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC): an analytical technique for separating organic compounds by passing an active mobile liquid over an inert stationary phase that has bound to it an active liquid phase. The varying affinities of the compounds in the sample for the active liquid phase, causes the desired compound separations.

HOLDING TIMES: These are the maximum allowable times, as defined by State and/or Federal regulations that samples may be held prior to the initiation of the analysis and still be considered valid or not compromised.

INDUCTIVELY COUPLED PLASMA ATOMIC EMISSION SPECTROMETRY (ICP-AES): a term applied to the process which can analyze for more than one metallic element by measuring the emission spectra produced by the sample when introduced into an argon plasma.

INDUCTIVELY COUPLED PLASMA/MASS SPECTROMETRY (ICP/MS): an analytical technique used to determine low level metal concentrations. The ICP is the means through which the sample is introduced into the system. The MS functions as the separator and the detector of the system.

INSPECTION (Also see: Audit): an activity such as measuring, examining, testing, or gauging one or more characteristics of an entity and comparing the results with specified requirements in order to establish whether conformance is achieved for each characteristic.

INTERNAL CHAIN OF CUSTODY FORM: records that document which laboratory personnel took possession of a sample in order to initiate analysis. This record does not consist solely of one form that accompanies the sample through analysis but is comprised of several different documents, that taken together, establishes internal chain of custody.

INTERNAL STANDARD: a known amount of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method. It is used to calculate the concentrations of the analytes of interest in the sample.

ION CHROMATOGRAPHY: an analytical technique used to separate the ionic components of a sample by passing a liquid phase containing the sample over an ion exchanger. The strength of the affinity of the sample ions for the ionic sites of the exchanger effects the separation.

ION SELECTIVE ELECTRODE METER: an apparatus used to assay samples, directly or indirectly, containing the species for which the electrode is selective.

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INSTRUMENT PERFORMANCE CHECK SAMPLE (IPC): solutions of known concentrations of one or more constituents prepared from the same stock standard solutions that are used to prepare the calibration curve and subjected to the same processes that those standards are subjected, which are analyzed prior to and/or throughout the analysis of environmental samples and are used to check for line drift of the calibration curve throughout the analysis.

LABORATORY FORTIFIED BLANK (LFB), also referred to as LABORATORY CONTROL SAMPLE (LCS), or SPIKED BLANK (SP), or QC check sample: a sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes prepared from a different set of standard material that are used to prepare the calibration standards and subjected to the same processes as the calibration standards. It is used to check on the continuing validity of the calibration curve throughout the analyses and to establish intra-laboratory or analyst specific precision or bias.

LABORATORY DUPLICATE: aliquots of a sample taken from the same container under laboratory conditions and processed and analyzed independently in the same analytical batch which are used to determine the precision of the analyses.

LEGAL CHAIN OF CUSTODY PROTOCOLS: procedures employed to record the possession of samples from the time of sampling through analysis that are performed at the special request of the client. These protocols include the use of a Sample Submittal Form that documents the collection, transport, and receipt of compliance samples by the laboratory. **In addition, these protocols document all handling of the samples within the laboratory via the internal chain of custody records.**

MANAGER: LABORATORY (however named): the individual designated as being responsible for the overall operation, personnel, and the physical plant of the environmental laboratory. This presently is the Director of PHEL. A Technical Director may report directly to the Laboratory Manager.

MANAGER: SERVICE: the individual designated as being responsible for the day-to-day operation of the Environmental and Chemical Laboratory Services. This person can also be referred to as a TECHNICAL DIRECTOR.

MATRIX: the component or substance that contains the analyte of interest. For purposes of batch and QC requirement determinations, the following distinctions shall be used, provided the sample submitter does not specifically designate the sample as a certain type:

AQUEOUS: any aqueous sample excluded from the definition of Drinking Water matrix or Saline/Estuarine source. includes surface water, groundwater, effluents, and TCLP or other extracts.

DRINKING WATER: any aqueous sample that has been designated as potable or potential potable water source.

SALINE/ESTUARINE: any aqueous sample from an ocean or estuary, or other salt-water source such as the Great Salt Lake.

NON-AQUEOUS LIQUID: any organic liquid with <15% settleable solids.

BIOLOGICAL TISSUE: any sample of a biological origin such as fish tissue, shellfish, or plant material. Such samples shall be grouped according to origin.

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SOLIDS: includes soils, sediments, sludges and other matrices with >15% settable solids.
CHEMICAL WASTE: a product or by-product of an industrial process that results in a matrix not previously defined.
AIR: whole gas or vapor samples including those contained in flexible or rigid wall containers and the extracted concentrated analytes of interest from a gas or vapor that are collected with a sorbent tube, impinger solution, filter, or other device.
SURFACE WIPES: a solids sample generated by using an appropriate wipe material to collect dust samples for metals analyses.
BODY FLUIDS: blood or urine samples collected from a person.

MATRIX SPIKE (MS) also referred to as SPIKED SAMPLE or LABORATORY FORTIFIED MATRIX (LFM): a sample prepared by adding a known amount of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.

MATRIX SPIKE DUPLICATE: a replicate matrix spike prepared in the laboratory and analyzed to obtain a measure of the precision of the recovery for each analyte.

MAXIMUM CONTAMINANT LEVEL (MCL): the highest level of a contaminant that is permitted in Drinking Water under Federal and/or State regulations.

METHOD DETECTION LIMIT (MDL) (Also see: DETECTION LIMIT): the minimum concentration of a substance that can be measured and reported with 99% confidence that the concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte. (40CFR Part 136, Appendix B).

MODIFIED REGULATORY REPORT PACKAGE (MRRP): see Tier 2 Report.

MS TUNING DATA: refers to the data generated and reviewed by the analyst to ensure that the mass spectrometer (MS) is operating within the required performance criteria. This is accomplished by running one of two compounds through the GC/MS: bromofluorobenzene (BFB) for volatile organics and decafluorotriphenylphosphine (DFTPP) for non-volatile extractable organics. A spectrum of the appropriate compound is acquired and it must meet the specific criteria listed in the methodology. The tuning solution for the ICP/MS consists of the elements beryllium, magnesium, cobalt, indium, and lead. The spectrum of this solution must meet the acceptance criteria listed in the method.

NEGATIVE CONTROL: measures taken to ensure that a test, its components, or the environment have not been exposed to method analytes or other interferences during the collection, transportation, preparation and/or analysis. This consists of method blanks, field blanks, and trip blanks.

NELAC STANDARDS: the plan of procedures for consistently evaluating and documenting the ability of laboratories performing environmental measurements to meet nationally defined standards established by the National Environmental Laboratory Accreditation Conference.

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NELAP: (National Environmental Laboratory Accreditation Program) The purpose of this program is to establish and implement a program for the accreditation of environmental laboratories.

NIST: the National Institute of Standards and Technology. This agency was previously known as the National Bureau of Standards (NBS).

NJDEP: the New Jersey Department of Environmental Protection.

NJDOT: the New Jersey Department of Transportation.

PERFORMANCE AUDIT: the routine comparison of independently obtained qualitative and quantitative measurement system data with routinely obtained data in order to evaluate the proficiency of an analyst or laboratory. This consists of external proficiency and internal blind samples.

PERFORMANCE BASED MEASUREMENT SYSTEM (PBMS): a set of processes wherein the data quality needs, mandates, or limitations of a program or project are specified and serve as criteria for selecting test methods to meet those needs in a cost-effective manner.

POSITIVE CONTROL: measures taken to ensure that a test and/or its components are working properly and producing correct or expected results from positive test subjects. This is shown through the analyses of LCSs.

PRECISION: the degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves; a data quality indicator. Precision is usually expressed as standard deviation, relative percent difference, variance or range, in either absolute or relative terms.

PRESERVATION: refrigeration and/or reagents added, usually at the time of sample collection, to maintain the chemical and/or biological integrity of the sample.

PROFICIENCY TESTING: a means of evaluating a laboratory's performance under controlled conditions relative to a given set of criteria through analysis of unknown samples provided by an outside source.

PROFICIENCY TESTING PROGRAM: the aggregate of providing rigorously controlled and standardized environmental samples to a laboratory for analysis, reporting of results, statistical evaluation of the results and the collective demographics and results summary of all participating laboratories.

PROFICIENCY TEST SAMPLE (PT): a sample, the composition of which is unknown to the analyst, which is provided by external, certified PT providers, to test whether the analyst/laboratory can produce analytical results within specified acceptance criteria.

PROMIUM™ Element: ECLS' Laboratory Information Management System (LIMS).

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PROTOCOL: a detailed written procedure for field and/or laboratory operation that must be strictly followed.

QUALITY ASSURANCE: an integrated system of activities involving planning, quality control, quality assessment, reporting and quality improvement to ensure that a product or service meets defined standards of quality with a stated level of confidence.

QUALITY ASSURANCE PROJECT PLAN (QAPP): a formal document describing the detailed quality control procedures by which the quality requirements, defined for the data and decisions pertaining to a specific project, are to be achieved.

QUALITY CONTROL: the overall system of technical activities whose purpose is to measure and control the quality of a product or service so that it meets the needs of users.

QUALITY MANUAL: a document stating the management policies, objectives, principles, organizational structure and authority, responsibilities, accountability, and implementation of an agency, organization, or laboratory, to ensure the quality of its product and the utility of its product to the users.

QUALITY SYSTEM: a structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products, and services. The quality system provides the framework for planning, implementing, and assessing work performed by the organization and for carrying out required QA and QC.

QUANTITATION LIMITS: levels, concentrations, or quantities of a target variable that can be reported at a specified degree of confidence.

RANGE: the difference between the minimum and the maximum of a set of values.

RAW DATA: any original factual information from a measurement activity or study recorded in laboratory notebooks, worksheets, records, memoranda, notes, or exact copies thereof that are necessary for the reconstruction and evaluation of the report of the activity or study. Raw data may include photography, microfilm or microfiche copies, computer printouts, magnetic media, including dictated observations, and recorded data from automated instruments. If exact copies of raw data have been prepared (e.g., tapes which have been transcribed verbatim, data and verified accurate by signature), the exact copy or exact transcript may be submitted.

RECOMMENDED METHODS: methods recommended by State and/or Federal agencies for use during certain analyses. However, these methods are not currently mandated for use by State and/or Federal Regulations.

REFERENCE MATERIAL: a material or substance, one or more properties of which are sufficiently well established, used for the calibration of an apparatus, the assessment of a measurement method, or for assigning values to materials.

APPENDIX 1

DEFINITIONS

REFERENCE METHOD: a method of known and documented accuracy and precision issued by an organization recognized as competent to do so.

REFERENCE STANDARD: a standard, generally of the highest metrological quality available at a given location, from which measurements made at that location are derived.

REPLICATE ANALYSES (See also: LABORATORY DUPLICATE): the measurements of the variable of interest performed identically on one or more sub-samples of the same sample within a short time interval.

REPORTING LEVEL:- the lowest concentration of an analyte that can be reported with a specified level of certainty, and without any special data qualifying codes. Defined by ECLS as the concentration of the lowest calibration standard.

REQUIREMENT: denotes a mandatory specification.

SAMPLE TRACKING: procedures employed to record the possession of a sample from the time of sampling until analysis, reporting, and archiving. These procedures include the use of a Chain of Custody Form that documents the collection, transport, and receipt of compliance samples to the laboratory along with the Internal Chain of Custody records. Access to the laboratory is limited and controlled to protect the integrity of the samples. Therefore, once a sample is received in the laboratory, only ECLS personnel have access to the submitted samples.

SEGMENTED FLOW ANALYSIS (SFA): or segmented continuous flow analysis (SCFA) is a technique which involves the introduction of sample into a flowing stream of reagents that react with the sample to produce a measurable end product. Samples are separated by the introduction of gas bubbles and a wash solution in order to avoid cross contamination between samples. In SCFA, turbulent flow conditions apply, complete sample dispersion occurs, and a steady-state condition is attained prior to analyte detection. The means of detection are similar to those used in flow injection analysis.

SELECTIVITY: the capability of a test method or instrument to respond to a target substance or constituent in the presence of non-target substances.

SENSITIVITY: the capability of a method or instrument to discriminate between measurement responses representing different concentrations of a variable of interest.

SPIKE: a known concentration of target analyte, or a substance which responds similarly to the analyte, added to a blank sample or sub-sample; used to determine recovery efficiency or for other quality control purposes.

STANDARD: the document describing the elements of laboratory accreditation that has been developed and established within the consensus principles of NELAC and meets the approval requirements of NELAC procedures and policies.

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"STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER": a compendium of approved analytical methods issued by the American Public Health Association (APHA).

STANDARD OPERATING PROCEDURES (SOPs or METHOD MANUALS): a written document which details the method of an operation, analysis or action whose techniques and procedures are thoroughly prescribed and which is accepted as the method for performing certain routine or repetitive tasks. ECLS SOPs list the actual procedures that are used in the laboratory and are not just a rewriting of the reference method.

STANDARD REGULATORY REPORT PACKAGE (SRRP): See Tier 1 Report.

STANDARDIZED REFERENCE MATERIAL (SRM): a certified reference material produced by the U.S. National Institute of Standards and Technology or other equivalent organization and characterized for absolute content, independent of analytical method. SUPERVISOR: Within each functional unit in ECLS, there are analytical areas of specialization each of which is lead by an individual who has responsibility for the proper functioning of that area. These individuals are designated as Supervisors. These Supervisors also meet the requirements of a Technical Director and are used as substitute Technical Supervisors when the Technical Supervisor is absent from work.

SURROGATE: a substance with properties that mimic the analyte of interest. It is unlikely to be found in environmental samples and is added to them for quality control purposes.

TECHNICAL DIRECTOR: individual(s) designated as being responsible for a particular area or category of scientific analysis. This responsibility includes direct day-to-day supervision of technical employees, supply and instrument adequacy and upkeep, quality assurance/quality control duties, and training of personnel so that those employees have the required balance of education, training, and experience to perform the required analyses. The Technical Director must possess the qualifications contained in revision 15 of the NELAC document (July 12, 2002) in section 4.1.1.1.

TECHNICAL SUPERVISOR: The ECLS staff here designated as Technical Supervisors, also meet the requirements of this section in NELAC for Technical Director. However, Technical Supervisor will be used to reference the 4 individuals that are the supervisors of the Inorganic, Organic, Sample Receiving and Data Management, and Radiochemistry Units within ECLS.

TEST: a technical operation that consists of the determination of one or more characteristics or performance of a given product, material, equipment, organism, physical phenomenon, process or service according to specified procedure. The result of a test is normally recorded in a document sometimes called a test report or a test certificate.

TEST METHOD: an adoption of a scientific technique for a specific measurement problem, as documented in a laboratory SOPS.

TIER 1 REPORT: this is the full data deliverables analytical report package produced by ECLS upon request of the client. It is also referred to as a Standard Regulatory Report Package (SRRP).

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Although it is referred to as a "Standard" package, it is not the style of report routinely generated by ECLS. This style of report is produced only if a client requests it. The report comprises a very large data package that fully documents every aspect of each analytical procedure used to produce the results. It includes copies of the analytical results as well as raw instrument output, raw QC data, summary QC data, extraction logs, submittal and chain of custody forms, a laboratory chronicle, a case narrative, etc.

TIER 2 REPORT: this is the analytical report package ECLS routinely produces for its clients.

TOLERANCE CHART: a chart in which the plotted quality control data is assessed via a tolerance level (e.g., +/- 10% of a mean) based on the precision level judged acceptable to meet overall quality/data use requirements instead of a statistical acceptance criteria (e.g., +/- 3 sigma).

TRACEABILITY: the property of a result of a measurement whereby it can be related to appropriate standards, generally international or national standards, through unbroken chain of comparisons.

USEPA: refers to the United States Environmental Protection Agency.

USGS: refers to the United States Geological Survey.

UV-VIS SPECTROMETER: an apparatus used as the detector in colorimetric analyses. The instrument functions by passing light of a specific wavelength through the sample that has been treated with reagents to form a colored end product with the analyte of interest. The colored end product absorbs light of the specific wavelength. The absorbance is proportional to the concentration of the end product in the sample.

VALIDATION: the process of substantiating specified performance criteria.

VERIFICATION: confirmation by examination and provision of evidence that specified requirements have been met. NOTE: In connection with the management of measuring equipment, verification provides a means for checking that the deviations between values indicated by a measuring instrument and corresponding known values of a measured quantity are consistently smaller than the maximum allowable error defined in a standard, regulation or specification peculiar to the management of the measuring equipment. The result of verification leads to a decision either to restore to service, to perform adjustment, to repair, to downgrade, or to declare obsolete. In all cases, it is required that a written trace of the verification performed shall be kept on the measuring instrument's individual record.

WORK CELL: a well defined group of analysts that work together to perform a specific analysis. The members of the group and their specific functions within the work cell are documented through the DOC process.

CHAPTER TWO
LABORATORY ORGANIZATION AND MANAGEMENT

2.1 PLACEMENT OF THE ENVIRONMENTAL AND CHEMICAL LABORATORY SERVICE (ECLS) WITHIN THE NEW JERSEY DEPARTMENT OF HEALTH (NJDOH)

NJDOH is the parent organization in which ECLS operates. ECLS is a Service Area located within the Public Health and Environmental Laboratories (PHEL), a part of the NJDOH Division of Public Health Infrastructure, Laboratories and Emergency Preparedness (PHILEP). The ECLS Service Director reports directly to the PHEL Director. See **Appendix 2.**

ECLS is autonomous in its day to day operation as a laboratory in that it is mandated to follow its own protocols, policies, and standard procedures without any interference from senior DOH management. ECLS performs the types of testing that it is certified to perform, using the requisite analytical methodologies, and reporting its results according to established protocols without any attempted interference from senior management. That is, senior management does not try to force ECLS to use non-approved methods, lessen QC testing, or in any way subvert the policies and procedures contained in this manual. It is true that, due to public health concerns, certain samples may receive emergency analysis at the temporary expense of routinely submitted samples. However, all analyses, data validation, and data reporting activities are still performed according to established standard procedures contained in this manual.

NOTE: The titles listed below are not the official NJ Civil Service Commission position titles. These titles have been adopted/modified from the NELAC guidelines and are used to indicate job function. There are several Civil Service Commission position titles that are qualified to fill these titles listed below.

2.2 ORGANIZATIONAL AND MANAGEMENT STRUCTURE OF ECLS

There is a PHEL Director who reports to the Assistant Commissioner for PHILEP. The PHEL Director has four Service areas, each headed by a Service Director. These Service Directors also function as a substitute PHEL Director when the Director is away.

ECLS is divided into five programs each headed by a Program Manager who reports directly to the ECLS Service Director. These Program Managers or Technical Directors also function as the substitute Service Director when the ECLS Director is away from the laboratory. These assignments are made on a rotating basis. The ECLS Director informs the Program Managers and designates who is in charge during his absence and the managers inform the staff. There is also an Office of Quality Assurance, staffed by the Quality Assurance Officer, which works closely with the ECLS Director, but reports directly to the PHEL Policy Planning and Regulatory Compliance (PPRC) Service Director. See **Appendix 3**. The ECLS programs are listed below.

CHEMICAL TERRORISM (CT): This program is responsible for the shipment and analysis of clinical specimens. Types of analytes are metabolites, chemical agents or biomarkers in urine and blood specimens. CT has its own QM and therefore, CT operations are not detailed in this QM.

DATA MANAGEMENT: This program is responsible for the preparation and collation of final sample reports, and the implementation and maintenance of the Laboratory Information Management System.

INORGANIC TESTING: This program is subdivided into two sections: General Analytical Chemistry Testing and Trace Metals Testing. The General Analytical Chemistry Section performs the traditional "wet" chemical analyses using techniques such as gravimetry, titrimetry, colorimetry, continuous flow analysis, UV/VIS spectrophotometry, and ion chromatography, etc. The Trace Metal section analyzes aqueous sample matrices for the presence of trace metals by cold vapor and graphite furnace atomic absorption spectrometry, inductively coupled plasma emission spectrometry, fluorescence spectroscopy and ICP/MS. This program is also responsible for the shipment and analysis of clinical specimens (urine and blood). These analyses are covered in the CT Quality Manual and therefore are not detailed in this QM. .

SAMPLE MANAGEMENT and ORGANIC TESTING: This program is subdivided into four sections: Sample Receiving, Gas Chromatography/Mass Spectrometry (GC/MS); Gas Chromatography (GC) and High Performance Liquid Chromatography (HPLC); and Sample Preparation. Sample Receiving is responsible for the receipt, logging in and sample custody of samples submitted to ECLS. The GC/MS section analyzes environmental and other samples for volatile and semivolatile toxic organic contaminants. The GC and HPLC section analyze environmental and other samples for toxic organic contaminants. The Sample Preparation section is responsible for carrying out the various sample preparation and clean-up protocols necessary to make samples ready for GC/MS, GC, or HPLC techniques.

RADIOANALYTICAL SERVICES: This program is subdivided into two sections: Sample Preparation and Instrumental Analysis. The Sample Preparation Section utilizes US EPA approved and other nationally recognized procedures for the preparation of water samples for analysis. The Instrumental Analysis section selects the appropriate instrumentation to measure the requested type of radiological activity in the sample.

The Radioanalytical Services program has its own QM and therefore, Radiochemical operations are not detailed in this QM.

SANITARY BACTERIOLOGY SECTION: This section is subdivided into two programs: water testing and dairy testing.

Sanitary Bacteriology has its own QM and therefore, its operation is not detailed in this QM. Sanitary Bacteriology is a unit under the Public Health Laboratory Services Microbiology Program.

OFFICE OF QUALITY ASSURANCE (OQA): OQA is responsible for implementing, reviewing and maintaining all of the procedures, protocols and policies contained in this Quality Assurance Manual. OQA is also responsible for providing sufficient documentation to verify that all of these activities have been successfully completed. OQA reviews data packages for accuracy and completeness prior to those packages being forwarded to the sample submitters. The QAO: serves as the focal point for QA/QC oversight and review; functions independently from laboratory operations for which s/he has QA oversight;

evaluates data objectively; and has general knowledge of the analytical test methods for which data review is performed. The QAO, working with the ECLS Service Director, will notify its certification authorities (EPA Region 2 and NJDEP) regarding changes in management, supervisory, and technical changes in personnel within 30 days of the change.

2.3 RELATIONSHIP BETWEEN MANAGEMENT, TECHNICAL OPERATIONS, SUPPORT SYSTEMS AND QUALITY SYSTEMS

The ECLS management consists of the PHEL Director, ECLS Director, the various ECLS Program Managers, and the Quality Assurance Officer. All laboratory personnel must comply with all the QA/QC procedures contained in this manual. All professional and technical staff is full time employees of ECLS. Selective individual responsibilities of the laboratory staff are listed below.

The PHEL Director is the final authority on ECLS policy and operations. This includes, but is not limited to:

- Determining the operational priorities of ECLS.
- Deciding how resources will be allocated.
- Having the final say on all personnel decisions such as hiring, firing, and promotions.
- Providing fiscal and administrative support such as maintaining a purchasing program to facilitate the acquisition of supplies and equipment and maintaining a central service program that assists in the cleaning and maintenance of laboratory glassware.
- Providing and maintaining adequate facilities for proper laboratory operation.
  Although the PHEL Director sets the ECLS priorities, he/she is not directly involved in the day-to-day operation of ECLS.

The ECLS Director is a position that is under the direction of the PHEL Director. He/she is responsible for the day-to-day operation of ECLS. These responsibilities include, but are not limited to:

- Providing the analytical methods and standard operating procedures for the analysts to employ to generate accurate and reliable results.
- Establishing the educational and experience requirements for each type of employee working in ECLS. Since the titles of the various types of employees have been in existence for an extended period of time, these requirements have already been formulated by the State of New Jersey's Department of Personnel (NJ DOP) and are adhered to in filling those positions.
- Providing adequate training to all employees to allow them to successfully complete their assigned duties.
- Delegating the Technical Director's responsibilities to qualified analysts, where appropriate.
- Assuming ultimate responsibility for the accuracy and reliability of the results that are reported.

QUALITY ASSURANCE OFFICER (QAO) is a person meeting all the requirements as stated in the NJDEP environmental laboratory personnel regulations. The QAO responsibilities include, but are not limited to:

- Maintaining, revising, and implementing as appropriate the quality systems contained in this Quality Manual.
- Developing and implementing the requisite documentation protocols necessary to verify that all the procedures contained in this manual are, in fact, being adhered to.
- Performing the requisite number of system and performance audits called for in the documentation protocols.
- Providing reports to management detailing the functioning of the quality systems.
- Serving as focal point for all QA/QC activities.
- Having responsibility for the oversight and/or review of QC data.

A more detailed account of the QAO responsibilities and practices are contained throughout the Quality Manual and in particular in Chapter 10. The QAO reports directly to the Service Director for Policy, Planning, and Regulatory Compliance (PPRC).

The ECLS Program Managers / Technical Directors are in charge of the five ECLS programs mentioned above who meet all the requirements contained in the New Jersey Civil Service Commission job listings. The responsibilities for these program managers include, but are not limited to:

- Providing day-to-day supervision and technical guidance to the analysts in their analytical section.
- Reviewing selected analytical QC data to verify that: they meet all the specifications of this manual, they have been interpreted correctly by the analysts, and that they are complete.
- Reviewing selected raw data for correctness.
- Performing the secondary data validation of the LIMS data, when necessary.
- Troubleshooting analytical problems.
- Bringing developing QC problems to the attention of the QAO.
- Certifying the analyst's capability to perform the requisite analyses.
- Performing analyses, when required.

The program managers report directly to the Service Director of ECLS.

ANALYSTS are the staff who meet all of the requirements contained in the New Jersey Civil Service Commission job listings for the professional titles of Research Scientist series, Chemist series and Laboratory Technician series. The responsibilities of the analysts include, but are not limited to:

- Conducting analyses using only approved methodologies as they are written.
- Reviewing the generated QC data of the analytical run to determine the validity of the sample data.
- Verifying that they analyze the proper samples for the analytes requested.

- Reporting data through their Program Manager.
- Maintaining their instruments in proper working condition and documenting those activities.
- Demonstrating, on a continuous basis, their capability to perform their assigned analytical tests.

Analysts report directly to their respective program managers or their designees.

2.4 PROPER TRAINING AND EDUCATION

It is the responsibility of the ECLS Service Director to verify that the analysts within their respective titles meet the education and experience requirements of those titles and also to provide those analysts with the training necessary to fulfill the requirements of their assigned duties. Toward that end, a personnel file is maintained in the QAO's office that contains the following information:

- Copy of their college transcripts so that the required college chemistry credits can be verified.
- Copy of their resumes to document the years and type of experience that they have accumulated. Resumes must be updated for each change in title and/or duties.
- Copy of the Receipt and Review of Methods Form documenting that: they have received their copies of the Method Manuals and that they have read and understood the contents of those Method Manuals (**Appendix 4**), and they have read and understood the ECLS Quality Manual (**Appendix 5**). Appendices 4 and 5 are completed annually and on an as needed basis for new hires and changes in duties.
- Copy of the Demonstration of Capability (DOC): Certification Statement. See **Appendix 6**. The DOC is performed prior to the initial use of new analytical procedures and after every significant change to instrument type, personnel, matrix or test method and/or yearly thereafter. If an analyst originally failed a DOC, the additional training given to the analyst to correct their shortcomings is documented and included in their personnel file.
- Copy of the Demonstration of Capability: Summary Report. See **Appendix 7**.
- Copy of the summary of previous training classes taken. These include: any computer classes taken, instructions received for operating instrumentation, management classes, training received from ECLS prior to assuming responsibility for conducting their own analyses, etc. Documentation of additional training will be made through the use of the ECLS Training Form. See **Appendix 8**.

Analysts are to maintain a copy, for their files, of all the information forwarded to the QAO's office.

2.5 DATA INTEGRITY (DI) POLICY

The DI System adopted by ECLS consists of a four step approach: DI training; signed DI documentation; periodic monitoring of DI activities; and defining the DI procedures that are followed.

DI TRAINING: Is conducted annually. The training will include, but is not limited to:

- Discussion of the organizational mission and the critical need for honesty.
- Discussion of the DI procedures.
- Discussion of DI record keeping.
- Discussion of how to report DI issues.
- Discussion of the emphasis on the importance of proper narration, on the part of the analysts, to explain circumstances that could impact the quality of the data.

SIGNED DI DOCUMENTATION: Attendees sign an attendance sheet indicating that they have taken the DI training and that, if they have any subsequent questions regarding the DI system, they are to inform the QAO in writing, through their Program Manager within 30 days of attending the DI training, and the response will be submitted back to the person raising the question as well as all the sections technical supervisors. See **Appendix 9**.

PERIODIC DI MONITORING: DI monitoring is conducted as an integral part of the internal system audits. DI is contained in the sum total of all the QC and QA activities contained in this manual although they may not be identified as such. Everyone who is following all these items will be in compliance with the DI program outlined below.

DI PROCEDURES:
It is the responsibility of every ECLS employee to follow the DI policy discussed above. The intent of the DI policy can be summarized as follows:

- No one shall knowingly circumvent the required procedures contained in their Method Manuals.
- No one shall knowingly circumvent the policies and procedures contained in the Quality Manual.
- No one shall knowingly refuse to adhere to other policies and procedures as they become available and are explained to the employees.
- No one shall knowingly falsify any records that must be generated during the performance of their assigned duties, such as: analytical raw data, final data, reports, etc.
- No one shall knowingly discuss the business of ECLS with persons who do not have a legitimate need to know. Some examples of people who may not have a legitimate need to know are: print or media reporters, the public at large, other agencies of State Government, etc. When receiving a request to discuss ECLS business, the employees are required to say nothing until they have had an opportunity to ascertain, by discussing the situation with their Program Managers, Service Director, or QAO whether this request is being made by a party with a legitimate right to know. In some cases, it may be necessary to refer the request to the Commissioner's Office for final resolution. NOTE: ECLS frequently receives requests from the various programs within NJ DEP for interim verbal reports for results on samples that they submitted. The employees can respond to these requests without going through upper management PROVIDED that the employee categorically knows to whom they are speaking AND that they do in fact work for the program that originally submitted the samples. If there is any question in the employee's mind, proceed as listed above.

- No one shall knowingly provide false information on any document that they are required to prepare as part of their normal working protocols.

An employee found to be in violation of the DI policy shall be subject to appropriate disciplinary or counseling actions. These actions are contained in the NJDOH Corrective and Disciplinary Action Handbook. Any action undertaken will be in compliance with the existing NJ Civil Service Commission rules and regulations in force at the time of the violation. Documenting that the employee understands their DI responsibilities is made by using **Appendix 10**.

Appendices 10, 11, 12, and 15 are signed by the analysts at the conclusion of the DI training session.

2.6 LEGAL POLICY

Due to the nature of the analytical work that is performed within ECLS, ECLS data can be used in court proceedings. As such actions take place, law firms forward subpoenas and/or requests to ECLS to make available certain information and/or records. Whenever an employee receives such a request for information and records, s/he is to immediately notify the Program Manager and the QAO. The QAO will proceed as follows:

- Send the subpoena for records to PHEL's Record Custodian who will in turn provide a copy to the Department's Legal and Regulatory Compliance Division and receive authorization from Legal to provide the records.
- Notify any other requestor of records to go through the State's Open Public Records (OPRA) process.
- At the request of the PHEL Records Custodian, work with the Program Managers to obtain the requested records.
- The Records Custodian completes the history, timeline, and records request OPRA database information and either provides the records or declines the request.

If anyone is found to have knowingly circumvented this policy, disciplinary action similar to that discussed above in the DI Policy will be undertaken. **See Appendix 11**.

2.7 CONFIDENTIALITY POLICY

Confidentiality policy addresses the proprietary nature of certain products and their formulations. ECLS does not generally receive samples with such proprietary considerations; however, the possibility does exist. At the time of sample submittal, ECLS must be provided written notification detailing the exact proprietary nature of the sample; ECLS will not release that information with the reported data. Legal considerations may supercede this policy.

The routine application of the confidentiality policy within ECLS takes the form of assuring that analytical results are reported only to those agencies that actually submitted the sample. This data reporting, as well as the disciplinary action, is addressed in the DI Policy. See **Appendix 12**.

2.8 COMPLAINTS/OBSERVATIONS

A complaint is an official expression of dissatisfaction, by a client, with the manner in which ECLS has conducted itself during the course of providing analytical services to that client. The dissatisfaction may stem from the analytical results, the manner in which they were reported, the QC results associated with the client's results, the timeliness in receiving the report, or anything else that causes, in the opinion of the client, dissatisfaction. In effect, a complaint is a serious accusation against the credibility of ECLS. Whenever anyone receives a complaint, whether it is through the mail, over the phone, or in person, the complaint is forwarded to the QAO for resolution. The analyst is not to respond to the complaint. S/he should mention that the issue is being referred to the ECLS QAO for resolution. The QAO will:

- Ascertain the pertinent information that is needed to investigate the complaint by forwarding a copy of **Appendix 13** to the complaining party and by completing the Complaint/Investigation Form. Inform the Service Director that a complaint has been received and the nature of the complaint.
- Investigate the complaint by auditing the suspect reported results, documentation, procedures and/or protocols.
- Provide the client with a written response indicating the results of the investigation.
- Attach a copy of the response to **Appendix 14** for the QAO's records.
- Implement corrective actions, if any, that arise from the investigation. The timeframe within which the corrective actions are expected to be completed will depend upon the seriousness and scope of the action required. The timeframe for correcting "minor" problems is set at two weeks.
- Inform management as to the resolution of the complaint.

An observation is notice by an analyst, that a situation exists that may be outside of the control of ECLS, that can have an adverse effect on the quality of the data produced or that a requirement of the analytical method or the QM is not being met. The analyst can complete **Appendix 13** and forward it to the ECLS QAO for resolution. Examples of what should be reported are:

- If foaming is observed during the course of an analysis that is not suppose to have any foaming.
- If the dissolved analytical result is greater than the total result.
- If the presence of a high concentration of an interfering element, etc. is established.
- If samples are submitted that are suppose to be duplicates and there are obvious differences in the composition of the samples.
- If the VO vials had air bubbles in them and it was necessary to use those vials in the analysis.

2.9 ATTESTATION STATEMENT

Each ECLS employee must sign an attestation statement indicating that they are free from any commercial, financial, or other undue pressures that could interfere with the quality of their work. See **Appendix 15**. It

is impossible to list all the different types of interference that could affect a person's ability to do quality work. However, the type of "potential conflicts" that we are looking to avoid are those where somebody, that the analyst knows, would unduly benefit from a specific type of laboratory result and the analyst is in a position to generate that particular result, or influence some other analyst to generate that result. **Appendix 15** will be maintained in the analyst's personnel file in the QAO's office.

It is certainly understandable that an analyst could sign this statement when they clearly were not experiencing any undue pressures of any kind. However, at some later date the situation could change. IT SHALL BE CLEARLY UNDERSTOOD THAT THE INTENT OF THIS ATTESTATION IS THAT WHENEVER A SITUATION AS DESCRIBED ABOVE IS ENCOUNTERED; IT MUST BE BROUGHT TO THE ATTENTION OF MANAGEMENT IMMEDIATELY. Failure to do so will be considered a violation of the Data Integrity Policy and will be handled accordingly.

2.10 POLICY VIOLATION

If it is determined that an employee deliberately violates any of these policies, disciplinary action similar to that discussed in section 2.5 will be undertaken. As a result of the policy violation, OQA will determine whether client data has been adversely affected and what steps are necessary to rectify the situation.

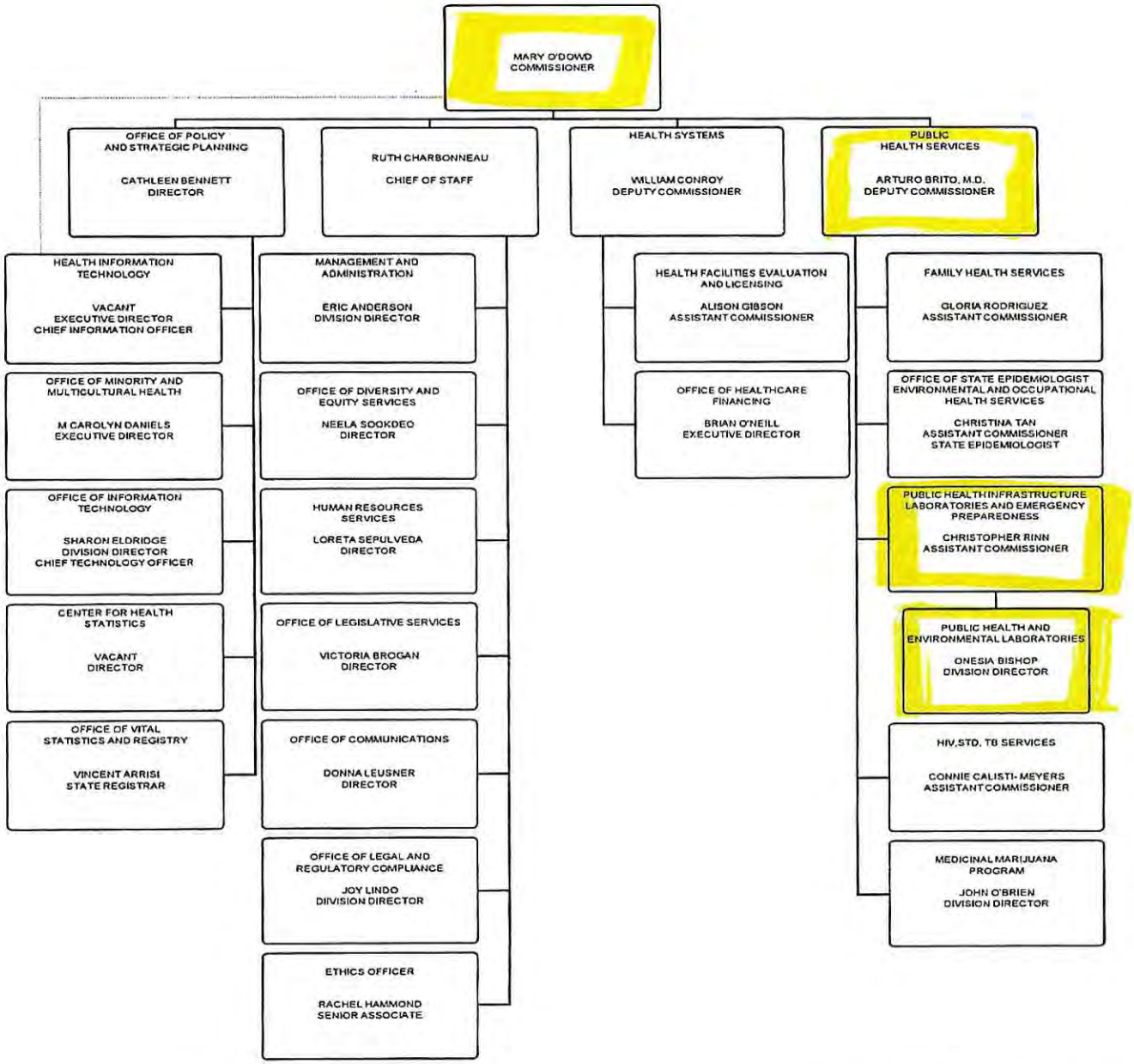
2.11 LIST OF EMPLOYEES

Appendix 16 contains the names of all ECLS employees that contribute to the generation or review of analytical results. This list also serves as the means of relating a set of initials to a particular employee. It is still necessary for analysts to enter their initials and signatures in work records.

Any changes in staff, from supervisory and above, must be reported to EPA Region 2 and the New Jersey Department of Environmental Protection (NJDEP) office of Quality Assurance (OQA), in writing, within 30 days of its occurrence. Credentials and resumes will be sent upon request.

DEPARTMENT OF HEALTH

APPENDIX 2

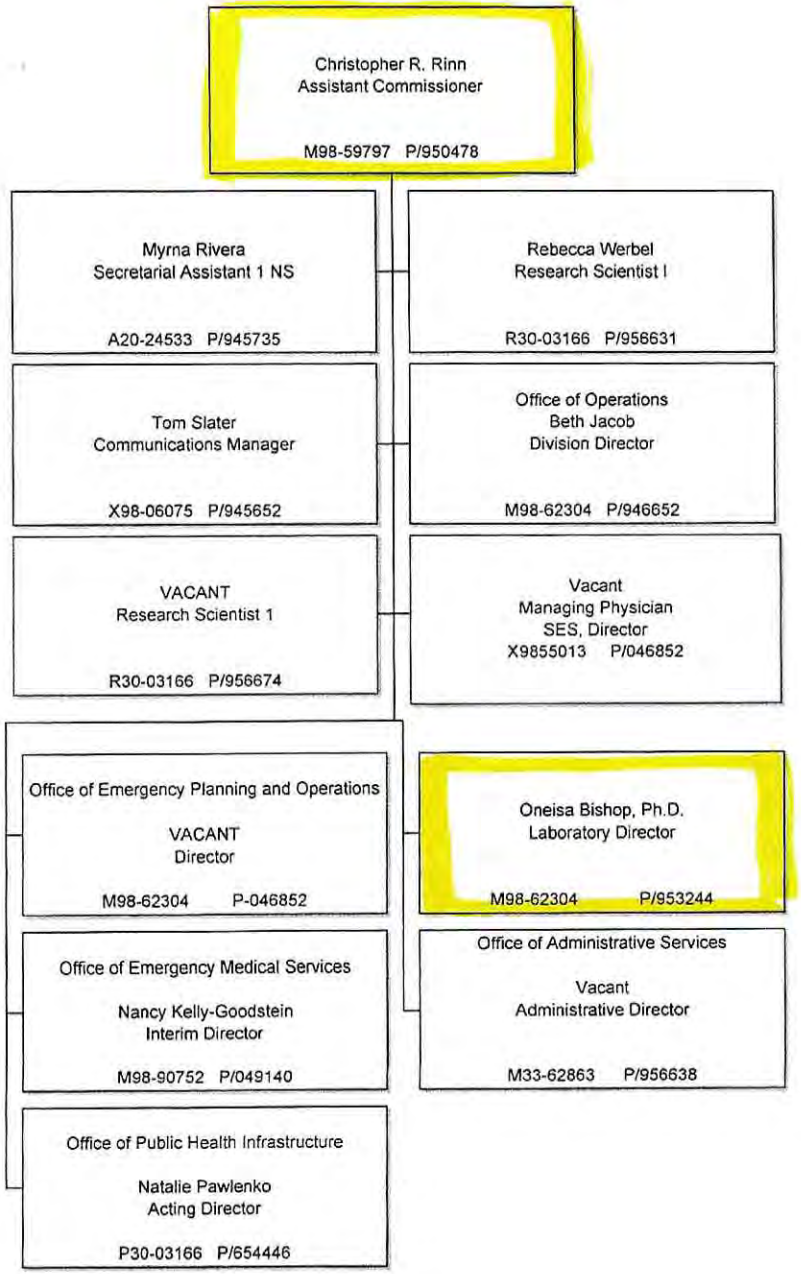


Last Modified 3/24/2014

PUBLIC HEALTH INFRASTRUCTURE, LABORATORIES, AND EMERGENCY PREPAREDNESS

Office of the Assistant Commissioner

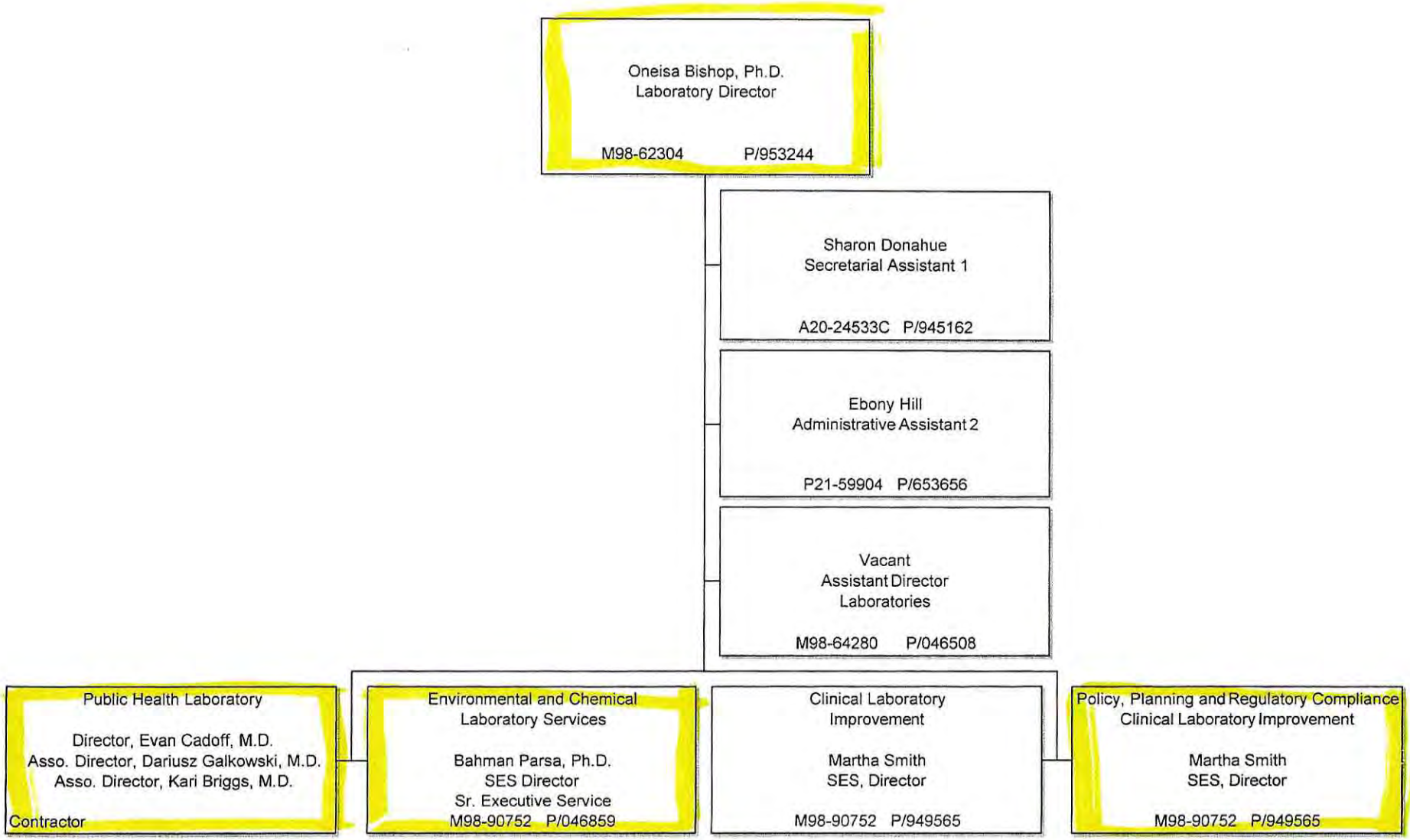
APPENDIX 2A



Last Modified 5/20/2014

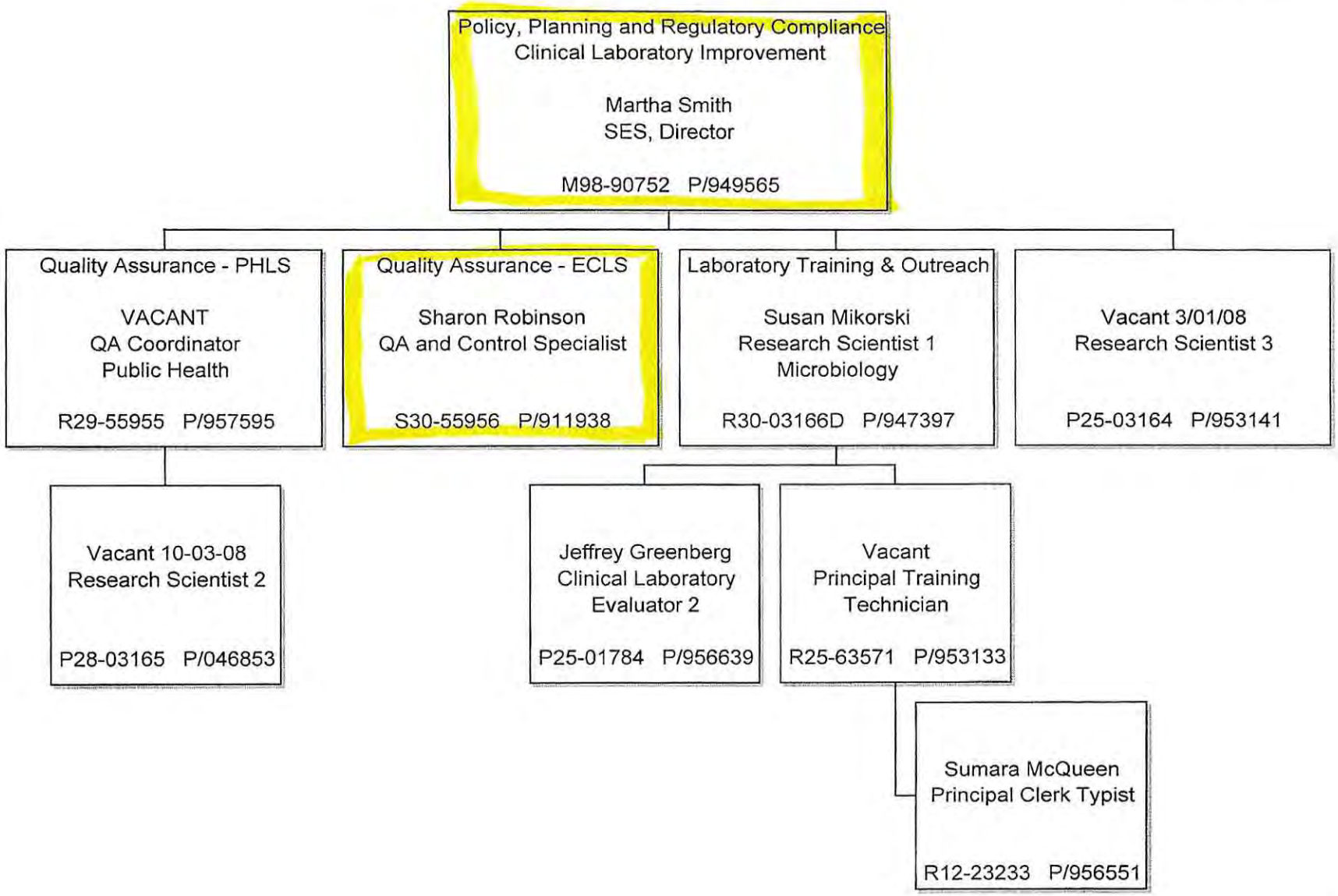
PUBLIC HEALTH INFRASTRUCTURE, LABORATORIES AND EMERGENCY PREPAREDNESS
PUBLIC HEALTH LABORATORIES

APPENDIX 2B



PUBLIC HEALTH INFRASTRUCTURE, LABORATORIES, AND EMERGENCY PREPAREDNESS
PUBLIC HEALTH AND ENVIRONMENTAL LABORATORIES

APPENDIX 2C



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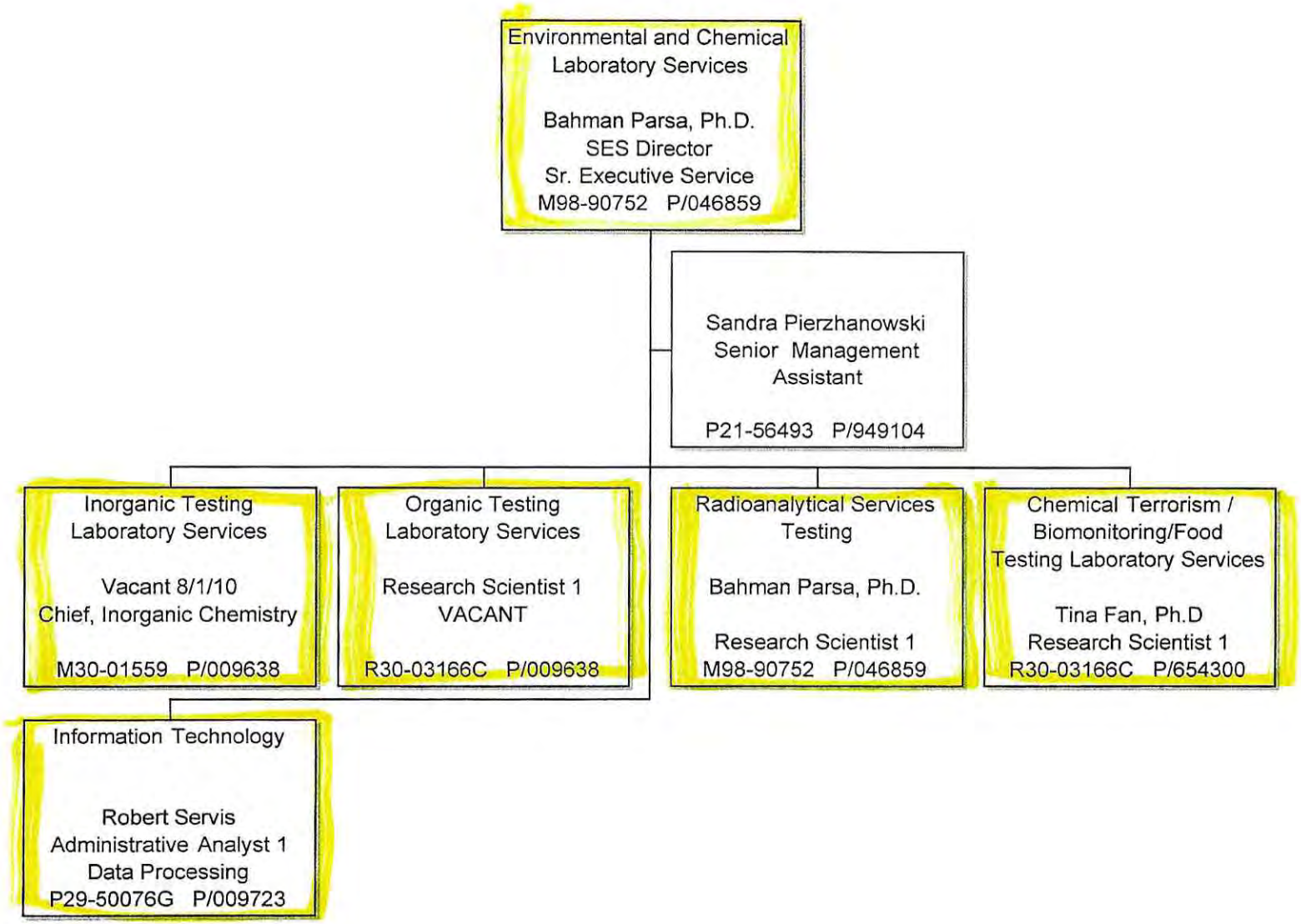
PUBLIC HEALTH INFRASTRUCTURE, LABORATORIES, AND EMERGENCY PREPAREDNESS
ENVIRONMENTAL AND CHEMICAL LABORATORY SERVICES

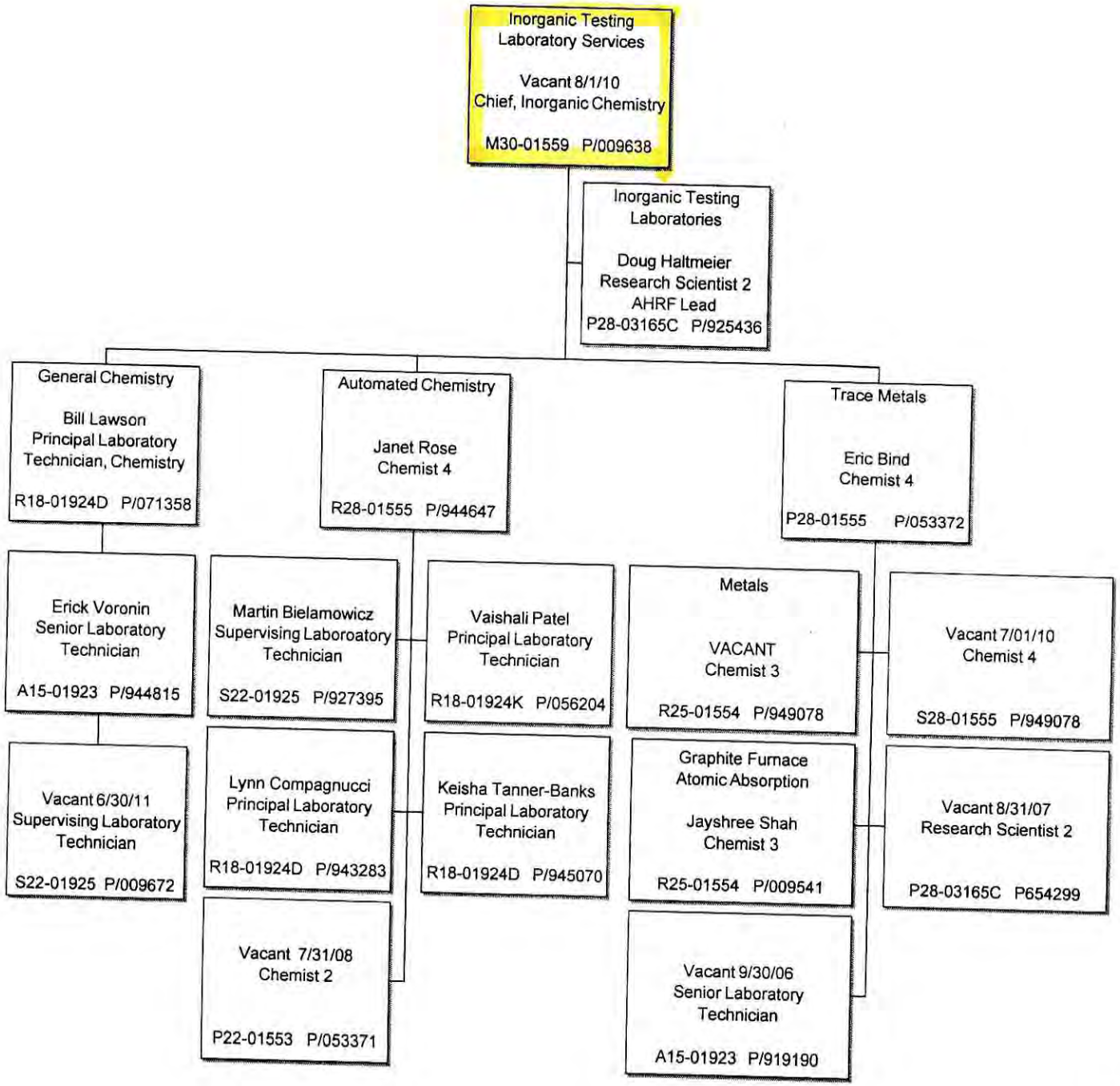
APPENDIX 3A



Last Modified 6/25/2014

ENVIRONMENTAL AND CHEMICAL LABORATORY SERVICES
INORGANIC TESTING

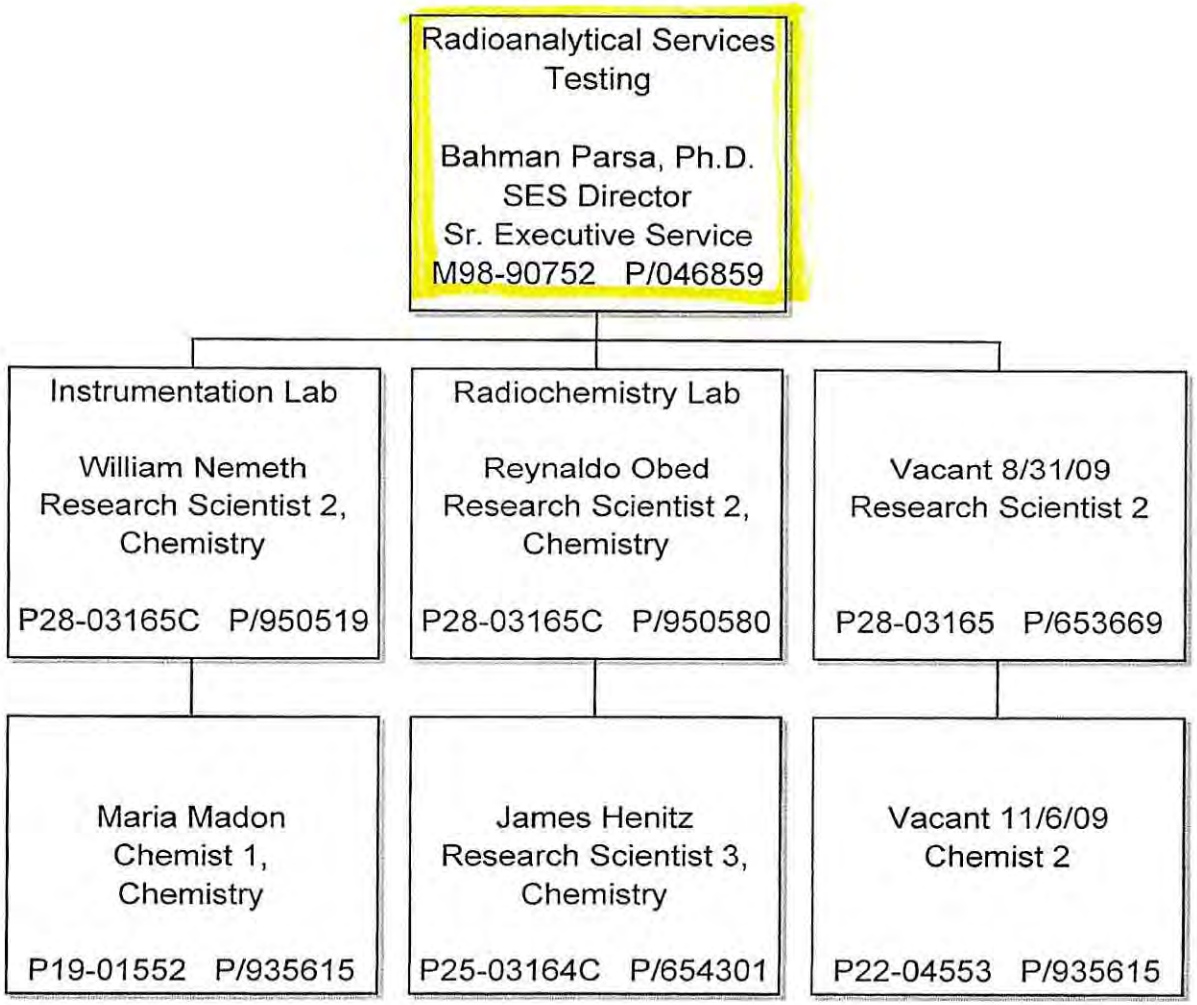
APPENDIX 3B



PUBLIC HEALTH INFRASTRUCTURE, LABORATORIES, AND EMERGENCY PREPAREDNESS

ENVIRONMENTAL AND CHEMICAL LABORATORY SERVICES
RADIOANALYTICAL TESTING

APPENDIX 3C



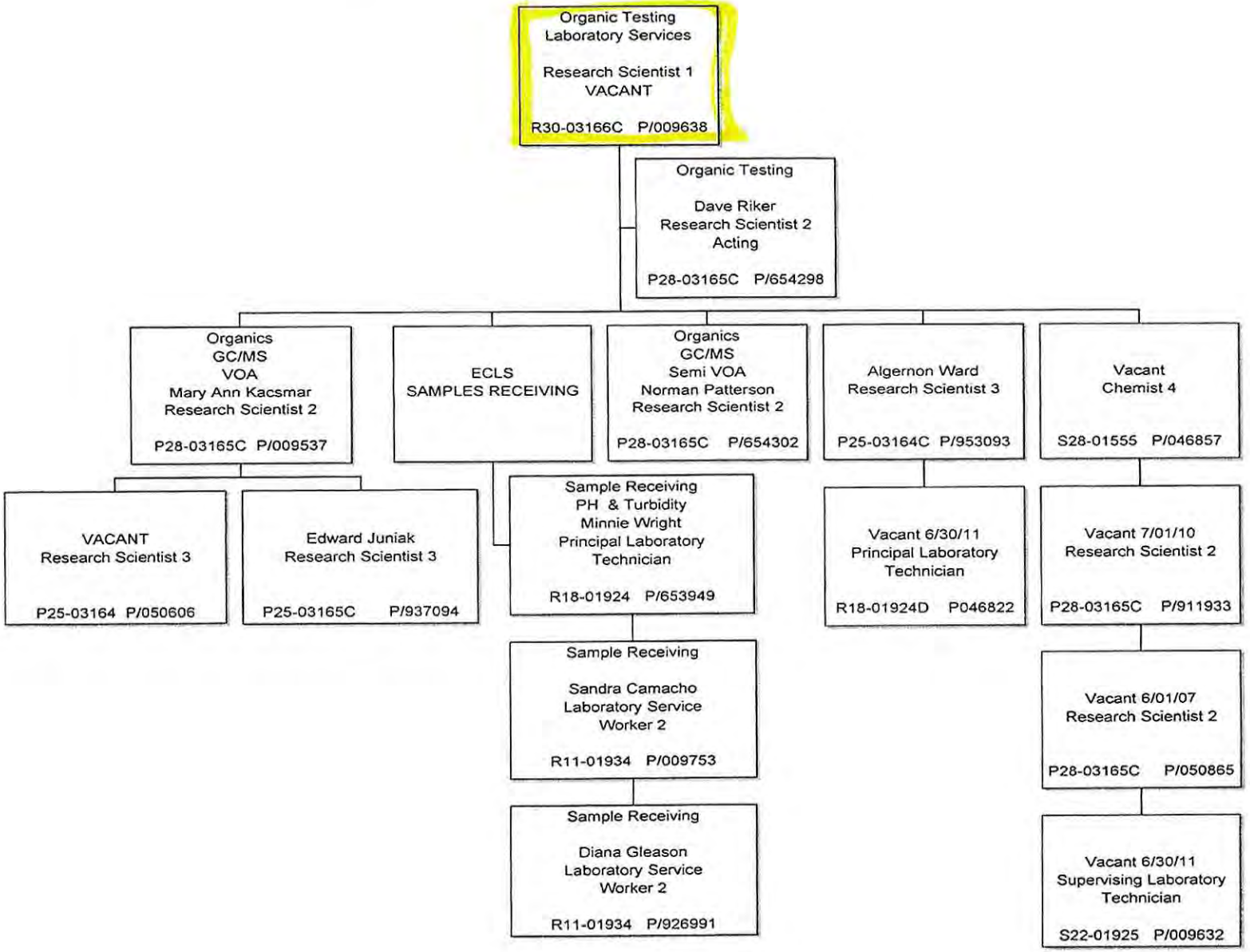
Last Modified 6/25/2014

PUBLIC HEALTH INFRASTRUCTURE, LABORATORIES, AND EMERGENCY PREPAREDNESS

ENVIRONMENTAL AND CHEMICAL LABORATORY SERVICES

ORGANIC TESTING

APPENDIX 3D

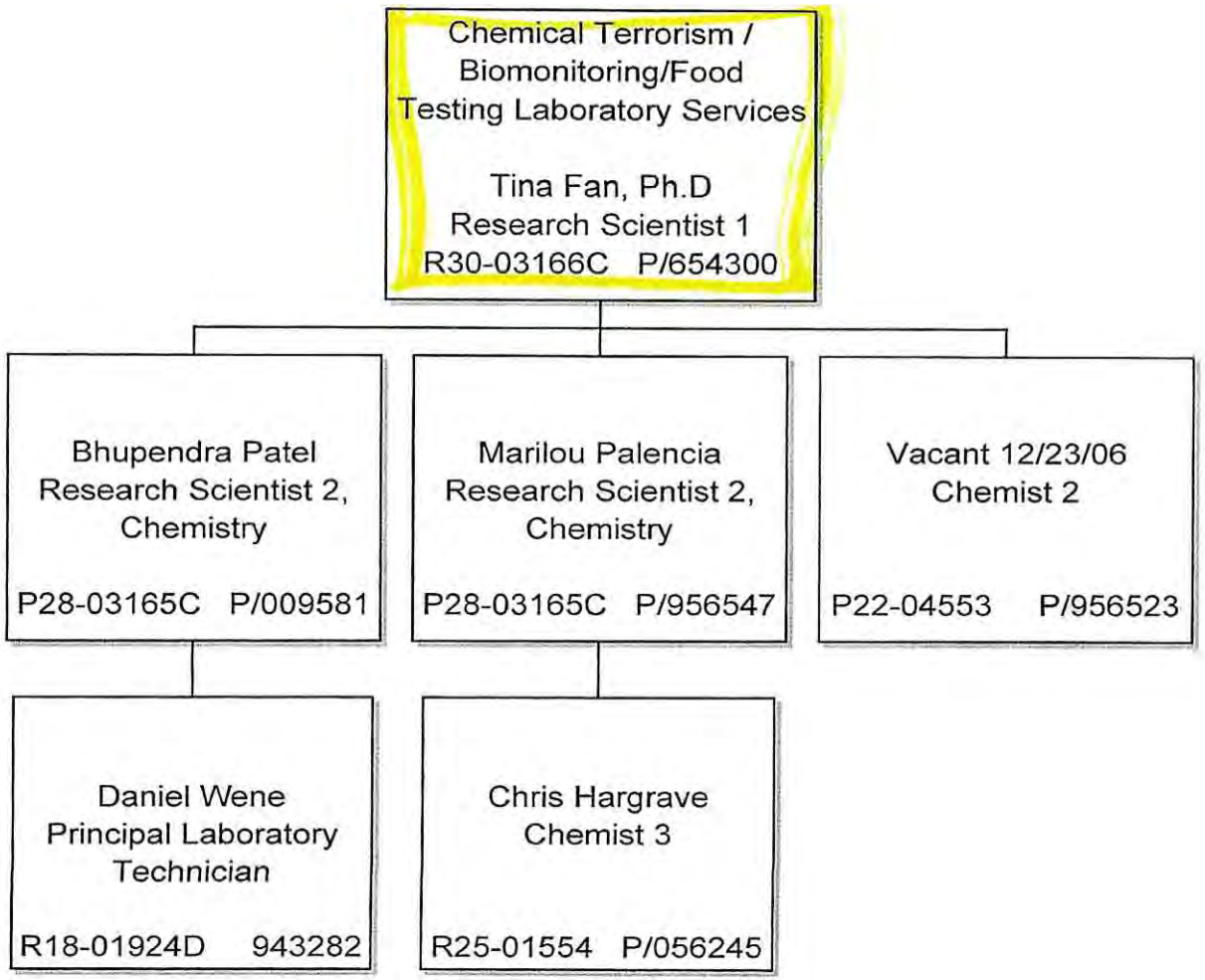


Last Modified 6/25/2014

PUBLIC HEALTH INFRASTRUCTURE, LABORATORIES, AND EMERGENCY PREPAREDNESS

ENVIRONMENTAL AND CHEMICAL LABORATORY SERVICES
CHEMICAL TERRORISM / BIOMONITORING/FOOD TESTING LABORATORIES

APPENDIX 3E

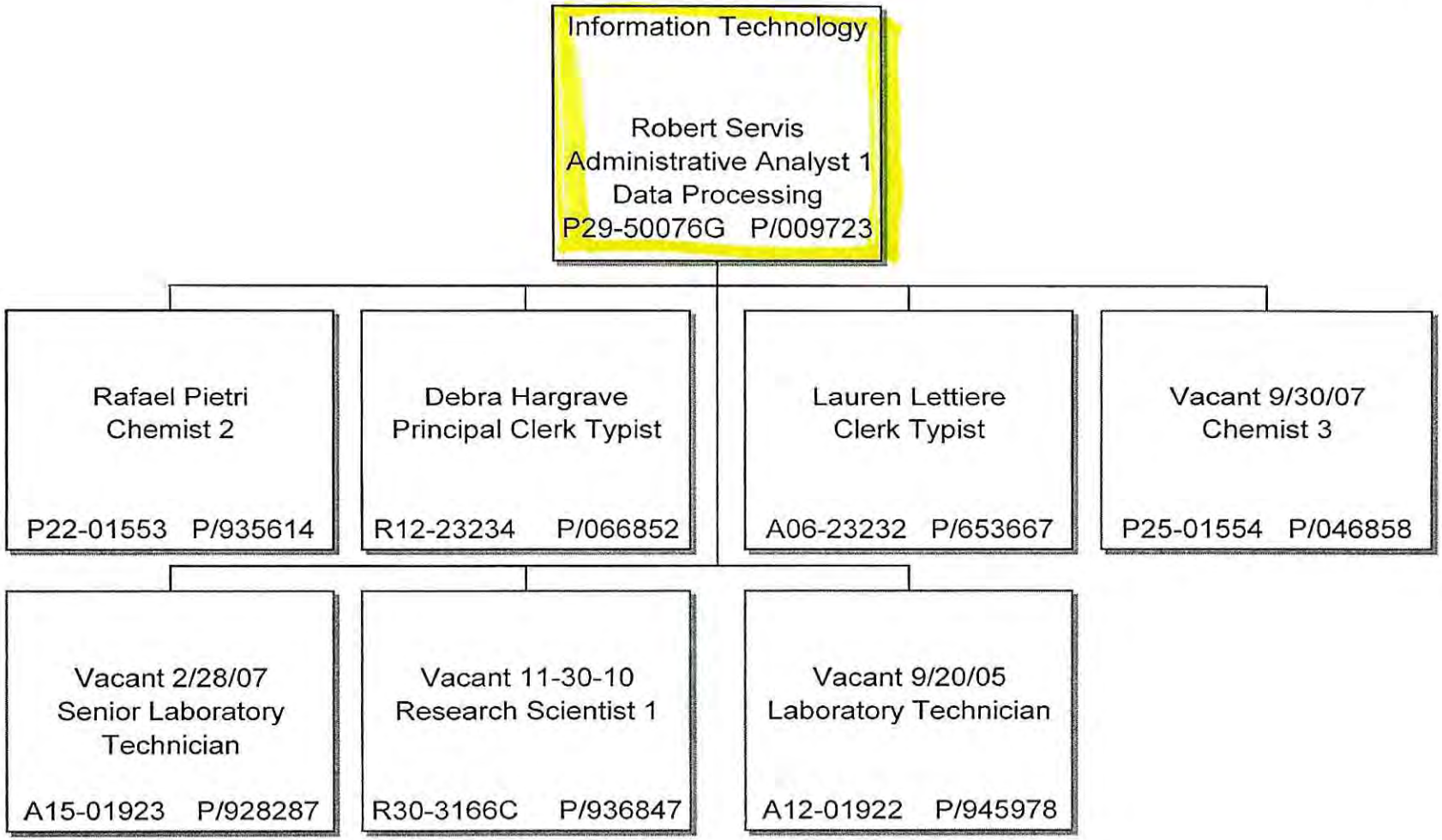


Last Modified 6/25/2014

PUBLIC HEALTH INFRASTRUCTURE, LABORATORIES, AND EMERGENCY PREPAREDNESS

ENVIRONMENTAL AND CHEMICAL LABORATORY SERVICES
SAMPLE RECEIVING AND DATA MANAGEMENT

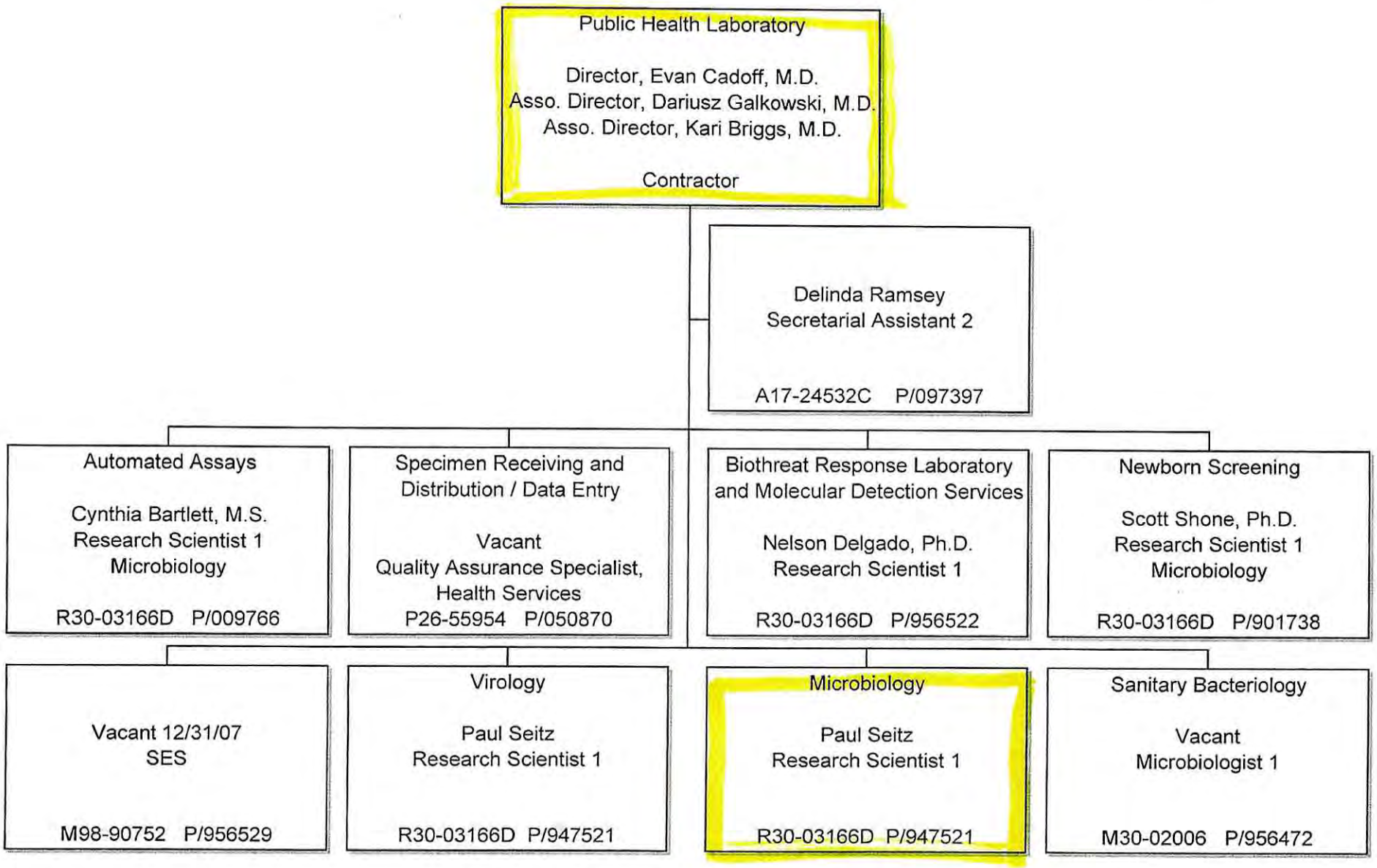
APPENDIX 3F



PUBLIC HEALTH INFRASTRUCTURE, LABORATORIES, AND EMERGENCY PREPAREDNESS

PUBLIC HEALTH LABORATORIES

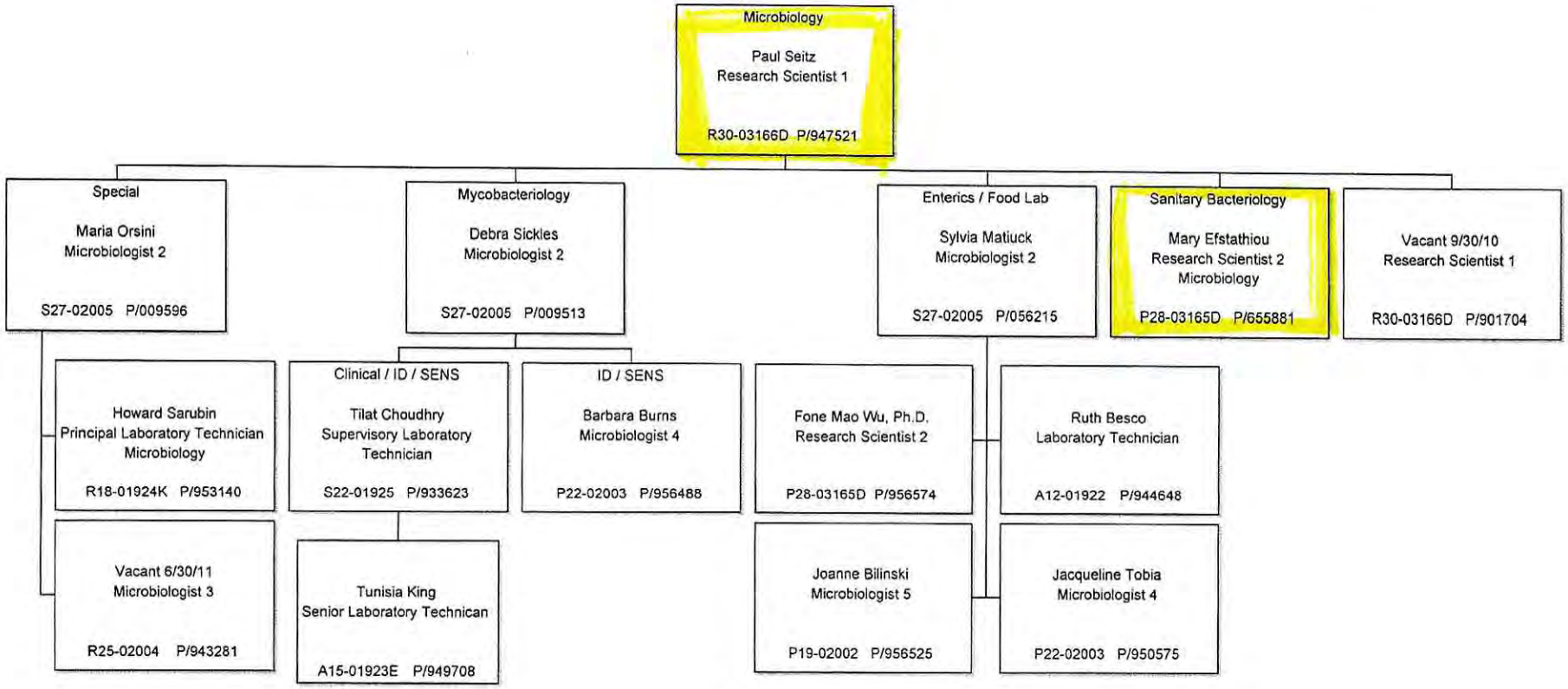
APPENDIX 3G



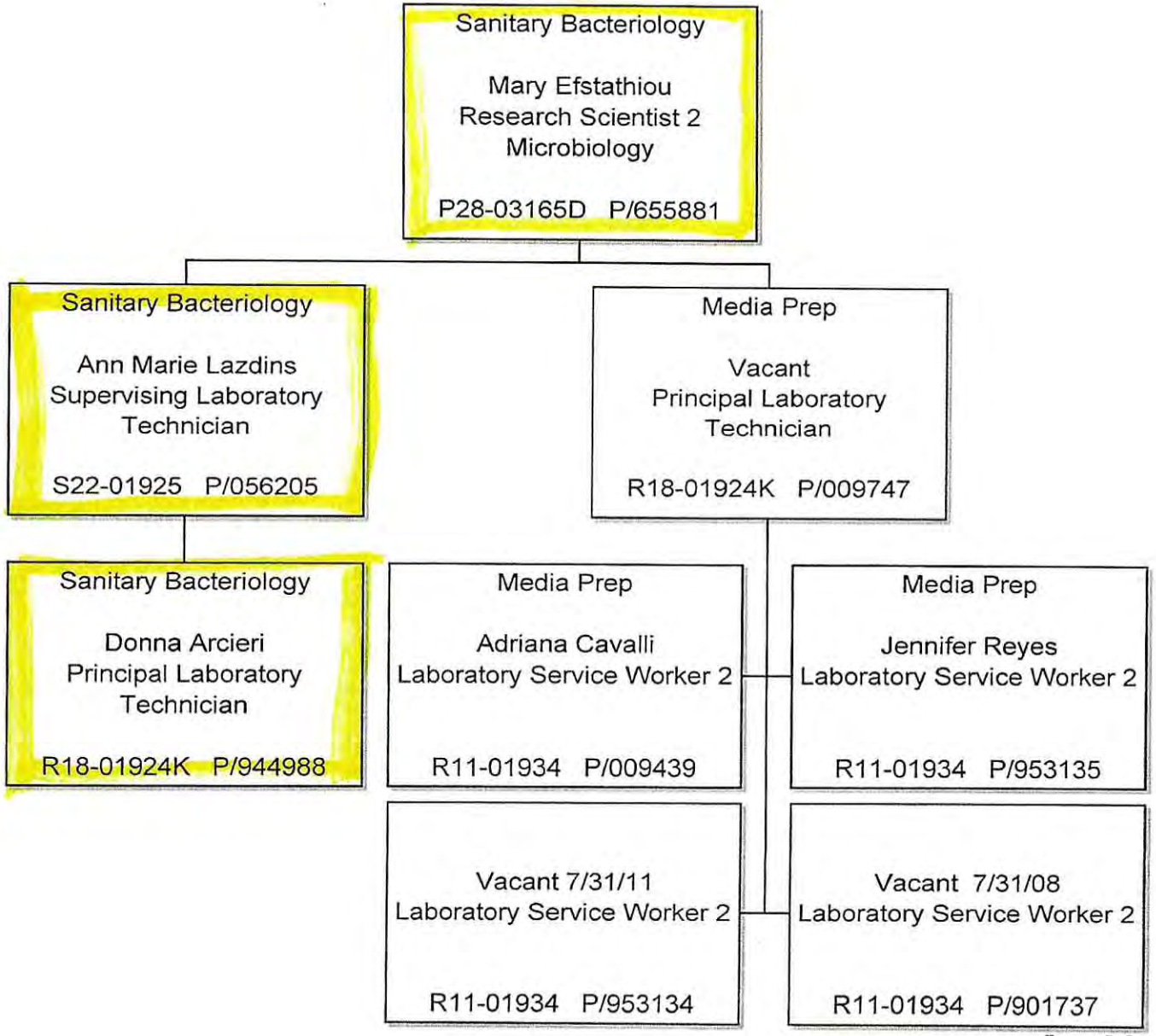
Last Modified 5/20/2014

PUBLIC HEALTH INFRASTRUCTURE, LABORATORIES, AND EMERGENCY PREPAREDNESS
MICROBIOLOGY

APPENDIX 3H



APPENDIX 3I


Sanitary Bacteriology
Mary Efstathiou
Research Scientist 2
Microbiology
P28-03165D P/655881
Sanitary Bacteriology
Ann Marie Lazdins
Supervising Laboratory Technician
S22-01925 P/056205
Media Prep
Vacant
Principal Laboratory Technician
R18-01924K P/009747
Sanitary Bacteriology
Donna Arcieri
Principal Laboratory Technician
R18-01924K P/944988
Media Prep
Adriana Cavalli
Laboratory Service Worker 2
R11-01934 P/009439
Media Prep
Jennifer Reyes
Laboratory Service Worker 2
R11-01934 P/953135
Vacant 7/31/11
Laboratory Service Worker 2
R11-01934 P/953134
Vacant 7/31/08
Laboratory Service Worker 2
R11-01934 P/901737

APPENDIX 4

ANALYST RECEIPT OF METHODS

This form is to be completed by newly hired personnel and existing personnel whenever they are assigned new analytical responsibilities. When entering the method numbers below, make sure that the revision number of the in-house method is included.

ANALYST (PRINT): _____

This is to certify that I have received a personal copy of all the analytical SOPs for the tests that I am required to conduct. It also indicates that I will review these SOPs within 30 days of receipt and that I will address any requests for clarifications to the appropriate Technical Supervisor. In the absence of any such requests, it will be Management's understanding that I fully understand the SOP requirements and that I will strictly adhere to the protocols contained therein.

ECLS METHOD: _____ REVISION: _____

SIGNATURE: _____ DATE: _____

ECLS METHOD: _____ REVISION: _____

SIGNATURE: _____ DATE: _____

ECLS METHOD: _____ REVISION: _____

SIGNATURE: _____ DATE: _____

ECLS METHOD: _____ REVISION: _____

SIGNATURE: _____ DATE: _____

ECLS METHOD: _____ REVISION: _____

SIGNATURE: _____ DATE: _____

ECLS METHOD: _____ REVISION: _____

SIGNATURE: _____ DATE: _____

SUPERVISORY REVIEW: _____ DATE: _____

APPENDIX 5

ANALYST RECEIPT OF ECLS QUALITY MANUAL

This form is required to be completed at the time the analyst receives his/her copy of the latest version of the Quality Manual.

ANALYST (PRINT): _____

This is to certify that I have received my personal copy of the QM and that I realize that I am to adhere to the policies and requirements contained therein. It also indicates that I will review the QM within 45 days of receipt of the QM and that I will address any requests, in writing, for clarification to the QAO through the Technical Supervisor. As part of my education concerning the QM and the changes that exist in this version of the QM when compared to the last version, there will be a set of 3 meetings, one of which I am required to attend, that will be scheduled for approximately 2 weeks after distribution, so that the changes in requirements can be brought to the analyst's attention. This will also allow me the opportunity to seek clarification on the requirements contained in the QM. In the absence of any written requests, it will be Management's understanding that I fully understand the QM requirements and that I will strictly adhere to the protocols contained therein.

EFFECTIVE DATE OF QM RECEIVED: _____

DATE RECEIVED: _____

SIGNATURE: _____

APPENDIX 6

DEMONSTRATION OF CAPABILITY
ANALYST CERTIFICATION STATEMENT

Each analyst is required to obtain this DOC Certification for each analysis, on a yearly basis, that s/he is responsible for performing.

NJ Department of Health
Public Health and Environmental Laboratories
Environmental and Chemical Laboratory Service
3 Schwarzkopf Drive,
West Trenton NJ 08628

Certification Statement Date:
ECLS Method No. and Revision No.:
Analyst(s): **Matrix:**
Parameter(s):

We, the undersigned, CERTIFY that:

1. The analyst(s) identified above, using the cited test method, which is in use at this facility for the analysis of samples under the USEPA and NJDEP Laboratory Certification Regulations, have met the Demonstration of Capability (DOC).
2. The test method was performed by the analyst(s) identified on this certification.
3. A copy of the test method and the laboratory specific Quality Manual is available for all personnel on-site.
4. The data associated with the DOC are true, accurate, complete, and self-explanatory.
5. All raw data (including a copy of this certification form) necessary to reconstruct and validate these analyses have been retained at the facility by the analyst, and that the associated information is well organized and available for review by authorized assessors.

Technical Supervisor of The Appropriate Analytical Unit	Signature	Date
Quality Assurance Officer	Signature	Date

All the supporting documentation used in the production of this report must be maintained with the report and placed in the analyst's method manual

ECLS METHOD NO.

Appendix 7

ANALYST(S):
MATRIX:
INSTRUMENT ID#:
SAMPLE TYPE:

REVISION NUMBER
REFERENCE METH. NO.
REPORTING UNITS:
DATE

File Number										
Analyte	Data Point	Data Point	Data Point	Data Point	Mean Recovery	Standard Deviation	RPD	Acceptance Limits-RPD	Conc. Analyzed	Mean % Recovery
					#DIV/0!	#DIV/0!	#DIV/0!			#DIV/0!
					#DIV/0!	#DIV/0!	#DIV/0!			#DIV/0!
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					#DIV/0!	#DIV/0!	#DIV/0!			#DIV/0!

APPENDIX 8

TRAINING DOCUMENTATION

Please complete this form electronically.

This form is to be completed whenever a new hire is trained to perform an analysis, whenever an existing staff is re-assigned to a new analysis, or whenever a staff member undergoes additional training, e.g. vendor training, conference participation, etc. If the training course provides the analyst with a certificate of attendance, please attach a copy to this form when forwarding it to OQA.

IN-HOUSE TRAINING

ANALYST:

NAME OF THE ECLS METHOD FOR WHICH TRAINING WAS GIVEN:

NAME OF TRAINER:

LENGTH OF TRAINING:

BRIEFLY DESCRIBE THE TYPE OF TRAINING GIVEN:

PROVIDE DOCUMENTATION THAT THE ANALYST SUCCESSFULLY ANALYZED A PT SAMPLE, BLIND SAMPLE, QC CHECK SAMPLE, ETC.

NAME OF THE TECHNICAL SUPERVISOR THAT IS RESPONSIBLE FOR MONITORING THE TRAINEE'S WORK:

TRAINING PROVIDED BY NON-ECLS PERSONNEL

NAME OF TRAINING COURSE TAKEN:

NAME OF THE ECLS METHOD FOR WHICH TRAINING WAS GIVEN:

NAME OF THE ORGANIZATION PROVIDING THE TRAINING:

DATES OF ATTENDANCE:

BRIEF DESCRIPTION OF COURSE CONTENTS:

TECHNICAL DIRECTOR'S SIGNATURE:

APPENDIX 9

DATA INTEGRITY MEETING ATTENDANCE FORM

DATE OF DI TRAINING:

TRAINING CONDUCTED BY:

FOR TOPICS COVERED, SEE ATTACHED

ATTENDEES SIGNATURES

APPENDIX 9

DATA INTEGRITY MEETING ATTENDANCE FORM

APPENDIX 10

EMPLOYEE DATA INTEGRITY POLICY STATEMENT

This form is to be completed at the time of the analyst's DI training.

This is to certify that I will read the Data Integrity Policy contained in the QM. It also indicates that if I have any questions regarding this policy, a written notification can be sent to the appropriate Technical Supervisor and forwarded to the OQA for clarification. If there are no written requests for clarification within 30 days of receiving DI training, it will be Management's understanding that I fully understand the requirements of this policy and that I will strictly adhere to the protocols contained therein.

The Data Integrity Policy consists of the following:

- I shall not knowingly circumvent the required procedures contained in my Method Manual(s).
- I shall not knowingly circumvent the policies and procedures contained in the ECLS Quality Manual.
- I shall not knowingly refuse to adhere to other policies and procedures as they become available and explained to the employees.
- I shall not knowingly falsify any records generated during the performance of my assigned duties, such as: raw data, final data, reports, time sheets, etc.
- I shall not knowingly discuss the business of ECLS with persons who do not have a legitimate right to know.
- I shall not knowingly falsify time sheets or any other records that I am required to prepare as part of my employment.
- I know that if I am found to be in violation of this Data Integrity Policy I am subject to the disciplinary actions contained in section 2.5 of the Quality Manual.

ANALYST (Print): _____

SIGNATURE: _____

SIGNING DATE: _____

APPENDIX 11

EMPLOYEE LEGAL POLICY STATEMENT

This form is to be completed at the time of the analyst's DI training.

Due to the nature of the work that is performed within ECLS, there is a strong chance that ECLS data will be used in court proceedings. I understand that if I were to receive a subpoena, a request for data from someone who does not have a right to that information, a request for information from someone who I do not know is an employee of a client in an unit that submitted the samples for analyses, or a request to explain the workings of ECLS, I will immediately inform either my Technical Supervisor or the QAO. I understand that I will not respond to these types of requests until I have been instructed to do so by either the Technical Supervisor or the QAO. I also understand that if I am ever in a position in which I do not absolutely know for sure how to proceed that I will contact the Technical Supervisor or the QAO for direction. I also understand that I have 30 days from the date of DI training in which to have any questions regarding this Policy explained. In the absence of any such requests, it will be Management understanding that I fully understand, and will conduct myself in accordance, with this Policy.

ANALYST (Print): _____

SIGNATURE: _____

SIGNING DATE: _____

APPENDIX 12

EMPLOYEE CONFIDENTIALITY STATEMENT

This form is to be completed at the time of the analyst's DI training.

I understand that ECLS may be required to analyze certain products, formulations, etc. that have proprietary components. I understand that it is ECLS's duty not to disclose any proprietary information in the reporting of analytical data, subject to the overriding legal considerations. I understand that as an employee of ECLS I will only report data, information, etc. that I am specifically told to do so by the Technical Supervisor, QAO, or Service Manager. In the absence of any written requests for explanation of this Policy, within 30 days of receipting DI training, it is Management's understanding that I fully understand this Policy and will strictly adhere to this Policy.

ANALYST (Print): _____

SIGNATURE: _____

SIGNING DATE: _____

APPENDIX 13

COMPLAINT/OBSERVATION FORM

COMPLAINT/OBSERVATION DOCUMENT NUMBER ASSIGNED BY THE OFFICE OF QUALITY ASSURANCE:

DATE OF OBSERVATION	
EMPLOYEE MAKING OBSERVATION	
DESCRIBE THE NATURE OF THE OBSERVATION	
FIELD NUMBERS OF AFFECTED SAMPLES	
ECLS SAMPLE ID NUMBERS AND BATCH NUMBERS OF AFFECTED SAMPLES	
EMPLOYEE RECEIVING COMPLAINT	
COMPLAINANT'S NAME	
COMPLAINANT'S AFFILIATION	
COMPLAINANT'S ADDRESS	
COMPLAINANT'S PHONE NUMBER	
NATURE OF THE COMPLAINT	
PROGRAM MANGER COMPLAINT SENT TO FOR CORRECTIVE ACTION RESPONSE	NAME DATE

APPENDIX 14

CORRECTIVE ACTIONS

THIS CORRECTIVE ACTION IS BEING UNDERTAKEN IN RESPONSE TO COMPLAINT/OBSERVATION DOCUMENT NUMBER:

DATE RECEIVED BY OQA	
INVESTIGATIVE ACTIONS AND RESULTS BASED ON OBSERVATION	
CORRECTIVE ACTIONS IMPLEMENTED BASED ON OBSERVATION	
DATE WRITTEN RESPONSE FORWARDED TO OBSERVER AND MANAGEMENT	
VERIFICATION OF IMPLEMENTATION OF CORRECTIVE ACTIONS	
COMPLETION DATE	
NATURE OF THE COMPLAINT: APPENDIX 64a	
INVESTIGATIVE ACTIONS AND RESULTS BASED ON COMPLAINT	
CORRECTIVE ACTIONS IMPLEMENTED BASED ON COMPLAINT	
DATE WRITTEN RESPONSE SENT TO COMPLAINTANT AND MANAGEMENT	
VERIFICATION OF IMPLEMENTATION OF CORRECTIVE ACTIONS	
COMPLETION DATE	
QAO'S SIGNATURE	

APPENDIX 15

EMPLOYEE ATTESTATION STATEMENT

This form is to be completed at the time of the analyst's Data Integrity (DI) training.

This is to certify that I am free from any commercial, financial, interdepartmental, or other undue pressures that could interfere with the quality of my work. I also understand that should my status change in regard to this matter, I will immediately inform management of such a change. I also understand that if I purposely am not truthful in signing this statement, or I purposely withhold from management any subsequent change in my status, that I am in violation of the Environmental and Chemical Laboratory Service Data Integrity Policy. In the absence of any written requests for an explanation of this Policy, within 30 days of receipting DI training it is understood that I fully understand this Policy and I will strictly adhere to this Policy.

ANALYST (Print): _____

SIGNATURE: _____

SIGNING DATE: _____

APPENDIX 16

EMPLOYEE SIGNATURES

NAME	SIGNATURE	INITIALS
Bielamowicz, Martin	Martin Bielamowicz	MEB
Bind, Eric		EJB
Camacho, Sandra	Sandra Camacho	
Compagnucci, Lynne	Lynne Compagnucci	LC
Fan, Zhihua (Tina)		ZF
Gleason, Diana	Diana Gleason	
Haltmeier, Douglas		
Hargrave, Christopher	Christopher Hargrave	
Hargrave, Deborah	Deborah Hargrave	
Henitz, James		
Juniak, Edward	Edward Juniak	
Kacsmar, MaryAnn		
Lawson, Bill		BL
Lettiere, Lauren		
Madon, Maria	Maria Madon	
Nemeth, William	William K Nemeth	WKN
Obed, Reynaldo	Reynaldo N. Obed	
Palencia, Marilou	Marilou N. Palencia	MP
Parsa, Bahman	Bahman Parsa	BP
Patel, Bhupendra	Bhupendra Patel	BP
Patel, Vaishali	VAISHALI R. PATEL	VRP
Patterson, Norman	Norman Patterson	NP
Pierzhanowski, Sandra		

APPENDIX 16

EMPLOYEE SIGNATURES

NAME	SIGNATURE	INITIALS
Pietri-Pietri, Rafael		
Riker, Collin (Dave)		
Robinson, Sharon		
Rose, Janet		
Servis, Robert		
Shah, Jayshree		
Tanner-Banks, Keisha		
Voronin, Erick		
Ward, Algernon		
Wene, Daniel		
Wright, Minnie		

CHAPTER THREE

PHYSICAL FACILITIES

3.1 FACILITY OPERATIONS

The Public Health and Environmental Laboratories' Environmental and Chemical Laboratory Service (ECLS) is located on the State Police Complex in Ewing Township. The physical address of the Public Health Environmental and Agricultural Laboratory (PHEAL) is 3 Schwarzkopf Drive, West Trenton, NJ 08628. ECLS' normal hours of operation are from 7:30 am to 5:30 pm, Monday through Friday. These hours may be extended if prior arrangements are made through ECLS Management.

ECLS is utilized as the NJ Department of Environmental Protection's Principal Drinking Water Laboratory for the enforcement of State and Federal regulations. Therefore, the data generated must be demonstrably valid and capable of withstanding court challenges. ECLS has expanded its test capabilities to analyze blood and urine samples for metabolites, chemical agents, and trace metals that may be indicators of a chemical terrorism event or an exposure to an environmental contaminant. ECLS does not store or utilize any chemical warfare agents or other unique chemical materials that would pose a special health risk to laboratory staff or would be of unique interest to a terrorist.

3.2 SECURITY STRATEGY

I. ***Purpose:*** To inform all employees of the security provisions and requirements incorporated at PHEAL. The PHEAL is a consolidated State testing facility. The work conducted here includes State Public Health, Environmental and Agricultural testing services.
In addition the Bioterrorism Laboratory and Molecular Detection Services (BTRL/MDS) are located in this facility. These laboratories handle select agents which are regulated by CDC/USDA. These agents have the potential to cause illness and even death when used inappropriately. This policy will address the facility security issues that must be in place to use these agents in addition to addressing the general access issues to ensure all work conducted at this facility is protected and secure.

II. ***Policy:*** Security of/for/at the PHEAL must be exercised by all employees, occupants, or visitors of the facility. Security Officer(s) will be present at this facility on a 24/7 basis and may be expected to require verification of your identification at any time.

Upon completion of the PHEAL Access Card/Employee ID Request form, all employees, new-hires, consultants and other individuals as deemed applicable, will be issued a separate access/photo ID card for the PHEAL indicating their level of operations.

Occupancy – All employees, consultants, and visitors will access the PHEAL through the doors located at the front of the building and must utilize the turnstiles for passage beyond the security desk.

Photographing the facility is prohibited, unless otherwise provided by the Employer for business reasons. Employees discovered taking pictures without permission may be subject to discipline.

Vendors needing access to the PHEAL laboratory areas to repair equipment must be accompanied by an authorized PHEAL employee for the duration of his/her repair visit.

Campus Access – Employees may access the campus via the State Police Drive or Cozy Road entrance and proceed to the employee parking lot.

All non-employees of the PHEAL must access the campus via the State Police Drive and present their identification for inspection as required.

All delivery personnel will be required to follow signs to the delivery entrance and present their identification at the swing gate via the camera to the PHEAL building security staff. Upon acceptance, Security will lift the gate for access. The driver will proceed to the correct loading dock (Agriculture or Health), call the applicable laboratory, show his/her identification via the camera and enter the proper accessioning area.

Parking – Upon completion of PHEAL Parking Request form, employees will receive a parking sticker to be prominently displayed on their automobile's front windshield or back window.

Reserved parking is limited.

There is no permanent parking behind the building. Service contractors who require a service vehicle to perform their duties may park vehicles in designated areas behind the building. Employees may park temporarily (approximately 30 minutes) at the AHRF, Greenhouse, supply sheds, loading docks, etc., to drop off product or supplies.

All employees will be expected to park in front of the building in the spaces provided by PHEAL Management.

III. Procedures:

A. Criminal Background Reviews:

- Cost of the fingerprint check will be borne by the PHEAL agency(ies) however, all other associated costs such as travel, tolls, etc., must be borne by the candidate for employment or employee.

- The results of the review by the New Jersey State Police will be forwarded to the Criminal Background Investigation Unit (CBI) and such information will be forwarded to the PHEAL Administration. This information is considered highly confidential and will not be faxed.

- If a criminal history is revealed which places the PHEAL in a vulnerable position (conviction of a crime of the first, second, third degree and selected crimes of the fourth degree), the candidate for employment or employee will be so advised and given an opportunity to review, refute, and/or clarify the information obtained before any final determination regarding their PHEAL employment status is issued.

- All questionable results and candidate or employee appeals will be forwarded to the respective departments' Human Resource division for review and final determination.

- An individual may address Human Resource orally or in writing, at the individual's discretion.

- Human Resource's determination is considered final in the matter and will be conveyed to the affected individual via the PHEAL Administration.

- All individuals' records indicating no convictions will be shredded upon notification to the appropriate parties.

- Individual's records indicating a relevant criminal conviction will be forwarded to Human Resource. Unless the claim is subject to litigation (Administrative, Civil, Criminal), the information will be shredded after two years. This information will NOT be transmitted to another employer (even if State Agency) or prospective employer.

- Individuals who do not wish to comply with the required criminal background review will not be considered for employment, or if already employed, will be subject to appropriate administrative action.

- Confidentiality: The information received regarding an individual's criminal arrest/convictions is considered highly confidential. The improper dissemination of such information may cause severe repercussions and/or may be addressed via administrative measures levied against the responsible party.

IV. Visitor Policy

Objective

This policy describes the requirements that must be followed that will allow visitors and other non-employees (VNE) access to PHEAL. The requirements outlined are designed to protect VNEs from injury or incident while ensuring the Institute is not exposed to potential liabilities and breaches of security arising out of their access.

Responsibilities

Safety Office is responsible for the development and periodic revision of this policy.

Senior leadership is responsible for providing input on the development of this policy and ensuring it is supported and enforced across the organization. Directors and managers are responsible for ensuring the use of this policy within their groups. Supervisors and their staff are responsible for the implementation and compliance of this policy. Employees who are coordinating the access and escort of VNEs are responsible for reading and following the requirements documented herein.

At PHEAL, Security is responsible for checking the identification of all VNE's, signing them in, providing those with a temporary photo ID. All employees, consultants, and visitors are required to use their ID cards to gain entrance into the building. Employees, consultants, vendors or visitors attempting to gain access to non-authorized areas will be addressed via proper administrative or legal responses.

Operating area escorts are responsible for ensuring all VNE's comply with the safety and operating area requirements at all times.

Categories of VNE include but not limited to, graduate students, consultants, vendors, clients and sponsors, contractors, regulatory inspectors, consultants/subject matter experts (SME), visiting scientists/collaborators, visiting students, and job candidates.

In general, facility access for individuals under the age of 18 years is limited to the lobby of any PHEAL facility. Children should not be left unattended in any PHEAL lobby or non-work area. Security personnel will not be responsible for watching children. Tours may be permitted for students and children under 18 years of age that have been pre-approved by the appropriate senior leadership and safety office. Tour groups will be prohibited from entering any high-hazard area. This will include any chemical or biological laboratory where work is being conducted. Tour groups are permitted at PHEAL facilities with prior approval.

Procedures to be followed

- Operating area escorts are responsible for identifying which areas of the facility the VNE will need to access.
- Upon arrival, the VNE will register with security and will receive a temporary photo ID. All VNEs must sign in with the guards on a daily basis as long as they are here.
- All personal protective equipment (PPE) will be provided to the VNE by the employee coordinating the visit prior to entering laboratory areas.
- For VNE's requiring access to the facility's BSL-3 for our Biothreat Response Laboratory, please refer to the separate Select Agent protocols for Biosafety and Biosecurity.
- Service contractors hired by Facilities may be allowed to do work unsupervised for periods of time if they are not working in a **functioning laboratory** or other high hazard area.
- VNEs are prohibited from carrying cameras or portable electronic devices into any BSL-2 or 3 laboratory or high security area of our facilities without the express permission of senior leadership.
- VNE's are prohibited from entering the PHEAL facility after hours without the approval of senior leadership responsible for that area.

Training

If the VNE will be working in a functioning laboratory, or other high hazard area; training on area-specific hazards (physical, chemical, and biological) must be provided by the supervisor or designee. This would include identifying hazardous chemicals, biological agents, radiation, confined spaces, electrical hazards, etc., that the VNE may encounter. In addition to this information the VNE must be instructed on actions to take in an emergency, and the location of emergency eye washes, showers and exits. Safety office should be contacted to assist with this training

3.3 LABORATORY ENVIRONMENT

LIGHTING: The lighting system in PHEAL is a state of the art automatic occupancy detection system.

VENTILATION: The ventilation system was commissioned and performance checks completed April, 2012.

TEMPERATURE AND HUMIDITY: Temperature is controlled by the facility's automated HVAC system between 70° and 74° F. There are times of day automatic setbacks in some of the laboratory rooms, while others necessitate constant temperature. The thermostats are controlled from a central location. The building is designed to maintain a humidity level between 30% - 35%.

CHAPTER FOUR

INSTRUMENTATION AND REFERENCE MATERIAL

4.1 INSTRUMENTATION

Appendix 17 contains the instrumentation employed by ECLS along with:

- Manufacturer.
- Serial number.
- Location.
- Methods analyzed.
- Model number.
- Instrument.
- Date acquired (if known).

Appendix 17 information must be updated annually. All of the instruments are operated according to the manufacturer's instructions and/or according to specific criteria contained in the reference method for any particular analysis. The instrument's manufacturer provides technical manuals which are kept in close proximity to the instrument for easy access. The specific protocols for operating these major pieces of instrumentation, e.g., calibration, QC requirements, operating specifications, etc., are contained in the Method Manuals for the individual analyses.

4.2 SUPPORT EQUIPMENT

Support equipment consists of instruments and equipment that are used in conjunction with other instrumentation in order to perform a specific analysis and report a result. Support equipment are usually items that an analyst is expected to know how to operate correctly and accurately. Therefore, the manufacturer operating instructions may be very limited or not provided at all. Below are operating instructions, and where appropriate, calibration and QC activities for ECLS support equipment not covered by manufacturer's operating instructions.

ANALYTICAL BALANCE-MECHANICAL: mounted on a heavy shockproof table or a heavy slab support, located away from laboratory traffic, and operated when in equilibrium with room temperature. This type of analytical balance is operated as follows:

- Make sure that the pan and the inside of the weighing chamber are clean. Use a brush to remove dust or particulate matter that could adhere to the weighing vessel and adversely affect the weighing.
- With the sliding doors closed, zero the balance by SLOWLY releasing the balance from its fully arrested position. By releasing the balance slowly, a minimum of vibration is introduced to the system thereby preventing an extended period of time being required to allow the balance to come to a resting position. If too much vibration is introduced, fully arrest the balance again, wait a minute, and then fully release. Zero the balance by turning the ZERO KNOB until the zero line of the balance readout is located between the two fixed reference gap indicators. If this does not zero the balance, it may be necessary to check the balance level (a circular "bulls-eye" configuration containing an air bubble) to verify that the balance is level (the air bubble is in the center of the circular array). To level the balance, adjust the height of the appropriate balance leg to bring the bubble to the center of the array by turning the knob on the balance leg. Zero the balance. In extreme cases, it may be necessary to adjust the weights inside of the balance before a zero can be achieved. This adjustment must be performed only by individuals familiar with the adjustment procedure.
- Place the weighing dish on the balance pan. With the doors closed, partially release the balance. Slowly add weights to the balance by turning the appropriate weight knobs until an approximate weight is obtained.

- Bring the balance slowly back to the fully arrested position. Then fully release the balance and add or subtract weights to arrive at a final weight of the weighing dish. Record the weight.
- Add the material to be weighed and repeat the weighing process described above.

Quality control measures:

- Each time of use, the balance is checked with a set of 2 S class weights that bracket the anticipated weight range that the balance will be operating in for that particular analysis. If a second analysis requires the use of that balance, another set of weight measurements are entered on **Appendix 18**. **Appendix 18** forms are contained in a bound logbook (CHEM 17) associated with each balance. The balance reading must agree to +/- 1 in the decimal place to the left of the decimal place that the balance is capable of reading. For example, if a balance reads to 5 decimal places, 0.00000g, the acceptable limit for that balance is 0.00010g. The acceptance limits for other balances are similarly determined until a balance is capable of reading to only one decimal place. Then the acceptance limit is +/- 0.3g. If this acceptance limit is exceeded, the balance is "removed from service" until corrective actions produce acceptable results. If a situation should ever arise that requires the immediate use of that balance, a "deviation curve" will be produced by weighing a minimum of 5 weights in the weight range of interest. Any results generated from a deviation curve will be qualified with the appropriate data qualifier indicating an "estimated value." However, due to the redundancy of balances in ECLS, this process of developing a deviation curve should never take place.
- Monthly, balances are checked with OQA's NIST traceable weight set. . This set is reserved strictly for OQA use. The checks are documented on **Appendix 19** and each program maintains their own Monthly Balance Check Logbook (LAB-6).
- Yearly, under a service contract, the balances are serviced by a qualified repair technician.
- An analytical Balance Logbook is kept for each balance documenting all the information required by section 4.3 3 of this manual.
- If a balance does not achieve the desired degree of accuracy, a sign is placed on the balance by OQA indicating that the balance is "Out-of-Service". The balance remains out of service until maintenance is performed and it has been verified by OQA to be working properly again.

ANALYTICAL BALANCE-ELECTRONIC: mounted on a heavy shockproof table or a heavy slab support, located away from laboratory traffic, and operated when in equilibrium with room temperature. This type of balance is operated as follows:

- Make sure that the pan and the inside of the weighing chamber are clean. Use a brush to remove dust or particulate matter that could adhere to the weighing vessel and adversely affect the weighing.
- With the sliding doors closed, zero the balance by pressing the on/off button. Wait until a constant reading is displayed. If it is not zero, press the TARE button and wait until a constant reading is displayed.
- If a zero reading is not obtained, see the remedial steps listed above.
- Place the weighing dish on the balance and press the TARE button.
- Add the material to be weighed and record the weight.

Quality control measures are the same as listed above for Analytical Balance: Mechanical.

pH METER: the electrodes are immersed in a buffer solution or saturated potassium chloride solution when not in use. The pH meters have a scale readability of +/- 0.05 pH units. The pH meter is operated as follows:

- The electrodes are removed from the preservative solution and rinsed with de-ionized water to remove the solution adhering to the electrodes.

- The electrodes are standardized against three buffers (pH 4.0, 7.0, and 10.0) and the standardization checked against two buffers from a different source (pH 4.0 and 10.0) prior to analyzing samples. The standardization is performed by pressing the standardization button on the meter and following the displayed instructions.
- Calibration and sample values are obtained using automatic temperature compensation while the sample is being stirred at a constant rate using a magnetic stirrer and stir bar.

Quality control measures:

- Electrodes are rinsed with de-ionized water after each reading.
- Electrodes are blotted dry, not wiped.
- Samples are stirred during analysis.
- The electrode solution is checked weekly by the analyst and the level is maintained at three-quarters capacity or greater. This is documented in the instrument maintenance log.
- The electrode bulb is cleaned as needed, with a 10% pepsin solution and/or a 50% solution of acetone and water. This is documented in the instrument maintenance log.
- Electrodes are conditioned by soaking in a pH 7.0 buffer solution for several hours following any of the stated QC measures and/or maintenance steps.
- The junction, if required, is replaced, as needed.
- A maintenance log is maintained for each pH meter documenting all of the information required above and by section 4.3 of this manual.
- If a pH meter stays in operation for an extended period of time, it must be recalibrated after every three (3) hours of continuous operation.
- If the pH meter can not be calibrated accurately, it is taken "Out-of-Service" as described above.

DISSOLVED OXYGEN METER: located in the Biochemical Oxygen Demand (BOD) laboratory. The DO meter is operated as follows:

- The DO probe is removed from the water bottle, in which it has been maintained, and placed in a BOD bottle that is half filled with water. The probe is not in contact with the water.
- The probe and the DO meter are allowed to achieve thermal equilibrium with the ambient air temperature.
- If the air temperature is 20° C, the probe should read 9.2 ppm. If a reading other than this is obtained, the meter is calibrated to read 9.2 ppm. There is a temperature chart that correlates the various temperature readings to the appropriate ppm values so a proper calibration can be achieved.
- A sample reading is obtained by immersing the probe in the sample, so that there are no air spaces in the sample, and turning the probe on.

Quality control measures:

- The probe membrane is changed as needed or every two weeks, whichever is more frequent.
- All other maintenance is performed by the vendor at the vendor's workstation.
- A maintenance log is kept for documenting all the information required by section 4.3 of this manual.

BOD INCUBATOR: there is one large, walk-in incubator located in the BOD laboratory. The incubator is maintained by the laboratory staff. The staff makes daily temperature checks to verify that the incubator is maintaining a temperature of 20 +/- 1 degree C. Those temperature readings are recorded in a bound logbook that is affixed to the incubator. If the incubators can not maintain the required temperatures, they are taken "Out-of-Service" as described above.

OVENS, REFRIGERATORS, AND FREEZERS: are located throughout ECLS. These items require no operating instructions and do not require any preventative maintenance by ECLS. The only control measure that is required is for the temperatures of these items to be monitored with each day's use. The temperatures are recorded on the bound

logbooks (CHEM 5) attached to each item. The refrigerators are to maintain a constant internal temperature of between 2.0^{0}C and 6.0^{0}C, as per DEP and EPA Regulation. Ovens are to maintain the desired temperature within a +/- 1.0^{0}C range. Presently, there is no freezer temperature requirements listed in any of the reference methods. Therefore, when an analyst stores something in the freezer, he may establish his own temperature and acceptance range. Generally, the temperature for freezer are in the range of -15 to -20^0 C When a method states a specific temperature range for a piece of equipment that range is to be followed. Entries into the temperature logbook are made each working day. If the equipment is outside of the acceptance limits, adjustment the unit should be made. If the unit shows continuous out of range readings an "Out of Order" notation is entered. "Out-of-Order" is defined as temperatures that are less than 2^{0}C outside of the acceptable temperature range that are observed for 2 consecutive days or for 2 days of the last 5 recording days. Any temperature observed that is outside of the acceptance range by more than 2^{0}C, is automatically considered Out of Service. If the equipment is not being used on a particular day, then a "Not-in-Use" notation must be entered in the temperature book. When listed as Out of Order, the corrective actions taken to return the equipment to service must be recorded on the temperature log. If the equipment is not being used that particular day, a "Not in Use" notation is to be entered. These logbooks are maintained by OQA for a five-year period and then discarded.

NOTE: The calibrated thermometers used to take these temperature readings have a correction factor associated with that particular thermometer. That correction factor must be used when recording the actual temperature of the unit in the temperature log. If a thermometer has a correction factor of +0.5 degrees and the reading that is obtained from the thermometer is 4.0 degrees, the temperature that is to be recorded in the temperature logbook is 4.5 degrees.

THERMOMETERS: Thermometers are used throughout the laboratory. All liquid-in-glass thermometers are calibrated annually near the temperature of its intended use. **All other thermometers (digital) require quarterly calibration.** This is accomplished by comparing the temperature readings of the in-house thermometers against a NIST thermometer that is re-calibrated ever 5 years. It is sent out for recertification and the "corrected" temperatures are used to calibrate the in-house thermometers. Each thermometer is then labeled to include the following information: date of calibration, person performing the calibration, the thermometer's in-house ID number and the correction factor necessary to achieve the equivalent NBS reading. The record of these calibrations is maintained by the QAO on **Appendix 20** (LAB-11) for a period of at least 5 years and then discarded. When ordering new thermometers, every effort must be made to order ones that have a serial number permanently affixed to the stem. This is necessary for accurate identification of the individual thermometers and for the tracking of the QC data associated with those thermometers. Thermometers are graduated in at least 0.5^{O}C increments.

When an infrared detection device is used to measure the temperature of samples, the device should be verified at least every six months using a NIST certified thermometer over the full temperature range that the IR thermometer will be used. Each day of use a single check of the IR should be made and recorded by checking the temperature of a bottle of water at the temperature of interest that contains a calibrated thermometer. Agreement between the two should be within 0.5^0 C, or the device should be recalibrated.

BURETTES: are used to perform titrations in the laboratory and are used as follows:

- The burette is washed with three 5 to 10 ml portions of the titrant solution. These washings consist of partially inverting the burette to make sure that the titrant comes in contact with all of the surface area of the burette. The wash solutions are discarded by allowing it to flow through the tip of the burette.
- The burette is filled with titrant. The titration is performed by slowly adding the titrant, by means of manipulating the stopcock at the bottom of the burette, until the endpoint is achieved. As the endpoint is approached, the titrant is added dropwise to prevent overshooting the endpoint.
- The reading is obtained by looking at the BOTTOM of the meniscus of the titrant.

- The burette is then washed with several times with the appropriate solvent (usually water) to remove the titrant.
- The burette is then stored either right side up, with water in the burette and a beaker over the top to prevent the accumulation of dust particles that would clog the stopcock assembly, or upside down.
- The only maintenance to be performed is to make sure that the grease used on the glass stopcock assembly does not dry out and thereby freeze the assembly. The stopcock is re-greased as needed. If teflon stopcocks are used, this maintenance step does not need to be performed.

Quality control measures:

- If burettes are not designated as "Class A" the accuracy is validated as per Automatic Pipettes listed below. If they are designated as "Class A", no validation is necessary.

PIPETTES: are used in the preparation of reagents, standards, and quality control samples. Pipettes are used as follows:

- There are two general types of volumetric pipettes: those identified as To Deliver (TD) or the "traditional" volumetric pipette and those identified as To Contain (TC) or serological pipettes. The pipettes are rinsed with the solution to be transferred two or three times before use. For the TD pipettes, the actual transfer is performed by placing the pipette in contact with the receiving vessel and emptying the pipette while the pipette is in an upright position. Pipette and receiving vessel contact is maintained for two to three seconds after transfer to ensure that the proper volume of solution is actually transferred. Since all volumetric pipettes are certified class "A", no checks of these pipettes are required. For the TC pipettes, the transfer is accomplished as above except that instead of allowing the pipette to remain in contact with the receiving vessel to complete the transfer, the remaining solution in the pipette is blown-out to ensure complete transfer.

  Before use, inspect pipettes for chips or cracks in the tip, inspect for cleanliness, and rinse with the solution to be transferred. Pipetting by mouth is strictly forbidden.

AUTOMATIC PIPETTES (ELECTRONIC OR MANUAL TYPES): are used to transfer small amounts of solutions that can not be easily transferred by normal glass pipettes. They are composed of a hand-held pipette assembly, manufactured to deliver a specific volume, and have disposable plastic pipette tips. These pipettes are used as follows:

- The pipette tip is placed on the end of the assembly.
- Holding the pipette tip in the solution to be transferred, squeeze the "trigger" to uptake solution into the pipette.
- Empty the pipette by squeezing the "trigger" again. These are emptied as in the TD pipettes above.

Quality control measures:

- These pipettes have their accuracy validated before they are placed in service and quarterly thereafter.
- Both gravimetric and photometric methods are acceptable techniques for calibrating pipettes.

GRAVIMETIC CALIBRATION

- Ten water aliquots are transferred to weighing dishes and the weights of the transferred water are determined.
- These actual weights are compared to the theoretical weights of the transferred water.
- The readings are recorded and entered into a excel spreadsheet to generate a report.
- All reports are signed by the analyst and reviewed by a supervisor.
- The accuracy acceptance limits are +/- 2.5% of the true value.

PHOTOMETRIC CALIBRATION

- Using the ARTEL Pipette Calibration System (PCS), one aliquot of reagent is transferred into collection vessels containing blank solution and then read phometrically.
- The addition of reagent is repeated ten times for each desired calibration volume.
- After all the readings are made a computer generated report is printed
- All reports are signed by the analyst and reviewed by a supervisor.
- The accuracy acceptance limits are +/- 2.5% of the true value.

- Each automatic pipette is assigned an ID number by the supervisor through which one can relate a specific validation event to a specific pipette. Examples of both calibration documentations are listed in **Appendix 21.** A copy is maintained by the supervisor and a copy kept by OQA for filing for a period of at least 5 years and then discarded.

INSTRUMENT MAINTENANCE: consists of two basic types: routine and non-routine. The routine maintenance is that which is required by the manufacturer to keep the instrument in working condition. The specific maintenance procedures, frequency for each procedure, and the responsible party for that procedure (laboratory or manufacturer personnel), are established by the manufacturer. Non-routine maintenance is required when an instrument can no longer function according to the manufacturer and/or quality control required specifications. This may require the attention of a service technician. At this time, the instrument is removed from service before it can adversely affect client data. If impacted, clients will be notified whenever an instrument is taken out of service provided that this is the only instrument available for performing a certain analysis. See the **information** below for the process used for notifying clients.

ECLS Providing Client Notifications

Whenever it becomes necessary to inform ECLS clients of pertinent information regarding the laboratory, this notification will be provided by the ECLS QAO. This notification will be provided in one of two ways. The first, for those notifications that do not require immediate attention/action on behalf of either the laboratory or the clients, will be in writing. This notification will be used to convey the specifics of impending actions that will be forthcoming in the near future that has ample time for both the clients and ECLS to plan for its implementation. It could be used for notifying clients of upcoming changes: in methodology, in certification status, to sampling requirements, etc.

The second, for those notifications that do require immediate attention/action on behalf of either the laboratory or the client, will be made verbally first and followed-up in writing. It could be used for notifying clients: of an instrument break down so the client could stop sampling for that testing procedure, of laboratory analytical capacity being exceeded, etc.

ECLS Providing Information To Client Inquiries

There are instances when clients request: follow-up information on reported results, a check of QC data associated with certain analytical results, replacement copies of lost data, etc. These requests have generally

been made by placing calls to the data management section or individual analysts in the laboratory and the corresponding responses back were generally verbal unless copies of data were requested. *THIS PROCESS HAS NOW BEEN CHANGED AND ALL INQUIRIES ARE TO BE MADE THROUGH THE ECLS QAO BY FORWARDING THE COMPLETED FORM CONTAINED IN **APPENDIX 64a***. The form is to be completed electronically and emailed to Sharon.Robinson@DOH.State.NJ.US. All fields listed on the form are required fields and must be completed before the request can be addressed by ECLS. When the information has been assembled, the response back to the requesting personnel will also be made by the ECLS QAO.

NOTE: Please be cognizant of the fact that any request for follow-up information may require the pulling of records from secondary storage. This process, although vastly improved of late, may still take several days for retrieval and, consequently, the response may not be immediately available. Please allow as much lead time for the retrieval of records.

4.3 INSTRUMENT MAINTENANCE

The instrument will remain out of service until such time as the methods run on that instrument have been re-validated. Much of the instrumentation in **Appendix 17** is covered under service contracts with the vendors. The procurement and maintenance of these contracts is the responsibility of the Program Technical Directors. All maintenance performed is documented in the INSTRUMENT MAINTENANCE LOG. This log consists of the following information:

- Instrument name, manufacturer, model number, serial number and the NJDOH ID number.
- Dates that the instrument was received and placed into service. For those instruments previously in-use, the following notation will be made: "Previously in service but date not recorded." For new instruments, this information will be recorded.
- Condition of the instrument when received. Since all of the instrumentation received by ECLS is purchased new, NEW will be the entry for this requirement. If a used instrument is ever obtained by ECLS, the condition of that instrument will be described using descriptions similar to: received in working order, needed service to repair (list particulars), etc.
- Dates, results, and retention of hard copy data for any calibrations or verifications performed by the contract service technician during the initial instrument set-up or non-routine service maintenance.
- Routine maintenance and documentation consists of the following: description of each item of maintenance, as indicated by the manufacturer that is to be performed, the frequency of its performance, when it was performed, by whom, and when it is to be performed next. Also included are any extra maintenance steps taken by the analyst.
- Non-routine maintenance and documentation consist of the following items: description of the instrumental problem, date(s) the service was performed, who performed the service, and a listing the items serviced and/or replaced.
- A history of the damage, malfunction, etc. of the instrument not covered by the above mentioned items.
- If there is space in a workbook for documenting the completion of a maintenance item, then an entry must be made for every day that the items appears in the workbook. Of course, if the maintenance item was performed, that is documented. If no maintenance was performed, enter the reason why. For example, if no maintenance was required, you can place a "NA," or some similar entry in the space. If the instrument was not in use, state as such.
- If maintenance is documented in the daily run logs, etc., highlight the entries so that they are readily observable to auditors.

CHAPTER FOUR

INSTRUMENTATION AND REFERENCE MATERIAL

It is ECLS policy that if a piece of equipment has no notice to the contrary, it is properly functioning. Only in the instance that the instrument is malfunctioning will an "Out of Service" notice be affixed to the instrument.

4.4 TRACEABILITY OF REFERENCE STANDARDS

The ability to trace back to some primary reference or measurement standard, all of the reference material used within ECLS. The reference materials presently in-use are weight sets used to check the balances, the thermometers used in temperature measurements, and the reagents and standards used in analyses. The traceability of these reference materials is as follows:

- WEIGHTS (ASTM Type I): weights are used to check the accuracy of the balances on each day of use by recording the results of the weighings in the bound book consisting of **Appendix 18**. The Inorganic Technical Director or the Organic Technical Director, or their designees, maintain possession of these weights. The accuracy of these weights is verified by comparing them to another "made to class S specifications" weights maintained by the QAO. This verification is performed prior to placing the weights in-use and annually thereafter. The results of these verifications are maintained by the QAO on **Appendix 22**. The NIST traceable QAO weights are sent every five years as per EPA regulations for re-certification. The NJ Office of Weights and Measures has been used in the past as the re-certification vendor. All certification documentation is maintained by the QAO. In this manner, every weighing that is made in ECLS is traceable back to a nationally recognized standard weight; namely, the NJ Office of Weights and Measures or the equipment manufacturer.
- THERMOMETERS: thermometers are used to check the temperature accuracy of ovens, refrigerators, freezers, etc. on each day of use. This check is documented by recording the temperature in the bound book that is maintained on that particular piece of equipment. The thermometers are dedicated to the particular instrument that they are functioning within. The accuracy of these thermometers is verified by comparing them to the "traceable to NIST" thermometer maintained by the QAO. This verification is performed prior to placing the thermometer in-use and annually thereafter. The results of these verifications are maintained by the QAO on **Appendix 20.** The QAO thermometers are sent every five years for recalibration according to the calibration date, to be calibrated against a NIST certified thermometer. In this manner, every temperature reading that is made in ECLS is traceable back to a nationally recognized temperature standard; namely, NIST.
- REAGENTS AND STANDARDS: at a minimum, all of the reagents used in ECLS are of analytical reagent grade. In those instances where analytical reagent grade chemicals are not available, the highest purity reagent available is used. Special high purity reagents are used in the trace metal and trace organic analytical laboratories; e.g. trace metal grade acids and pesticide residue free solvents. Standards purchased are of the highest purity available and come with a Certificate of Analysis that is maintained in the analytical unit using the material.

  Reagents and standard solutions are all labeled with unique identifiers. The unique identifier is assigned to the individual solution by the analysts. For those analysts, or analytical units, that employ workbooks in which they document how they prepare each solution, those workbooks have an ID number that was assigned to them by the QAO. The unique solution identifiers are generated by the analyst by combining the workbook ID number with the page number on which the formulation is documented and, in the case that there is more than one formulation on a page, adding a suffix (a, b, c etc.) to indicate the particular formulation on that page. For example, if the preparation of the total phosphorous color reagent was documented in workbook 1729 on page 73 and was the second reagent documented, the unique identifier would be 1729-73b. Additionally, each reagent or standard solution is assigned a unique identifier by

the ECLS LIMS system. This number is used in conjunction with the unique identifier assigned by the analyst to identify the reagent or standard. The solution bottle is then labeled, as a minimum, with these unique identifiers along with the name of the solution and its expiration date. If no expiration dates are provided by the manufacturer or the reference method, ECLS will assign a tentative expiration date. For example, most of the VO standards have an expiration date of two years. Therefore, this will be assigned as the tentative expiration date. This can be extended provided the analytical characteristics are equivalent to the original characteristics. ECLS is in the process of adopting one label that will be used by the Inorganic and Metal units which provides spaces for recording the pertinent information.

Reagents that are used as titrants must be standardized or replaced by a new lot at the schedule listed in the appropriate reference method. All titrants that are purchased must have a lot specific C of A. In the absence of any such specification, the titrants are to be re-standardized quarterly.

Those analysts that perform analyses that require that reagents and standards be made on a daily basis and used only on that day, may document the preparation and ID of the materials in the daily run log.

When a solution is prepared, the type of information documented in the workbook depends on the source material that is used. For the preparation of a solution from a solid source, liquid source or solution from a previously prepared in-house solution, see the information below.

PREPARATION OF A SOLUTION FROM A SOLID SOURCE

FOR THE SOLUTION BEING PREPARED, DOCUMENT THE FOLLOWING:

Solution ID number: as per section 4.4.
Solution name: Name that will appear on the solution container e.g., standard mix #1.
Name of analyst preparing the solution:
Preparation date:
Expiration date:

FROM THE SOLID SOURCE, DOCUMENT THE FOLLOWING:

Name of the chemical supplier:
Lot number:
Bottle number: 1 of X, 2 of X,…
Date received in the laboratory:
Purity:
Expiration date:

PREPARATION DOCUMENTATION:

Weight of the weighing dish and the chemical:

Weight of the weighing dish:
Weight of the chemical:
Dilution volume:
Solvent:
Analyte(s) concentration(s):
Description of the preparation process: Any specific detail that is necessary for the correct preparation of the solution. This may be a reference back to the Method Manual.
Calculations:
Analyst Signature:

PREPARATION OF A SOLUTION FROM A LIQUID SOURCE

FOR THE SOLUTION BEING PREPARED, DOCUMENT THE FOLLOWING:

Solution ID number: as per section 4.4.
Solution name: Name that will appear on the solution container e.g., standard mix #1.
Name of the analyst preparing the solution:
Preparation date:
Expiration date:

FROM THE LIQUID SOURCE, DOCUMENT THE FOLLOWING:

Name of the chemical supplier:
Lot number:
Bottle number: 1 of X, 2 of X,...
Purity:
Analyte(s) concentration(s):
Date received in the laboratory:
Expiration date:

PREPARATION DOCUMENTATION:

Volume transferred:
Dilution volume:
Solvent:
Analyte(s) concentration(s):
Description of the preparation process: Any specific detail that is necessary for the correct preparation of the solution. This may be a reference back to the Method Manual.
Calculations:
Analyst signature:

PREPARATION OF A SOLUTION FROM A PREVIOUSLY PREPARED IN-HOUSE SOLUTION

FOR THE SOLUTION BEING PREPARED, DOCUMENT THE FOLLOWING:

Solution ID number: as per section 4.4.
Solution name: Name that will appear on the solution container e.g., standard mix #1.
Name of the analyst preparing the solution:
Preparation date:
Expiration date:

FROM THE IN-HOUSE SOLUTION BEING DILUTED, DOCUMENT THE FOLLOWING:

Solution ID number:
Analyte(s) concentration(s):
Expiration date:

PREPARATION DOCUMENTATION

Volume transferred:
Dilution volume:
Solvent:
Analyte(s) concentration(s):
Description of the preparation process: Any specific detail that is necessary for the correct preparation of the solution. This may be a reference back to the Method Manual.
Calculations:
Analyst signature:

If an analyst determines that he would like to develop a form that would make the preparation and documentation of his reagents, standards, etc. easier, he may do so provided that all of the information requested in the preparations described above are documented. However, these forms must be compiled into a bound book, like the temperature and balance books; pages numbered, and have a book number assigned by the QAO. This will allow the analysts to assign a unique identifier to the reagents, etc. in an analogous manner as the other analysts.

4.5 ORDERING REAGENTS, STANDARDS and OFFICE SUPPLIES

IN-HOUSE OFFICE/LABORATORY SUPPLY INVENTORY:

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INSTRUMENTATION AND REFERENCE MATERIAL

The Office of the Director maintains an in-house inventory of office supplies, located in room 480. In addition to these supplies, the Office of the Director maintains an in-house inventory for laboratory gloves; plastic sample bottles; Kim wipes; and plastic gloves. Staff may go to the copy room (480) directly and obtain the necessary office supplies on an as needed basis. For all items, excluding plastic sample bottles, staff must submit a completed LAB-22 (**Attachment 1**) form approved by the respective Technical Supervisor, then forward to the Office of the Director. The supply request will be processed and given to the requestor. The Office of the Director is responsible for tracking the in-house supply inventory and assuring that adequate quantities of supplies are on-hand at all times.

When necessary to restock the in-house office supply inventory, The Office of the Director will complete a LAB-22 form, and enter the request into the purchase tracking records. The request will be forwarded to the, Divisional Warehouse Coordinator, for processing. Upon delivery the order is verified for completeness by comparing the LAB-22 with the items received against the original order. All items will be received, verified, and placed in storage area by the close of the business day.

WAREHOUSE OFFICE SUPPLY REQUESTS:
When requesting office supplies not covered in the in-house Office Supply Inventory, staff must submit a completed LAB-22 form approved by the Technical Supervisor, and then forward it the director's secretary for processing. . All requests will then be submitted for review and approval by the Director. Upon approval, the request will be entered into the purchase tracking records. The request will then be forwarded to Divisional Warehouse for processing. In order to track completed orders, orders will no longer be combined. They will be submitted to the Divisional Warehouse as originally received by The Office of the Director.

LABORATORY SUPPLY REQUESTS:
Requests for purchase of laboratory supplies will be made using the LAB-14 (**Attachment 2**) Purchase Request form .All requests must be approved by the respective Technical Supervisor and submitted to the Director, the director's secretary for review and approval. If approved, the LAB-14 will be processed (issuance of the internal tracking number) and forwarded to the Assistant Commissioner. A copy of the approved LAB-14 will also be forwarded back to the Technical Supervisor for their records. The director's secretary maintains the tracking of all purchase orders and will initiate follow-up action on those unfilled orders by checking the Purchase Order Log and identifying all orders that have not been received within 2 months of submittal to the purchasing unit. This task will be performed at the end of each month. This follow-up action and feedback from the purchasing unit will be forwarded back to the respective Technical Supervisor, in writing.

EMERGENCY PURCHASE ORDER REQUESTS:
Emergency Purchase Order Requests cause a disruption to the purchasing process, not to say added time and effort by staff to handle the request in an individualized expedited manner. Therefore, Emergency requests must be kept to a minimum through diligent monitoring of in-house supplies and thorough planning for the replenishment of supplies well in advance of their needed usage. It is understood that there will be instances (e.g. supplies become contaminated, emergency development of a new test method, unanticipated client change to a new analytical procedure, etc.) whereby we will need to expedite the procurement of a supply item. In those instances, the procedures listed above shall be followed with the following added provisions:

-The words "Emergency Purchase Order" are to be written across the top of the LAB-14 and highlighted in yellow.
- The LAB-14 shall be hand carried through our administrative signoff procedure.

- A memo from the requestor through the Director to the Division's Purchasing Unit shall be submitted with the LAB-14 justifying why the emergency order is being requested. This justification needs to address why this is an emergency. Lack of sufficient detail in the justification will cause a return of the LAB-14 to the original submitter for additional clarification.

4.6 RECEIVING SUPPLIES

Upon delivery of office supplies, verification that the order is complete is confirmed by comparing the LAB-22 with the items received against the original order. The respective Technical Supervisors are then notified that the ordered items have been received.

Upon delivery of laboratory supplies, the employee receiving the delivery will sign for the delivery of the supplies and perform an immediate review of the items to see if anything being delivered is hazardous or requires refrigeration or freezing.

All packing slips must be given to the director's assistant to be kept in a file. The copy of the packing slip will be given to the respective Technical Supervisor for supply receipt verification. Once the laboratory program staff has verified the receipt of the supplies, the director's assistant will forward the original packing slip to purchasing processing. If there are any outstanding items on the LAB-14, this must be brought to, the director's secretary's attention.

GLASSWARE: are all of the Pyrex-Kimax or borosilicate type with all of the volumetric glassware being Class-A. All new glassware must be initially washed as per Chapter 3 in the Central Service unit or by the analyst using the glassware. ECLS has switched to using pre-washed, one time use plastic bottles for sample collection, wherever appropriate. Some glassware requires additional cleaning prior to their use in the laboratory. Those additional cleaning steps are as follows:
METAL ANALYSIS: The additional cleaning steps consist of:

- Placing in an acid bath containing 1:4 (v/v) nitric acid/water and allowed to soak for three hours.
- This is followed by a tap water rinse.
- Rinsing with de-ionized water three times.
- Inverting and placing in plastic storage containers or storage cabinets to prevent contamination.

ORGANIC ANALYSIS: The additional cleaning steps outlined below are described as beginning immediately after analysis. Any or all steps may be necessary to clean depending upon the nature of the sample and the concentration of the analysis.

- Removals of surface residues as soon as possible after use by using acetone (or other suitable solvent) prior to being placed in the hot detergent soak.
- The hot detergent soak consists of a bath of a suitable detergent (Alconox or Sparkleen) in water at 50^0 C or warmer. These detergents are entirely synthetic and not of fatty acid base since that would cause a film to develop on the glassware which would have an affinity for organic residues.
- Hot water rinse.
- Soak in an oxidizing agent or deep penetrating agent which usually consists of a warm chromic acid solution. Potential substitutes are Chem Solve 2157 and Detex.
- Several hot tap water rinses.
- Distilled water rinse.
- Acetone rinse.

- A preliminary flush before use with the solvent to be employed in the analysis.
- An additional "cleaning" step adhered to is to discard all glassware that comes into contact with highly contaminated samples rather than risk contaminating other glassware through incomplete cleaning.

4.7 SAMPLE BOTTLES

May be purchased pre-cleaned to USEPA specifications or may be cleaned in-house by the Central Services Unit. Bottles cleaned in-house are cleaned according to the listed procedure for Central Service. These bottles may require additional cleaning prior to distribution to the sample collectors. The finished sample bottles are stored in the bottle supply cabinet inside of the Sample Receiving room. The additional cleaning steps for bottles are as follows:

GENERAL CHEMISTRY: bottles used for collection of samples for general analyses such as, cyanide, color turbidity; BOD, COD, etc. require no additional cleaning.

TRACE METAL: bottles are rinsed with 10% nitric acid, double distilled water rinsed, and then air dried.
ORGANICS: bottles are acetone rinsed, hexane rinsed, air-dried and capped.

Appendix 17: Instrument Information for Chemical Terrorism Laboratory

Instrumentation	Components	Model	Serial Number	Manufacturer	Unique ID	Location	Analysis	Date Acquired
GC/MS System # 2	Gas Chromatograph	6890N	CN1030816	Agilent	CT GCMS-2	L415	CT-T021	<2004
	Mass Selective Detector	5973MSD	US30964997	Agilent	CT GCMS-2	L415		<2004
	Automatic Liquid Sampler	7683	US92708108	Agilent	CT GCMS-2	L415		<2004
	Ion Gauge Controller	59864B	US6018893	Agilent	CT GCMS-2	L415		<2004
	Rough Pump	EM2M 1.5	027552808	Edwards	CT GCMS-2	L415		<2004
	Computer Monitor	PE1135T	CN250YF584	HP Compaq	CT GCMS-2	L415		<2004
	Computer	EVO	6X2C-KN9X-202F	HP Compaq	CT GCMS-2	L415		<2004
	Printer	LaserJet 2200d	CNGRH27455	Hewlitt-Packard	CT GCMS-2	L415		<2004
GC/MS System # 3	Gas Chromatograph	6890N	US10502021	Agilent	CT GCMS-3	L415	Tetramine in Urine	Jan-05
	Mass Selective Detector	5973 *inert*	US44630560	Agilent	CT GCMS-3	L415		Jan-05
	Automatic Liquid Sampler	7683B	US44510065	Agilent	CT GCMS-3	L415		Jan-05
	Ion Gauge Controller	59864B	US60111605	Agilent	CT GCMS-3	L415		Jan-05
	Rough Pump	EM2M 1.5	119502604	Edwards	CT GCMS-3	L415		Jan-05
	Computer Monitor	HP1702	CNC4520KN4	HP Compaq	CT GCMS-3	L415		Jan-05
	Computer	d530	USU445036J	HP Compaq	CT GCMS-3	L415		Jan-05
	Printer	LaserJet 2300d	CNBHG998325	Hewlitt-Packard	CT GCMS-3	L415		Jan-05
GC/MS System # 4	Gas Chromatograph	6890N	US10418021	Agilent	CT GCMS-4	L415	Cyanide in Blood	Nov-04
	Mass Selective Detector	5973 *inert*	US40630292	Agilent	CT GCMS-4	L415		Nov-04
	Automatic Sampler	MPS2	124512	Gerstel	CT GCMS-4	L415		Nov-04
	Automatic Sampler	MPS2	124505	Gerstel	CT GCMS-4	L415		Nov-04
	Ion Gauge Controller	59864B	US60110557	Agilent	CT GCMS-4	L415		Nov-04
	Rough Pump	EM2M 1.5	400023	Edwards	CT GCMS-4	L415		Nov-04
	Computer Monitor	HP1710	CNC802SXYM	HP Compaq	CT GCMS-4	L415		Nov-04
	Computer	dc7700s	2UA75205XF	HP Compaq	CT GCMS-4	L415		Nov-04
	Printer	LaserJet p3005d	CNJ1F45408	Hewlitt-Packard	CT GCMS-4	L415		Nov-04
Dynatherm/GC/MS System #5	Gas Chromatograph w/FPD	6890N	US10310113	Agilent	CT GCMS-5	L415	No method currently assigned	<2004
	Mass Selective Detector	5973N	US30965022	Agilent	CT GCMS-5	L415		<2004
	Air Sample Desorber	IACEM980	32959	Dynatherm	CT GCMS-5	L415		<2004
	Ion Gauge Controller	59864B	US60110502	Agilent	CT GCMS-5	L415		<2004
Not currently in use.	Rough Pump	EM2 1.5	27552807	Edwards	CT GCMS-5	L415		<2004
	Computer Monitor	9500	CN247YB373	HP Compaq	CT GCMS-5	L415		<2004
	Computer	D51S/P2	6X2C-KN9X-2012	HP Compaq	CT GCMS-5	L415		<2004
	Printer	LaserJet 2200d	JPGGR22986	Hewlitt-Packard	CT GCMS-5	L415		<2004

Appendix 17: Instrument Information for Chemical Terrorism Laboratory

Instrumentation	Components	Model	Serial Number	Manufacturer	Unique ID	Location	Analysis	Date Acquired
GC/MS System #6	Gas Chromatograph	6890	US10648080	Agilent	CT GCMS-6	L415	VOC in Blood	Jan-2007
	Mass Selective Detector	5975B	US62744609	Agilent	CT GCMS-6	L415		
	Automatic Sampler	MPS2	127970	Gerstel	CT GCMS-6	L415		
	Automatic Sampler	Controller 505	74170214	Gerstel	CT GCMS-6	L415		
	Ion Gauge Controller	NA	NA		CT GCMS-6	L415		
	Rough Pump	Duo 2.5	21794117	Pfeiffer	CT GCMS-6	L415		
	Computer Monitor	LA2205wg	3CQ01317VF	HP	CT GCMS-6	L415		
	Computer	dc7600	2UA6480445	HP/ Compaq	CT GCMS-6	L415		
	Printer	LaserJet2420d	CNGJF4839	HP	CT GCMS-6	L415		
GC/MS System #7	Gas Chromatograph	7890A	CN1111130	Agilent	CT GCMS-7	L410C	No method currently assigned	May-2011
	Mass Selective Detector	5975	US11163704	Agilent	CT GCMS-7	L410C		
	Automatic Sampler	MPS2		Gerstel	CT GCMS-7	L410C		
	Automatic Sampler	Controller 505	07411-01187	Gerstel	CT GCMS-7	L410C		
	Rough Pump	Duo 2.5	2159564	Pfeiffer	CT GCMS-7	L410C		
	Computer Monitor	LA 1954g	CNC106QOPG	HP	CT GCMS-7	L410C		
	Computer	EM 890A	2UA 1090857	HP/ Compaq	CT GCMS-7	L410C		
	Printer	LaserJet3015	JPBCBDK1F9	HP	CT GCMS-7	L410C		
CT LC/MSD-1	Infuser	100	17388	KD Scientific	CT LC/MSD-1	L425B	Medical Marijuana	<2004
	Degasser	1100 Series	JP4071704	Agilent	CT LC/MSD-1	L425B	FERN Method T022	
	Binary Pump	1100 Series	DE23912504	Agilent	CT LC/MSD-1	L425B		
	Automated Liquid Sampler	1100 Series	DE23921269	Agilent	CT LC/MSD-1	L425B		
	Column Compartment	1100 Series	DE23931252	Agilent	CT LC/MSD-1	L425B		
	Diode Array Detector	1100 Series	DE30517855	Agilent	CT LC/MSD-1	L425B		
	MSD Ion Trap	1100 Series	DE24505158	Agilent	CT LC/MSD-1	L425B		
	Rough Pump	E1M18	119475408	Edwards	CT LC/MSD-1	L425B		
	Computer Monitor	LA2205wg	3CQ0204PMF	HP Compaq	CT LC/MSD-1	L425B		
	Computer	HPZ400	2UA02907BT	HP Compaq	CT LC/MSD-1	L425B		
	Printer	LaserJet P2055dn	CNBJ502713	Hewlitt-Packard	CT LC/MSD-1	L425B		
	Nitrogen Generator	NitroFlowLabK727	US3868B100229	Parker	CT LC/MSD-1	L425B		

Appendix 17: Instrument Information for Chemical Terrorism Laboratory

Instrumentation	Components	Model	Serial Number	Manufacturer	Unique ID	Location	Analysis	Date Acquired
CT-LC/MS/MS-1	Nitrogen Generator	N100Dr	DR09-03-185A	Peak Scientific	CT-LC/MS/MS-1	L425B	HNPAA, MTP,	<2007
	Rough pump	HS602	2293601	Galilea TP	CT-LC/MS/MS-1	L425B	OPNA, Abrine/Ricinine	
	WPALS (autosampler)	G1367A	DE60405010	Agilent	CT-LC/MS/MS-1	L425B	in Urine	
	ALS/Therm	G1330B	DE13213404	Agilent	CT-LC/MS/MS-1	L425B		
	Degasser	G1379A	JP54427462	Agilent	CT-LC/MS/MS-1	L425B		
	Pump	G13676A	DE43601508	Agilent	CT-LC/MS/MS-1	L425B		
	Column Comp.	G1316A	DE43650195	Agilent	CT-LC/MS/MS-1	L425B		
	LC/MS/MS	API 4000	VO110720603	Applied Biosystems	CT-LC/MS/MS-1	L425B		
	Computer	Precision 370	4B39B71	Dell	CT-LC/MS/MS-1	L425B		
	Monitor	1905FP	CN-OT6116-71618-5C1-A535 Dell		CT-LC/MS/MS-1	L425B		
	Printer*	LJ4015x	CNDY936755	HP	CT-LC/MS/MS-1	L425B		
	*This is a networked printer							
Spectrofluorometer	Spectrofluorometer	RF-5301 PC	A40194001351	Shimadzu	CT-Fluorometer-1	L425	Histamine	<2004
	Computer	D850EMV2	3411588-001	MPC	CT-Fluorometer-1	L425		
	Monitor	E773s	MXOY135247605479BW82 Dell		CT-Fluorometer-1	L425		
	Printer	DeskJet 5550	MY29P1Q018	Hewlitt-Packard	CT-Fluorometer-1	L425		
FT/IR	FT-IR	FT-IR 480*Plus*	A010260850	Jasco	CT-FT/IR-1	L425	CT	<2004
	Computer	Dimension 2350	6FROB21	Dell	CT-FT/IR-1	L425		
	Monitor	CM700	CM700S023716	Micron	CT-FT/IR-1	L425		
	Printer	DeskJet 5550	MY2BCIKIWX	HP	CT-FT/IR-1	L425		
Travel IR	Travel IR HCl	Travel IR HCl	07040703A	SensIR	CT-FT/IR-2	L425	Screening	<2004
	Portable Power Pack	PUP110-315	165921	Xantrex	CT-FT/IR-2	L425		
	Laptop Computer	Lattitude C540/640	958C231	Dell	CT-FT/IR-2	L425		
UV-Vis Spectrometer	UV-Vis Spectrometer	Lambda 35	101N3052006	Perkin-Elmer	CT-UV/VIS-1	L425	CT	<2004
	Computer	Optiplex GX260	936TQ21	Dell	CT-UV/VIS-1	L425		
	Monitor	VCDTS23104-2M	241022654870	ViewSonic	CT-UV/VIS-1	L425		
	Printer	Hpdeskjet 5500	MY2CG1P03C	Hewlitt-Packard	CT-UV/VIS-1	L425		
Freezer	-70 Freezer	Ultima UXF	124646301121130	Revco	F425-7A	L425A	CT	Jan-2013
Freezer	-70 Freezer	Ultima Plus	0129984101110804	Revco	F425-8	L425	CT	<2011
Freezer	-20 Freezer	Ultima	X150107047XO	Revco	F425-6	L425	CT (Not in service)	<2004

Appendix 17: Instrument Information for Chemical Terrorism Laboratory

Instrumentation	Components	Model	Serial Number	Manufacturer	Unique ID	Location	Analysis	Date Acquired
Freezer	-20 Freezer	Ultima	X150107046XO	Revco	F425-5	L425	CT	<2004
Refrig./Freezer	Refrigerator/freezer, explosion proof	Isotemp	408N0048	Fisher	R415-1	L415	CT	<2004
Refrg./Freezer	Refrigerator/freezer, explosion proof	Isotemp	No visable S/N	Fisher	R425-1	L425	CT	<2004
Refrigerator	Whole Blood Refrigerator	REL3004A	W27R 1254495-XR	Thermo/Revco	R425A-1	L425A	CT	<2010
Refrg./Freezer	Refrigerator	55700-390	02044225	SAS		L410	CT	<2004
	Drying Oven	1350FM	202503	VWR	OV-3	L425	CT	<2004
Oven								<2004
Blender	Blender	34BL97	050331	Waring		L425	CT	<2004
Blender	Blender	34BL97	34BL97	Waring		L425	CT	<2004
Evaporator	TurboVapII		TV0521N12228	Caliper		L425	CT	<2004
	TurboVapII		TV0521N12222	Caliper		L425	CT	<2004
Evaporator	TurboVap LV		TV0643N13337	Caliper		L425	CT	<2004
Water Bath	Water Bath	Cat. # 51221080	603101936	Precision	CT-HB-1	L425	CT	<2004
	Water Bath	Cat. # 51221080	604041193	Precision			CT	<2004
Mixer	Mixer	M16715	1329040266043	Barnstead		L425	CT	<2004
Hot Plate/ Stirrer	Hot Plate/ Stirrer	220	665	VWR			CT	<2004
	Balance	SB16001	N26230110	Mettler	Bal-19	L425	CT	<2004
Analytical Balance	Balance	AX205	112293400	Mettler Toledo	Bal-15	L425	CT	<2004
	Balance	PR503	112030609	Mettler Toledo	Bal-6	L425	CT	<2004
Sonicator	Sonicator	250HT	09H54A156	VWR		L425	CT	<2004
Solid Phase Extraction System	Main Unit	215 SPE system	250H5J018	Gilson		L410C	CT	<2004
	Computer	Optiplex 280	BCNC981	Dell		L410C	CT	<2004
	Monitor	HP1530	CNK5050HX5	HP		L410C	CT	<2004
	Printer	LJ 4100	USLND28575	HP		L410C	CT	<2004
UV Lamp	UV Lamp	UVGL-58	No S/N	Eneta		L425	CT	<2004
Weighing Hood	Weighing Hood	3950300	070874631C	Labconco		L425	CT	<2004
Mixer	Mixer/grinder	Blixer	5270115203E-09	RoboCoupe		L425	MM	2012
Wrist Action Shaker	Shaker	Model 75	No S/N	Burrell		L425	MM	2012
Heat Block	Heater	FDB03DP	103377-20	Techne		L425	CT	<2004
Incubator	Incubtor	Model 1535	08034505	Shel-Labs		L425	CT	<2004
Scale	Scale	ES-100L	06712066BH	O-Haus		L425	CT	<2004
Water Polisher	Water Polisher	Gradient A-10	F4HN34346	Mill-Q		L425	CT	<2004
Microscope	Microscope	MZ16	10447050	Leica		L425	CT	<2004
Light module	Light module	LKL1500LCD	225769	Schott		L425	CT	<2004
Computer	Computer	Optiplex 260	DLV4L21	Dell		L425	CT	<2004
Monitor	Monitor	M782	MY-08G157-47603-323-BNW9	Dell		L425	CT	<2004

APPENDIX 17
INSTRUMENT INFORMATION
Inorganics

INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQUIRED
Ion Chromotography	Main Unit	LC20	95100433	Dionex	IC-1	L432	Hexchrom	Oct-02
	Autosampler	AS3500	115/0224	Dionex				
	Gradient Pump	GP40	95100378	Dionex				
	Condutivity Detector	CD20	95100094	Dionex				
	Absorbance Detector	AD20	95120231	Dionex				
Ion Chromotography	Main Unit/Detector Compartment	Dionex 5000	11030865	Dionex	IC-2		anions	May-11
	Autosampler	AS	11031046	Dionex			perchlorate	
	ICS 5000 eluent generator	ICS 5000	11040013	Dionex				
	Isocratic Pump	DP5000	11030640	Dionex				
	IC cube	ICS 5000-cube	11031183	Dionex				
	Condutivity Detector	ICS 5000-CD	10070629	Dionex				
	Condutivity Detector	ICS 5000-CD	11031217	Dionex				
Discrete Anayzer					DCA-1			
	Analyzer Console	SmartChem	WO209016	Westco Scientific, Inc.		L455		Dec-03
Flow Injection Analyzer					LA-2	L437	NO2/NO3	Jan-05
	Console	QuikChem 8500	50100000091	Hach/Lachat			Cl	
	Reagent Pump		A82000-1365	Hach/Lachat				
	Reagent Pump		A82000-1004	Hach/Lachat				
	Autosampler	ASX-410	A81010-1118	Hach/Lachat				
	Autosampler	ASX-500	A81010-883	Hach/Lachat				
Flow Injection Analyzer	Console	QuikChem 8500 series2	11030001316	Hach/Lachat	LA-3	L447	NH3/OP/CN	May-11
	Reagent Pump	RP150	203239-2	Hach/Lachat				
	Diluter	PDS-200	1104000583	Hach/Lachat				
	Autosampler	ASX-520	11040002069	Hach/Lachat				
Flow Injection Analyzer	Console	QuikChem 8500 series2	11030001315	Hach/Lachat	LA-4	L446	TKN/TP	May-11
	Reagent Pump	RP150	204207-1	Hach/Lachat				
	Diluter	PDS-200	1104000583	Hach/Lachat				
	Autosampler	ASX-520	11040002069	Hach/Lachat				
Flow Injection Analyzer					LA-1	L455	out of service	Oct-03
	Console	QuikChem 8000	A83000-2224	Hach/Lachat				
	Reagent Pump			Hach/Lachat				
	Autosampler	ASX-500	A89000-1246	Hach/Lachat				
TOC Analyzer					TOC-2	L462	TOC	1/1/2006

APPENDIX 17
INSTRUMENT INFORMATION
Inorganics

INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQUIRED
	Analyzer	Aurora 1030	C537730905	OI Analytical				
	Autosampler	1088AS	B5451788294	OI Analytical				
Midi Distillation Unit	Heating block	EasyDIst	asset # A94471	Westco Scientific		L441	CN	Feb-04
Midi Distillation Unit	Heating block	EasyDIst		Westco Scientific		L441	NH3	2/3/2004 ??
Sterliizer, Autoclave	autoclave	Bioclave 16L	E53032N16C1B010114	Benchmark Scientific	Bioclave-1	L461	TP	Mar-14
UV Vis Spectrphotometer	UV Vis Spectrphotometer	Lambda 35	502S11040404	Perkin Elmer	UV-3	L451	MBAS/COD	May-11
UV Vis Spectrphotometer	UV Vis Spectrphotometer	Lambda 35	101N307305	Perkin Elmer	UV-2	L455	CR+6/SO4	<2004
GFAAS System					PEAA600A	L440	EPA 200.9	
	GFAAS Spectrometer	Aanalyst 600	600S2050105	Perkin-Elmer				<2004
	Cooling System	Accessory	319S6081403	Perkin-Elmer				<2004
	Computer/CPU	Optiplex GX150	C9W1L61	Dell				<2004
	Monitor	VCDTS23104-2M	241020451552	Viewsonic				<2004
	Deskjet Printer	HP Desk Jet 5550	MY2BC1K1XB	Hewlett-Packard				<2004
GFAAS System					PEAA600B	L440	EPA 200.9	
	GFAAS Spectrometer	Aanalyst 600	600S3080301	Perkin-Elmer				Jan-2004
	Cooling System	Accessory	3195S3051905	Perkin-Elmer				Jan-2004
	Computer/CPU	Optiplex GX260	D88F831	Dell				Jan-2004
	Monitor	VLCDS23719-1W	A14032200298	Viewsonic				Jan-2004
	Deskjet Printer	HP Desk Jet 825	CN16C1Q1W1	Hewlett-Packard				Jan-2004
Mercury CVAAS System					HGPS200II	L435	EPA 245.2	
	Hg CVAAS Analyzer	PS200 II	122-300-31-1	Leeman				Aug-01
	Hg CVAAS Prep Station	AP200 II	122-300-34-1	Leeman				Apr-01
	Computer/CPU	L667R	1B5B001	Dell				<2004
	Monitor	M770	MX01780R47801	Dell				<2004
	Deskjet Printer	Laser Jet 4	JPBK051318	Dell				<2004

APPENDIX 17
INSTRUMENT INFORMATION
Inorganics

INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQUIRED
ICP/MS System					ICPMS (1)	L445	CDC Urine Metals	
							CDC Blood Metals	
	ICP/MS Analyzer	ELAN DRCII	Z0920406	Perkin-Elmer				Oct-2004
	Autosampler	SC4 DX Fast	X4NSHS-TSP16-120705	ESI				Dec-2012
	Recirculator	1171PD	10730012	Polyscience				Oct-2004
	Computer/CPU	Optiplex GX270	DVOCY41	Dell				Oct-2004
	Monitor	VG710s	A2W042102508	Viewsonic				Oct-2004
	Laserjet Printer	HP 4200	US6N541641	Hewlett-Packard				Oct-2004
	Alternate Autosampler	AS93 Plus	93384061605	Perkin-Elmer				Oct-2004
	Alternate Chiller	N0772046	1C1282089	Perkin-Elmer				Dec-2012
ICP/MS System					ICPMS (2)	L445	Medicnial Marijuana	
	ICP/MS Analyzer	ELAN DRCII	Q0470204	Perkin-Elmer			Low level testing DRC	May-02
	Auto-Sampler	AS93Plus	NA	Perkin-Elmer				May-02
	Recirculator	C105PE	G12808	Polyscience				May-02
	Computer	Optiplex GX28	HKCZV61	Dell				May-02
	Monitor	M993S	MYOX3578476003	Dell				May-02
	Laserjet Printer	HP2430N	C96KK9957	HP				May-02
ICP/MS System					ICPMS (3)	L445	EPA 200.8 / Speciation	
	ICP/MS Analyzer	Nexion	81DN1042601	Perkin-Elmer				Jul-11
	Auto-Sampler	AS-93	N/A	Perkin-Elmer				Jul-11
	Chiller	208V	1B1130920	Polyscience				Jul-11
	Computer	ThinkCentre	1S6138AR7MJEAAC9	Lenovo				Jul-11
	Monitor	ThinkVision	GA24WCBNS	Lenovo				Jul-11
	HPLC		Boxed	Perkin-Elmer				Jul-11
ICP System					PEICP7300	L440	EPA 200.7	Jul-11
	ICP Analyzer	Optima 7300DV	077C1032201	Perkin-Elmer				Jul-11
	Auto-Sampler	S10		Perkin-Elmer				Jul-11
	Chiller	110V	1B1131045	Polyscience				Jul-11
	Computer							Jul-11
	Monitor							Jul-11
Mercury CVAA System					HYDRA II AA	L435	EPA 245.1	
	Mercury Analyzer	Leeman Hydra II AA	1041	Leeman Labs				Jul-11

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INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQUIRED
	Computer	Optiplex 380	BG4MGQ1	Dell				Jul-11
	Monitor	Dell	CNOUO72N6418013AOQJL	Dell				Jul-11
	Printer	Phaser 4500	JEA-2	Xerox				Jul-11
Mercury Combustion System					HYDRA II C	L435		
	Mercury Analyzer	Leeman Hydra II C	6411	Leeman Labs				Jul-11
Dissolved Oxygen Meter	Dissolved Oxygen Meter	YSI 5100	05A1067AF	YSI	DO-1	L462	SM5210B	Jul-11
Dissolved Oxygen Meter	Dissolved Oxygen Meter	YSI 5100	12B100140	YSI	DO-2	L462	SM5210B	Jul-11
			CDC					
INSTRUMENTATION	**COMPONENTS**	**MODEL**	**SERIAL NUMBERS**	**MANUFACTURER**	**UNIQUE ID**	**LOCATION**	**ANALYSES**	**DATE ACQUIRED**
ICP/MS System					ICPMS (1)	L445	CDC Urine Metals	
	ICP/MS Analyzer	ELAN DRCII	Z0920406	Perkin-Elmer			CDC Blood Metals	Oct-2004
	Autosampler	SC4 DX Fast	X4NSHS-TSP16-120705	ESI				Dec-2012
	Recirculator	1171PD	10730012	Polyscience				Oct-2004
	Computer/CPU	Optiplex GX270	DVOCY41	Dell				Oct-2004
	Monitor	VG710s	A2W042102508	Viewsonic				Oct-2004
	Laserjet Printer	HP 4200	US6N541641	Hewlett-Packard				Oct-2004
Auto-Sampler	Alternate Autosampler	AS93 Plus	93384061605	Perkin-Elmer				Oct-2004
	Alternate Chiller	N0772046	1C1282089	Perkin-Elmer				Dec-2012

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INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQ.
GC/MS System	Gas Chromatograph	6890	US00040573	Agilent	GCMS524C	L480	EPA 524.2	<2004
	Mass Selective Detector	5973	US10440759	Agilent				<2004
	Sample Concentrator	3100	99256008	Tekmar				<2004
	Autosampler	Aquatek-70	99195003	Tekmar				<2004
	PC	Optiplex GX110	G2KC201	Dell				<2004
	Monitor	Dell	MYOX37824760347GBYYD	Hewlett-Packard				<2004
	Laserjet Printer	HP 4050	USBB401292	Hewlett-Packard				<2004
	Ion Gauge Controller	59864B	US6016329	Agilent				<2004
	Vacuum Pump	Edwards 1.5	27220253	Edwards				<2004
GC/MS System	Gas Chromatograph	6890N	US10210075	Agilent	GCMS624B	L480	EPA 624	<2004
	Mass Selective Detector	5973	US10442483	Agilent				<2004
	Sample Concentrator	3100	US02198004	Tekmar				<2004
	Autosampler	Aquatek-70	US02198001	Tekmar				<2004
	PC	Vectra VL800DT	US14704808	Hewlett-Packard				<2004
	Monitor	Dell	MWOY135247605479BW80	Hewlett-Packard				<2004
	Laserjet Printer	4100	USJND01811	Hewlett-Packard				<2004
	Ion Gauge Controller	59864B	US6016038	Agilent				<2004
	Vacuum Pump	Edwards 1.5	SN109429446	Edwards				<2004
	UPS	SG3K-2TX	1012038008	Falcon				5/1/2011
GC/MS System	Gas Chromatograph	6890	US00040583	Agilent	GCMS524D	L480	EPA 524.2 or	<2004
"Not In Use"	Mass Selective Detector	5973	US03940739	Agilent			624	<2004
	Sample Concentrator	3100	US02198005	Tekmar				<2004
	Autosampler	Aquatek-70	US02198001	Tekmar				<2004

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INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQ.
	PC	Optiplex GX110	2BS9K01	Dell				<2004
	Monitor	HP-91	MY04N73647603341PBH95	Hewlett-Packard				<2004
	Laserjet Printer	4050	USBG008851	Hewlett-Packard				<2004
	Ion Gauge Controller	59864B	US6016336	Agilent				<2004
	Vacuum Pump	Edwards 1.5	SN006805000	Edwards				<2004
	Autosampler	Aquatek-70	US02179004	Tekmar	SPARE	L480	EPA 524.2 or	<2004
							624	
GC/MS System	Gas Chromatograph	7890A	CN11171122	Agilent	GCMS524A	L480	EPA 524.2	5/1/2011
	Mass Selective Detector	5975C	US11164606	Agilent				5/1/2011
	Sample Concentrator	14-9800-100	US11095001	Teledyne-Tekmar				5/1/2011
	Autosampler	15-0500-000	US11118001	Teledyne-Tekmar				5/1/2011
	PC	HP Compaq 8000	2UA1100SLL	Hewlett-Packard				5/1/2011
	Monitor	HP Compaq LA1951	CNC108P8C9	Hewlett-Packard				5/1/2011
	Laserjet Printer	HP P3015	VNBCBD639C	Hewlett-Packard				5/1/2011
	Circulator	2050-1	050211-2050-1-299	Caron				5/1/2011
	UPS	SG3K-2TX	1010044002	Falcon				5/1/2011
	Vacuum Pump	DUO 2.5	21549021	Pfeiffer				5/1/2011
GC/MS System	Gas Chromatograph	7890A	CN11171123	Agilent	GCMS524B	L480	EPA 524.2	5/1/2011
	Mass Selective Detector	5975C	US11174602	Agilent				5/1/2011
	Sample Concentrator	14-9800-100	US11118002	Teledyne-Tekmar				5/1/2011
	Autosampler	15-0500-000	US11108007	Teledyne-Tekmar				5/1/2011
	PC	HP Compaq 8000	2UA1100SL6	Hewlett-Packard				5/1/2011
	Monitor	HP Compaq LA1951	CNC108PBCP	Hewlett-Packard				5/1/2011

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INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQ.
	Laserjet Printer	HP P3015	VNBCC171FZ	Hewlett-Packard				5/1/2011
	Circulator	2050-1	022211-2050-1-275	Caron				5/1/2011
	UPS	SG3K-2TX	1010044010	Falcon				5/1/2011
	Vacuum Pump	DUO 2.5	21549038	Pfeiffer				5/1/2011
GC/MS System	Gas Chromatograph	7890A	CN11181006	Agilent	GCMS624A	L480	EPA 624	5/1/2011
	Mass Selective Detector	5975C	US11164605	Agilent				5/1/2011
	Sample Concentrator	14-9800-100	US11095002	Teledyne-Tekmar				5/1/2011
	Autosampler	15-0500-000	US11125006	Teledyne-Tekmar				5/1/2011
	PC	HP Compaq 8000	2UA1131N1K	Hewlett-Packard				5/1/2011
	Monitor	HP Compaq LA1951	CNC109Q13C	Hewlett-Packard				5/1/2011
	Laserjet Printer	HP P3015	VNBCC171FS	Hewlett-Packard				5/1/2011
	Circulator	2050-1	032311-2050-1-286	Caron				5/1/2011
	UPS	SG3K-2TX	1010044006	Falcon				5/1/2011
	Vacuum Pump	DUO 2.5	21544316	Pfeiffer				5/1/2011
Water Filtration		Nanopure 7148	287026-44	Barnstead	Organic	L480	Organics	5/1/2011
					WS1			
Explosion Proof	Refrigerator/Freezer	EL11SCRSW00	S74525770	Whirlpool	F-480-2	L480	Organics	<2004
Refrigerator	Crisper							
Freezer		3556-4	168106401110304	Thermo Scientific	F-480-1	L480	Organics	5/1/2011
Double Door		TS-49	7081795	Labrepco	R-480-1	L480	Organics	5/1/2011
Refrigerator								

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INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQ.
Drying Oven		Iso Temp 700	275822-53	Fisher Scientific	O-480-1	L480	Organics	5/1/2011
Ultrasonic Cleaner		3200	B3200R-3	Branson	39597	L480	Organics	<2004
HPLC System 1	Degasser	G1322A 1100 Series	JP73016523	Agilent	HPLC531B	L481	EPA 531.1	<2004
	QuatPump	G1311A 1100 Series	DE91608743	Agilent				<2004
	Autosampler	G1313A 1100 Series	DE91610687	Agilent				<2004
	ColCom	G1316A 1100 Series	DE91612870	Agilent				<2004
	Fluorescence Detector	G1312A 1100 Series	DE92001741	Agilent				<2004
	Post Col. Derv. Unit	PCX 5200	400203	Pickering				<2004
	PC	HP Compaq 8000	2UA1131NOW	Hewlett-Packard				5/1/2011
	Monitor	HP Compaq LA1951	CNC110PZMS	Hewlett-Packard				5/1/2011
	Laserjet Printer	HP P3015	VNBCC361VH	Hewlett-Packard				5/1/2011
HPLC System 2	Degasser	G1322A 1260 Infinit	JP02679193	Agilent	HPLC531A	L481	EPA 531.1	5/1/2011
	BinPump	G1312B 1260 Infinit	DEABM01466	Agilent				5/1/2011
	Autosampler	G1329B 1260 Infinit	DEABE04480	Agilent				5/1/2011
	TCC	G1316A 1260 Infinit	DEAAK05367	Agilent				5/1/2011
	Fluorescence Detector	G1321B 1260 Infinit	DEABO00684	Agilent				5/1/2011
	Post Col. Derv. Unit	PCX 5200	400203	Pickering				<2004
	PC	HP Compaq 8000	2UA1131NOW	Hewlett-Packard				5/1/2011
	Monitor	HP Compaq LA1951	CNC110PZMS	Hewlett-Packard				5/1/2011
	Laserjet Printer	HP P3015	VNBCC361VH	Hewlett-Packard				5/1/2011

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INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQ.
Balance		7124 (Series 7000)	4474	Fisher	BAL11	L472	Organics	<2004
Hotplate/ Stirrer		33918-262	4608	VWR 375		L472	Organics	<2004
Refrigerator		13-988-426R-4	75025707	Fisher Scientific	CC02162	L470B	Organics	<2004
Refrigerator	Refrigerator/Freezer	RCRF-25A14	X16T-180275-XT	Thermo Scientific	R-470-2	L470B	Organics	5/1/2011
					F-470-2			
Refrigerator	Refrigerator/Freezer	RCRF-25A14	P11N-681325-PN	Thermo Scientific	R-470-1	L470B	Organics	5/1/2011
					F-470-1			
Ultrasonic Cleaner		3200	B3200R-4	Branson	CC02090	L470B	Organics	<2004
Ultrasonic Cleaner		Bransonic 12	C02660	Branson		L470B	Organics	<2004
Drying Oven		1320	1320188	VWR	OV-5	L470B	Organics	<2004
Vortex Mixer		945300 (Analog)	110311002	VWR		L470B	Organics	<2004
Vortex Mixer		G-560 (Genie 2)	2-202619	VWR	CC02092	L470B	Organics	<2004
Roto-rack		Fisher	1110	Fisher	CC02093	L470B	Organics	<2004

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INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQ.
Turbo Vap II		46370/A	TV9647N7200	Zymark	CC02086	L465	Organics	<2004
Turbo Vap II		46368/O	TV0138N10500	Zymark	A94462	L465	Organics	<2004
Turbo Vap II		46368/A	TV9505N5996	Zymark	CC02079	L465	Organics	<2004
Nitrogen Blow-down		N-EVAP 112	3139	Organomation		L465	Organics	<2004
Water Filtration		11951 Nanopure Diamond	1195010000000	Barnstead	Organic WS2	L465	Organics	<2004
Turbo Vap II		103189/05	TV1113N16455	Biotage		L465	Organics	5/1/2011
Turbo Vap II		103187/05	TV1116N16515	Biotage		L465	Organics	5/1/2011
Turbo Vap II		103187/05	TV1115N16490	Biotage		L465	Organics	5/1/2011
Refrigerator		3566-10A	168394801110603	Thermo Scientific	R-465-1	L465	Organics	5/1/2011
Drying Oven		6926	275821-52	Fisher Scientific	O-465-1	L465	Organics	5/1/2011
Heat Treatment Oven		F30428C	152826601110317	Thermo Scientific	O-465-2	L465	Organics	5/1/2011
Balance		1518	3501071	Sartorius	BAL-9	L465	Organics	<2004

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INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQ.
Vortex Mixer		945300 (Analog)	110311029	VWR		L465	Organics	<2004
Vortex Mixer		12-812 (Genie)	25805	VWR	CC02080	L465	Organics	<2004
Stirrer		PC-310	LR33481	Corning	CC02107	L465	Organics	<2004
Magnetic Stirrer		14-511-2		Fisher Scientific		L465	Organics	<2004
Hotplate/ Stirrer		PC-620D	133811032256	Corning		L465	Organics	5/1/2011
Hotplate/ Stirrer		PC-620D	133811032049	Corning		L465	Organics	5/1/2011
Hotplate		Type 1900	HP-A1915B	Sybron/Thermolyne	CC02078	L465	Organics	<2004
Triple Beam Balance		2610 700 Series		Ohaus		L465	Organics	<2004
Triple Beam Balance		2610 800 Series		Ohaus	26094	L465	Organics	<2004
Refrigerator		3566-10A	168394701110603	Thermo Scientific	L476 Ref2	L476	Organics	5/1/2011
Refrigerator		3566-10A	168390601110602	Thermo Scientific	L476 Ref1	L476	Organics	5/1/2011

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INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQ.
Freezer		3556-4	119808601101116	Thermo Scientific	F-470-3	L470A	Organics	5/1/2011
Gas Leak		21-150	2907037	Gow-Mac Instruments	30955	L470A	Organics	<2004
Detector								
GC System	Gas Chromatograph	7890A	CN11171098	Agilent	GC504A	L470A	EPA 504.1	5/1/2011
	Autosampler	7693	CN11120091	Agilent				5/1/2011
	Tower 1 (Injector)	G4513A	CN11130211	Agilent				5/1/2011
	Tower 2 (Injector)	G4513A	CN11130229	Agilent				5/1/2011
	PC	HP Compaq 8000	2UA1100SL	Hewlett-Packard				5/1/2011
	Monitor	HP Compaq LA1951	CNC109Q13G	Hewlett-Packard				5/1/2011
	Laserjet Printer	HP P3015	VNBCC361VR	Hewlett-Packard				5/1/2011
GC System	Gas Chromatograph	7890A	CN11171099	Agilent	GC608A	L470A	EPA 608	5/1/2011
	Autosampler	7693	CN11120086	Agilent				5/1/2011
	Tower 1 (Injector)	G4513A	CN11140006	Agilent				5/1/2011
	Tower 2 (Injector)	G4513A	CN11130220	Agilent				5/1/2011
	PC	HP Compaq 8000	2UA1100SLF	Hewlett-Packard				5/1/2011
	Monitor	HP Compaq LA1951	CN109Q0NP	Hewlett-Packard				5/1/2011
	Laserjet Printer	HP P3015	VNBCBD639J	Hewlett-Packard				5/1/2011
GC/MS System	Gas Chromatograph	7890A	CN11181005	Agilent	GCMS625A	L470A	EPA 625	5/1/2011
	Mass Selective Detector	5975C	US11154601	Agilent				5/1/2011
	Autosampler	7693	CN11100033	Agilent				5/1/2011
	Tower (Injector)	G4513A	CN1130239	Agilent				5/1/2011

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INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQ.
	PC	HP Compaq 8000	2UA1131N1Q	Hewlett-Packard				5/1/2011
	Monitor	HP Compaq LA1951	CNC109Q0P5	Hewlett-Packard				5/1/2011
	Laserjet Printer	HP P3015	VNBCBD638L	Hewlett-Packard				5/1/2011
	UPS	SG3K-2TX	1012038007	Falcon				5/1/2011
	Vacuum Pump	DUO 2.5	21545597	Pfeiffer				5/1/2011
GC System	Gas Chromatograph	6890N	US10308061	Agilent	CC02211	L470A	EPA 507	<2004
"Not in Use"	PC	HP Compaq dc7800	2UA8291FCQ	Hewlett-Packard	E05038			<2004
	Laserjet Printer	HP 4000	USMC067381	Hewlett-Packard	A82051			<2004
HP Controller		G1512A	US82105808	Hewlett-Packard		L470A	Organics	<2004
GC System	Gas Chromatograph	6890	US00024023	Agilent	GCMS625B	L470A	EPA 625	<2004
	Mass Selective Detector	5973	US82321832	Agilent				<2004
	Autosampler	18596C	US84104847	Agilent				<2004
	Tower (Injector)	G1513A	US83908110	Agilent				<2004
	PC	Optiplex GX620	1G23J91	Dell				<2004
	Monitor	Dell	MYOX378247603556FY32	Hewlett-Packard				<2004
	Laserjet Printer	4000	USEK076690	Hewlett-Packard				<2004
	Vacuum Pump	Edwards 1.5	764003281	Edwards				<2004
GC/MS System	Gas Chromatograph	6890N	US10210073	Agilent	GCMS525LLA	L470A	EPA 525.2	<2004
							LL/SIM	
	Mass Selective Detector	5973N	US10442487	Agilent				<2004
	Autosampler	7683	US20714395	Agilent				<2004

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INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQ.
	Tower (Injector)	G2614A	US91606772	Agilent				<2004
	PC	HP Compaq dc5100	MXL6190F50	Hewlett-Packard				<2004
	Monitor	Dell	MYO3758476034CHBWA5	Hewlett-Packard				<2004
	Laserjet Printer	4100	USJNH28872	Hewlett-Packard				<2004
	Vacuum Pump	Edwards 1.5	37835527	Edwards				<2004
	UPS	SG3K-2TX	1010044009	Falcon				5/1/2011
	Ion Gauge Controller	59864B	US6016045	Agilent				<2004
	Universal Peltier Cooling	4005	7820	Gerstel				<2004
	Controller	506	119460	Gerstel				<2004
Tower (Injector)		7683	CN30529389	Agilent		L470A	Organics	<2004
Tower (Injector)		7683	30529400	Agilent		L470A	Organics	<2004
Tower (Injector)		6890	3428A39269	Agilent		L470A	Organics	<2004
Tower (Injector)		6890	CN20221760	Agilent		L470A	Organics	<2004
Tower (Injector)		6890	US91009368	Agilent		L470A	Organics	<2004
GC System	Gas Chromatograph	7890A	CN11171097	Agilent	GC505A	L470A	EPA 505	5/1/2011
	Autosampler	7693	CN11120092	Agilent				5/1/2011
	Tower 1 (Injector)	G4513A	CN11130209	Agilent				5/1/2011
	Tower 2 (Injector)	G4513A	CN11130228	Agilent				5/1/2011
	PC	HP Compaq 8000	2UA10908SL	Hewlett-Packard				5/1/2011
	Monitor	HP Compaq LA1951	CNC109Q0PP	Hewlett-Packard				5/1/2011
	Laserjet Printer	HP P3015	VNBCC361VX	Hewlett-Packard				5/1/2011

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INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQ.
GC/MS System	Gas Chromatograph	6890	US00027797	Agilent	GCMS525C	L470A	EPA 525.2	<2004
"Back-up"	Mass Selective Detector	5973	US82330425	Agilent				<2004
	Autosampler	G2614A	US91204663	Agilent				<2004
	Tower (Injector)	G2613A	CN15223783	Agilent				<2004
	PC	HP Compaq dc5100	MXL6190FCT	Hewlett-Packard				<2004
	Monitor	HP 1745	CNK81902K7	Hewlett-Packard				<2004
	Laserjet Printer	4100	USJNF21780	Hewlett-Packard				<2004
Tower (Injector)		6890	CN20221734	Agilent		L470A	Organics	<2004
Vortex Mixer		945300 (Analog)	110310051	VWR		L470A	Organics	<2004
GC System	Gas Chromatograph	7890A	CN11171100	Agilent	GC515A	L470A	EPA 515	5/1/2011
	Autosampler	7693	CN11120095	Agilent				5/1/2011
	Tower 1 (Injector)	G4513A	CN11130204	Agilent				5/1/2011
	Tower 2 (Injector)	G4513A	CN11130231	Agilent				5/1/2011
	PC	HP Compaq 8000	2UA10908SK	Hewlett-Packard				5/1/2011
	Monitor	HP Compaq LA1951	CNC109Q0PH	Hewlett-Packard				5/1/2011
	Laserjet Printer	HP P3015	VNBCC171G0	Hewlett-Packard				5/1/2011
GC/MS System	Gas Chromatograph	7890A	CN11181003	Agilent	GCMS525A	L470A	EPA 525.2	5/1/2011
	Mass Selective Detector	5975C	US11164601	Agilent				5/1/2011
	Autosampler	7693	CN11100039	Agilent				5/1/2011
	Tower (Injector)	G4513A	CN11140010	Agilent				5/1/2011

APPENDIX 17
INSTRUMENT INFORMATION
ORGANICS

INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQ.
	PC	HP Compaq 8000	2UA114080X	Hewlett-Packard				5/1/2011
	Monitor	HP Compaq LA1951	CNC109Q0P1	Hewlett-Packard				5/1/2011
	Laserjet Printer	HP P3015	VNBCC4L1GQ	Hewlett-Packard				5/1/2011
	Vacuum Pump	DUO 2.5	21545610	Pfeiffer				5/1/2011
	UPS	SG3K-2TX	1012038006	Falcon				5/1/2011
GC System	Gas Chromatograph	7890A	CN11171104	Agilent	GC507A	L470A	EPA 507	5/1/2011
	Autosampler	7693	CN11120077	Agilent				5/1/2011
	Tower 1 (Injector)	G4513A	CN11130215	Agilent				5/1/2011
	Tower 2 (Injector)	G4513A	CN11130210	Agilent				5/1/2011
	PC	HP Compaq 8000	2UA1100SL9	Hewlett-Packard				5/1/2011
	Monitor	HP Compaq LA1951	CNC110PZTB	Hewlett-Packard				5/1/2011
	Laserjet Printer	HP P3015	VNBCC361VL	Hewlett-Packard				5/1/2011

APPENDIX 17
INSTRUMENT INFORMATION
RADS

INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQ.
Alpha/Beta Counter								
	Alpha/Beta Proportional Counter	S5XLB	400557	Tennelec/Canberra	5XLB	L-180	Gross Alpha/Beta	2008
	PC	d220 MT	DS942A#ABA	HP/COMPAQ				2008
	Monitor	HPL1706	CNC706NT6F	Hewlett-Packard				2010
	Deskjet Printer	HP895cXI	CN0BC1N0YF	Hewlett-Packard				<2000
Alpha/Beta Counter					LB4100 RED	L-180	Radium226	
	Detector	LB41W-FP-421	76812	Tennelec/Canberra			Radium228	2001
	Controller	LB4110	183	Tennelec/Canberra			Sr 89/90	2001
	Controller	LB4110	176	Tennelec/Canberra				2001
	PC	5008MT	MXL0421TDX	Hewlett-Packard				2011
	Deskjet Printer	6940	MY06ACK0TY	Hewlett-Packard				2011
	Monitor	S1993	CNC038Q72G	Hewlett-Packard				2011
					LB4100 BLUE			
	Detector	LB41W-FP-4211	84890	Tennelec/Canberra			Radium 228	2011
	Controller	LB4110	199	Tennelec/Canberra	A & B		Gross alpha/beta	2008
	Controller	LB4110	298	Tennelec/Canberra	C & D		Sr 89/90	2011
Liquid Scintillation Counter					LSC 2900TR	L-180	Tritium	
	LS Counting System	TriCarb2900TR/A290000	424709	Hewlett-Packard			Radon222	2000
	Monitor	OptiQuestVCDTS215695M	AQ01303637	OptiQuest				2000
	Stylus Printer	P950A	A5PY956150	Epson				2000
Gamma Spectroscopy					Genie-VMS	L-180	Gamma Emitters	
	Detector LN2 Monitor	1786	10884666	Canberra			Radium224	1997
	Detector LN2 Monitor	1786	12884765	Canberra			Iodine131	1997
	Detector LN2 Monitor	1786	12884765	Canberra			Radium226	1997
	Detector LN2 Monitor	1786A	5995052	Canberra			Radium228	1997
	Detector LN2 Monitor	1786A	6995596	Canberra				1997
	NIM BIN/Power Supply	2000	4031761	Canberra				1997
	NIM BIN/Power Supply	2000	6032399	Canberra				1997
	Germanium Preamplifier	2001	4864334	Canberra				1997
	Germanium Preamplifier	2001	677655	Canberra				1997
	Germanium Preamplifier	2001	6833057	Canberra				1997
	AFT Research Amplifier	2025	12934367	Canberra				1997
	AFT Research Amplifier	2025	12934363	Canberra				1997
	AFT Research Amplifier	2025	12934365	Canberra				1997

APPENDIX 17
INSTRUMENT INFORMATION
RADS

INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQ.
	AFT Research Amplifier	2025	89026	Canberra				1997
	NIM BIN/Power Supply	2100-1	9974164	Canberra				1997
	NIM BIN/Power Supply	2100-1	6972009	Canberra				1997
	NIM BIN/Power Supply	2100-1	3955540	Canberra				1997
	0-6 KV H.V. Power Supply	3106D	5948405	Canberra				1997
	0-6 KV H.V. Power Supply	3106D	5948402	Canberra				1997
	0-6 KV H.V. Power Supply	3106D	5948659	Canberra				1997
	System Power Panel	5005		Canberra				1997
	100 MHZ ADC,8192 Channel	8075	1083671	Canberra				1997
	100 MHZ ADC,8192 Channel	8075	182105	Canberra				1997
	DECXM Thinwire Ethernet TR. Box	861683		Canberra				1997
	556 Ethernet Acq. Intf. Mod. Aim	880763	9973760	Canberra				1997
	557 Ethernet Acq. Intf. Mod. Aim	880763	9973761	Canberra				1997
	558 Ethernet Acq. Intf. Mod. Aim	880763	9973758	Canberra				1997
	ICB 6 Usec Adc, 16K Channel	9633	8996717	Canberra				1997
	ICB 6 Usec Adc, 16K Channel	9633	8996718	Canberra				1997
	ICB 6KV High Voltage Power Sup.	9645	8996894	Canberra				1997
	Digital Spectrum Analyzer	DSA2000A	4031761	Canberra				1997
	Digital Spectrum Analyzer	DSA2000A	6032399	Canberra				1997
	Genie-ESP Alpha Station 500/266	M11343		Canberra				1997
	DEC 2 Port Print Server	862313		Canberra				1997
	1.05GB SCSI Disk	862408		Canberra				1997
	9-Pin Serial to MMJ Adapter	862487		Canberra				1997
	1.44MB Internal Floppy Drive	AS255	862528	Canberra				1997
	17" Color X:Term	TXD7F35R	JPB7441866	Tektronix				1997
	X: Term DEC Optimization Kit	862541		Canberra				1997
	X: Term DEC LK401 Keyboard	862542		Canberra				1997
	32MB Memory Expansion	AS255	630612	Canberra				1997
	X: Term 8MB Memory Expansion	630616		Canberra				1997
	X: Term 4MB Flash Memory	630617		Canberra				1997
	HP Laserjet Printer	6MP (C3982A)	USCB022632	Hewlett-Packard				1997
	Monitor	VRT17-WA	5A64403826	Digital				1997
	7500S Coaxial Detector	7229N	382504	Canberra				1997
	HPGE Detector	N1GC1320	PGT2115	Canberra				1997
	HPGE Detector	N1GC1320	PGT2117	Canberra				1997
	7229P-1319 Ge Coaxial Detector	GC1319	2861531	Canberra				1997
	Germanium Coaxial Detector	GC1319	6037671	Canberra				1997
	Germanium Coaxial Detector	GC4019	6037675	Canberra				1997
	Germanium Coaxial Detector	GC4018	10275	Canberra				2011

APPENDIX 17
INSTRUMENT INFORMATION
RADS

INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQ.
	Germanium Coaxial Detector	GC4018	10278	Canberra				2011
	MCA-based Digital Signal Processor	LYNX-MCA	130000364	Canberra				2011
	MCA-based Digital Signal Processor	LYNX-MCA	13000065	Canberra				2011
Alpha Spectroscopy					QUAD-Alpha	L-180	Isotopic-U	
	NIM/BIN Power Supply	2100	4994628	Canberra			Po-210	1985
	Preamp/Amplifier	7404-01	11841931	Canberra			Th-230	1985
	Acq. Interface Module	556A	8996934	Canberra			Pu-239	1985
	QUAD Alpha Spectrometer	7404VR	11841931	Canberra			Am-241	1985
	8-Input Analog AMX	8224	7995794	Canberra				1985
	ICB 6 USEC ADC, 16K Channel	9633	8996721	Canberra				1985
	PIPS Detector	A-450-18-AM	23301	Canberra				1985
	PIPS Detector	A-450-18-AM	23302	Canberra				
	PIPS Detector	A-450-20-AM	12225	Canberra				
	PIPS Detector	A-450-20-AM	12226	Canberra				
	Vacuum Pump	1402B-01	EF071506	Welch				
Balance, top loading		Sb16001	1121493698	Mettler Toledo	BAL-22	L-185A		1993
Analytical balance		AE 260	P32823	Mettler Toledo	BAL-21	L-185A		1993
Balance, top loading		SB16001	112412036	Mettler Toledo	BAL-24	L-185		2004
Analytical balance		AE 160	73740	Mettler Toledo	BAL-20	L-185		1990
Oven		1370GM	9164604	Sheldon Manufacturing		L-185A		2011
Glove Box		5220200	110339143C	Labconco		L-185A		2011
Water Bath		2839	247311-614	Thermo Scientific		L-185A		2011
Centrifuge		Megafuge 40	41191729	Thermo Scientific		L-185A		2011
Sonicator		3510R-MT	RMA110410386E	Branson		L-185		2002
Centrifuge (Floor)		K	71654795	Thermo Scientific		L-185		2005
Centrifuge		Megafuge 40	41191728	Thermo Scientific		L-185		2011
Ice Maker		F-300BAF	Q02728C	Hoshizaki		L-185		2008

APPENDIX 17
INSTRUMENT INFORMATION
RADS

INSTRUMENTATION	COMPONENTS	MODEL	SERIAL NUMBERS	MANUFACTURER	UNIQUE ID	LOCATION	ANALYSES	DATE ACQ.
Muffle Furnace		CBFL518C	S13Z-514210-SZ	Cole-Parmer	EW-33858-80	L-185A		2014
Nanopure		7148	287026-45	Thermo Scientific		L-185		2011

New Jersey Department of Health and Senior Services
Division of Public Health and Environmental Laboratories

SUPPLY ORDER

Emergency Order (Y) ___ (N) __x_

From *(Program/Individual)*	Cost Center	Date
ECLS / Shawn O'Leary	317	1/9/12
Deliver To *(Name and Room Number)* Shawn O'Leary L-440		

Quantity	Stock Number	Activity Code	Item Name/Description	Location	Amount Distributed
1	5047	3492	Filter Paper #903	L-440	case

Phone Number
609-530-2076

Approval Officer

FOR WAREHOUSE USE ONLY

Date Completed	Completed By	Date/Time Delivered
Received By		Date

Internal LAB-22 Copy to: Accounting/Procurement • Warehouse • Program Revised 4/2/08

ATTACHMENT 1

Division of Public Health and Environmental Labora

PURCHASE AND EXPENDITURE REQUEST

ATTACHMENT 2

PO # _____

Catalog number: _____

ernal Tracking No.: _____

Contract No.: _____

Requested By	Unit Name	Unit No.	Telephone No.	Date of Request

ACCOUNTING DISTRIBUTION

State Fiscal Year: Budget Fiscal Year:

FUND	AGENCY	ORG CODE	APPR UNIT	ACT CODE	OBJ CODE	REPT CAT
100	046			J001		
100	046			J001		
100	046			J001		

Fiscal Section Action:
☐Funds Available ☐Funds Not Available

TOTAL:

Signature | Date

APPROVALS

	Approved	Disapproved	Signature	Date
☐ Unit Manager	☐	☐		
☐ IT Manager	☐	☐		
☐ Service Director	☐	☐		
☐ Fiscal Section Supv.	☐	☐		
☐ Laboratory Director	☐	☐		

VENDOR INFORMATION

Vendor Name and Address

Vendor ID Number

x☐ **Sole Source (No Substitution)**
Attach detailed justification.
Telephone Quotes required $1,001 to $17,500.

Ship to:
☐S010 H&A Bldg, Room #: _____
X☐S018 PHEAL

INFORMATION ON ITEMS TO BE ORDERED

Item # 1.
*Comm. Code: _____ *K Line #: _____ *Discount: _____ *Unit/Measure: _____
Quantity: _____ $ _____ _____ $ _____
Description: _____

Item # 2.
*Comm. Code: _____ *K Line #: _____ *Discount: _____ *Unit/Measure: _____
Quantity: _____ $ _____ _____ $ _____
Description: _____

Item # 3.
*Comm. Code: _____ *K Line #: _____ *Discount: _____ *Unit/Measure: _____
Quantity: _____ $ _____ _____ $ _____
Description: _____

APPENDIX 18

Public Health Infrastructure, Laboratories and Emergency Preparedness
Environmental and Chemical Services

Make: _____ Model Number: _____
Serial Number: _____ Location: _____

Date	Zero	Serial No. of Weight Set	Value Listed on Wt. (g)	Reading (g)	Correction Factor (g)	Corrected Reading (g)	Analyst Signature

Issued: June, 2014
Revision Number: 7
Effective Date: July 1, 2014
NJDOH/PHEL/ECLS-QM

APPENDIX 19

MONTHLY BALANCE CHECK

BALANCE ID NO.: _____ **ROOM:** _____ **DATE:** _____

CHECKED BY: _____ **NBS WT. SET SERIAL NO.:** **82051**

Listed NBS Wt. (g)	Correction (g) (1)	True Wt. Of NBS Wt. (g)	Weighing (g)	Difference (g)	Difference Within +/- 5% of True Wt.

(1) Obtained mm/dd/yy from: NIST Certification Source

Public Health Infrastructure, Laboratories and Emergency Preparedness
Environmental and Chemical Services

APPENDIX 20

THERMOMETER CHECK

DATE	CHECKED BY	NBS SERIAL NO.	NBS CORRECTION FACTOR (^{O}C)	NBS READING (^{O}C)	TRUE NBS TEMP. (^{O}C)	THERMO-METER SERIAL NO.	THERMO-METER READING (^{O}C)	CORRECTION FACTOR (^{O}C) TO ACHIEVE TRUE NBS TEMP.

Issued: June, 2014
Revision Number: 7
Effective Date: July 1, 2014
NJDOH/PHEL/ECLS-QM

APPENDIX 21

PIPETTE CALIBRATION

GRAVIMETERIC CALIBRATION

NJ DHSS/PHEL/ECLS
Gravimetric Pipette Calibration Report

Date Calibrated 3/29/2010
Balance Location: Rm. 129
Balance ID#: 18
Room Temperature (°C): 25.5°

Rainin 10ml Variable
S/N F0519194F

	Test Volume				
Replicates	**1000µL** wt. (grams)	**Replicates**	**5000µL** wt. (grams)	**Replicates**	**10000µL** wt. (grams)
1	1.00964	1	5.04210	1	10.03550
2	1.00734	2	5.05297	2	10.05271
3	1.01517	3	5.04281	3	10.04950
4	1.01746	4	5.08646	4	10.07920
5	1.02462	5	5.07159	5	10.05140
6	1.02021	6	5.06980	6	10.04850
7	1.03131	7	5.07943	7	10.08930
8	1.01214	8	5.05820	8	10.05290
9	1.00197	9	5.06525	9	10.07530
10	1.02226	10	5.06017	10	10.04540
Mean (mg)	1016.21	Mean (mg)	5062.9	Mean (mg)	10056.0
Mean (µl)	1019.3	Mean (µl)	5078.3	Mean (µl)	10086.6
True Value	1000.0	True Value	5000.0	True Value	10000.0
STDEV	8.789	STDEV	14.611	STDEV	13.985
Imprecision (<1.5%)	**0.862 PASS**	**Imprecision (<1.5%)**	**0.288 PASS**	**Imprecision (<1.5%)**	**0.139 PASS**
Inaccuracy (±2.5%)	**101.93 PASS**	**Inaccuracy (±2.5%)**	**101.57 PASS**	**Inaccuracy (±2.5%)**	**100.87 PASS**

Performed By: _____

Reviewed By: _____

APPENDIX 21

PIPETTE CALIBRATION

PHOTOMETERIC CALIBRATION

ARTEL

ARTEL Pipette Calibration System

Pipette Calibration Report

Pipette ID: J100219
Description: Rainin EDP2 Basic, variable, 100-1000 uL, 1ch
PCS Instrument Details
Serial Number: 8200
Firmware Revision: PCS 7A2 004
Instrument Cal. Date: 12/22/2010
Reagent Lot Code: 42677
Temperature: 22.9 °C

Location: Room 107
Owner: Erick Voronin
Method: Control Calibration 10
Test Plan: Eppendorf Reference, variable, 100-1000 uL, 1ch
Type: As Calibrated
Interval: 01
Comment:

Pipette Tip Information
Tip Name: Rainin Green Pak (HP-1000)
Tip Lot:

STATUS: Passed

Target Volume (µL)	Channel	Mean Volume (µL)	Standard Deviation	Relative Inaccuracy (%) Actual	Target	CV (%) Actual	Target	Status
100.00	1	99.9600	0.4970	-0.04	2.50	0.50	2	Passed

Sample	Volume (µL)
1	99.3700
2	99.4700
3	99.5100
4	100.2700
5	100.4800
6	100.6000
7	99.9000
8	100.7700
9	99.9500
10	100.4900

500.00	1	499.7000	1.1000	0.10	1.00	0.20	1.0	Passed

Sample	Volume (µL)
1	500.2800
2	500.2500

Printed Date: [illegible]
Printed Time: [illegible] PM

Pipette Calibration Report

Sample	Volume (µL)
3	498.4000
4	499.8000
5	501.3000
6	501.4000
7	501.7000
8	501.3000
9	502.4000
10	500.3000

1,000.00	1	1,000.2000	3.5800	0.02	2.50	0.36	1.0	Passed

Sample	Volume (µL)
1	1,005.4000
2	989.7000
3	1,003.2000
4	1,003.5000
5	1,000.7000
6	1,000.9000
7	997.9000
8	997.9000
9	998.4000
10	997.9000

Performed by: [signature] Date: 22 December 2010 at 12:25:56

Reviewed by: [signature] Date: 12/23/10

APPENDIX 22

YEARLY CHECK OF IN-HOUSE WEIGHTS VS. NBS WEIGHTS

Checked By: _____ **Date:** _____

ID of Weight Set Checked: _____ **NBS Wt. Set Serial No.: 69505**

Listed NBS Wt. (g)	NBS Weighing (g)	Correction Factor (g) [1]	True Balance Wt. (g)	Set Wt. (g)	Weighing (g)	Correction to Achieve Eq. Bal. Wt. (g)

(1) Obtained mm/dd/yy from: NIST Certification Source

APPENDIX 64a

FORM FOR REQUESTING FOLLOW-UP INFORMATION FROM ECLS

NAME OF PERSON REQUESTING INFORMATION:

PHONE NUMBER:

REQUESTING AGENCY/PROGRAM:

FIELD AND/OR LABORATORY SAMPLE NUMBERS OF THE SAMPLES FOR WHICH THE INFORMATION IS BEING REQUESTED:

TYPE OF INFORMATION REQUESTED:

REASON FOR THE REQUEST:

CHAPTER FIVE

SAMPLE COLLECTION, PRESERVATION, AND HOLDING TIMES

5.1 SAMPLE REQUIREMENTS

The list below provides the parameter groupings, volume of sample, preservation, and holding time requirements for the various routine analyses performed on aqueous samples by ECLS. The volumes listed in the tables will suffice for all samples requiring routine data reporting (I.E., a report produced in the Tier 2 format). Should the sample batch require a full deliverables data package (I.E., a report produced in the Tier 1 format), ECLS requests that one of the samples in the batch be submitted at a volume three times that requested in the tables. For example, if the sample batch submitted contains 5 samples to be analyzed for a combination of ICP and GFAA metals, one of the five samples should be submitted with three 500ml bottles for ICP and three 500ml bottles for GFAA. Sample batches containing more than 20 samples should include this additional volume for one sample out of every 20. Lists for non-aqueous matrices (soils, air samples and biological tissues) are also provided. Sample preservation is usually effected in the field at the time of sample collection. Exceptions may include trace metals, addition of dechlorinating agents to sample containers, and EPA 531 preservative added to the sample bottles prior to bottle distribution. The container, preservation, and holding times must meet the requirements: established by the US EPA, as listed in 40CFR136 and 40CFR141; established by the State of New Jersey, as listed in NJSA58:10A-1 and NJAC7:10-1.1; and recommended by the National Institute of Occupational Safety and Health, as listed in its third edition methods manual.

SAMPLE COLLECTION, PRESERVATION, AND HOLDING TIMES FOR AQUEOUS SAMPLES

Parameter	Parameter Grouping	Required Volume, ml	Container	Preservative	Holding Times (2)
BACTERIOLOGICAL TESTS					
Colilert Enumeration E Coli	A	100	Sterilized P	P-11	8 hours (NPW)
Colilert P/A Total & Fecal Coliform	A	100	Sterilized P	P-11	30 hours (PW)
Colilert Enumeration Total Coliform & E Coli	A	100	Sterilized P	P-11	30 hours (PW)
Fecal Coliform (MPN)	I	100	Sterilized P	P-11	8 hours (NPW)
Total Coliform (MPN)	I	100	Sterilized P	P-11	8 hours (NPW)
Fecal Coliform by A1	I	100	Sterilized P	P-11	8 hours (NPW)
Fecal Streptococci (MPN)	I	100	Sterilized P	P-11	8 hours (NPW)
Enterococci (MPN)	I	100	Sterilized P	P-11	8 hours (NPW)
Enterococci (MF)	I	100	Sterilized P	P-11	30 hours (PW)
SPC/HPC Bacterial Colonies	I	100	Sterilized P	P-11	30 hours (PW)

CHAPTER FIVE

SAMPLE COLLECTION, PRESERVATION, AND HOLDING TIMES

Parameter	Parameter Grouping	Required Volume, ml	Container	Preservative	Holding Times (2)
INORGANIC TESTS					
ABS/LAS (MBAS)	B	500	P or G	P-1	48 Hours
Acidity	E	500	P or G	P-1	14 Days
Alkalinity	E	500	P or G	P-1	14 Days
BOD5	A	1000 (3)	P or G	P-1	48 Hours
BOD20	A	1000 (3)	P or G	P-1	48 Hours
CBOD5	A	1000 (3)	P or G	P-1	48 Hours
CBOD20	A	1000 (3)	P or G	P-1	48 Hours
COD	L	500 (10)	P or G	P-2	28 Days
Chloride	B	100	P or G	None Required	28 Days
Color	B or J	100	P or G	P-1	48 Hours
Cyanide	A	1000 (23)	P or G	P-25	14 days (9)
Dissolved Oxygen	A	300	G	P-4	8 Hours
Fluoride (PW)	B	300	P or G	None Required	28 days
Fluoride (SS)	B	500	P or G	None Required	28 Days
Hardness	C	100	P or G	P-5	6 Months
METALS TOTAL					
Aluminum	C or D	500 (7)	P (12)	P-5	6 Months
Antimony	C or F	500 (7)	P (12)	P-5	6 Months
Arsenic	C or F	500 (7)	P (12)	P-5	6 Months
Barium	C or D	500 (7)	P (12)	P-5	6 Months
Beryllium	C or D	500 (7)	P (12)	P-5	6 Months
Boron	C or D	500 (7)	P (12)	P-5	6 Months
Cadmium	C or D	500 (7)	P (12)	P-5	6 Months
Chromium, Hexavalent Colorimetric Method	A	250 (7)	P (12)	P-1	24 Hours
Chromium, Hexavalent Ion Chromatographic Method Non-chlorinated	A	500 (7)	P (12)	P-26	28 Days
Chromium, Hexavalent Ion Chromatographic Method Chlorinated (PW)	A	500 (7)	P (12)	P-26	24 Hours
Chromium Total	C or D	500 (7)	P (12)	P-5	6 Months
Cobalt	C or D	500 (7)	P (12)	P-5	6 Months
Copper	C or D	500 (7)	P (12)	P-5	6 Months
Iron	C or D	500 (7)	P (12)	P-5	6 Months
Lead	C or F	500 (7)	P (12)	P-5	6 Months
Manganese	C or D	500 (7)	P (12)	P-5	6 Months
Mercury (SS)	C or K	125 (7)	G (12)	P-5	28 Days
Mercury (PW)	C or K	125 (7)	G (12)	P-5	28 Days

Parameter	Parameter Grouping	Required Volume, ml	Container	Preservative	Holding Times (2)
Molybdenum	C or D	500 (7)	P (12)	P-5	6 Months
Nickel	C or D	500 (7)	P (12)	P-5	6 Months
Selenium	C or F	500 (7)	P (12)	P-5	6 Months
Silver	C or D	500 (7)	P (12)	P-5	6 Months
Thallium	C or F	500 (7)	P (12)	P-5	6 Months
Vanadium	C or D	500 (7)	P (12)	P-5	6 Months
Zinc	C or D	500 (7)	P (12)	P-5	6 Months
METALS DISSOLVED (13)					
MINERALS TOTAL					
Calcium	C or G	500	P (12)	P-5	6 Months
Magnesium	C or G	500	P (12)	P-5	6 Months
Potassium	C or G	500	P (12)	P-5	6 Months
Sodium	C or G	500	P (12)	P-5	6 Months
MINERALS DISSOLVED (13)					
NITROGEN					
Ammonia	H	200	P or G	P-6	28 Days
Nitrite	B	100	P or G	P-1	48 Hours
Nitrite + Nitrate (SS)	H	100	P or G	P-6	28 Days
Nitrite + Nitrate (PW) chlorinated	B	100	P or G	P-1	28 Days
Nitrite + Nitrate (PW) non-chlorinated	H	100	P or G	P-6	14 Days
TKN	H	250	P or G	P-6	28 Days
Oil and Grease	A	1000 (4,35)	G	P-8	28 Days
Odor	A	1000	G	P-1	24 Hours
PH	E	250	P or G	P-1	Analyze Immediately
Phenolics	A	500	G	P-6	28 Days
Phosphorus Hydrolyzable	H	100	P or G	P-6	7 Days
Phosphorus Ortho	B	100	P or G	P-1	48 Hours
Phosphorus Total	H	100	P or g	P-6	28 Days
Residue Filterable (TDS)	B	250	P or G	P-1	7 Days
Residue Non-filterable (SS)	B	250	P or G	P-1	7 Days
Residue Total	B	250	P or g	P-1	7 Days
Settleable Matter	A	1000	P or g	P-1	48 Hours

CHAPTER FIVE

SAMPLE COLLECTION, PRESERVATION, AND HOLDING TIMES

Parameter	Parameter Grouping	Required Volume, ml	Container	Preservative	Holding Times (2)
Conductance	B	250	P or g	P-1	28 Days
Silica	A	250	P	P-1	28 Days
Sulfate	B	500	P or G	P-1	28 Days
TOC	L	500 (3,10)	P or G	P-2	28 Days
Turbidity	B or J	100	P or G	P-1	48 Hours
ORGANIC TESTS					
ABN EPA625 Chlorinated	N	1000 (15,16)	G (19)	P-10	7 Days (17)
ABN EPA 625 Nonchlorinated	N	1000 (15,16)	G (20)	P-1	7 Days (17)
Benzidine	N	1000 (3,15)	G (20)	P-16	7 Days
Methylcarbamates EPA 531.1 Chlorinated	A	125	G (31)	P-21	28 Days
Methylcarbamates EPA 531.1 Nonchlorinated	A	125	G (31)	P-23	28 Days
Chlorinated Acids EPA 515.3 Chlorinated	A	1000	G (28)	P-22	14 Days (30)
Chlorinated Acids EPA 515.3 Nonchlorinated	A	1000	G (28)	P-1	14 Days (30)
EDB, DBPC EPA 504.1 Chlorinated	A	3 X 40	G (25)	P-20	14 Days (27)
EDB, DBPC EPA 504.1 Nonchlorinated	A	3 x 40	G (25)	P-1	14 Days (27)
Haloacetic Acids EPA 552.1 Chlorinated	A	3 x 250	G (18)	P-18	28 Days
Haloacetic Acids EPA 552.1 Nonchlorinated	A	3 x 250	G (18)	P-1	28 Days
ABN EPA 525.2 Chlorinated	N	1000 (15)	G (5))	P-13	14 Days (11)
ABN EPA 525.2 Nonchlorinated	N	1000 (15)	G (5))	P-15	14 Days (11)
Nitrogen and Phosphorus Pesticides EPA 507 Chlorinated	A	2 x 1000	G (28)	P-19	14 Days (29)
Nitrogen and Phosphorus Pesticides EPA 507 Nonchlorinated	A	2 x 1000	G (28)	P-1	14 days (29)
Pesticides EPA 505 Chlorinated	A	2 x 1000 (15)	G (5)	P-20	7 Days (17)
Pesticides EPA 505 Nonchlorinated	A	2 x 1000 (15)	G (5)	P-1	7 Days (17)

SAMPLE COLLECTION, PRESERVATION, AND HOLDING TIMES

Parameter	Parameter Grouping	Required Volume, ml	Container	Preservative	Holding Times (2)
Pesticides EPA 608	A	1000 (15)	G (5)	P-19	7 Days (17,25)
PCBs EPA 608	K	1000 (5)	G	P-1	7 Days (17)
PCBs EPA 508A	A	2 x 1000 (15)	G (5)	P-1	7 Days (17)
VOs EPA 524.2 Chlorinated	A	6 x 40	G, Screwcapped septum vials (3, 6, 24)	P-14	14 Days
VOs EPA 524.2 Nonchlorinated	A	6 x 40	G, Screwcapped septum vials (3, 6, 24)	P-14	14 Days
VOs EPA 624 Chlorinated	A	8 x 40	G, Screwcapped septum vials (3, 6, 24)	P-14	14 Days
VOs EPA 624 Nonchlorinated	A	8 x 40	G, Screwcapped septum vials (3, 6, 24)	P-14	14 Days
RADIOLOGICAL TESTS					
Gross Alpha/Beta	O	1000	P, 1-Gallon	P-5	None
Ra-224	O	6000	P, 2-Gallon	P-5	(32)
Ra-226	O	250	P, 1-Gallon	P-5	None
Ra-228	O	1000	P, 1-Gallon	P-5	None
Isotopic Uranium	O	1000	P, 1-Gallon	P-5	None
Tritium	P	100	P, 100ml	P-24	None
Rn-222	P (34)	20	G, 20ml vials	P-24	(33)
Gamma	O	1000	P, 1-Gallon	P-5	None
I-131	O	1000	P, 1-Gallon	P-5	None
SR-89/90	O	1000	P, 1-Gallon	P-5	None

PARAMETER GROUPINGS

A. These parameters must be bottled separately and preserved if required.

B. These parameters may be collected within the same bottle provided that the required sample volumes are supplied. These require NO CHEMICAL PRESERVATION but should be cooled to less than or equal to 6° C as soon as possible after collection.

C. These parameters may be collected within the same bottle provided that the required sample volumes are supplied.

D. Any combination of ICP metals (pretreated to a pH of less than 2 with nitric acid) may be analyzed in a single 500ml sample.

E. These parameters must be bottled together. They may be analyzed from a single 500ml sample. No preservative should be added but the bottle should be iced as soon as possible.

F. A combination analysis may be made for furnace metals (antimony, arsenic, lead, selenium, tin, and thallium) with a 500ml sample (pretreated to a pH of less than 2 with nitric acid.

G. Any combination of these minerals (pretreated to a pH of less than 2 with nitric acid) may be analyzed from a single 500ml sample.

H. These parameters may be collected within the same bottle provided that the required sample volumes are supplied.

I. Membrane Filtration (MF) procedure is utilized for fecal coliform and total coliform analyses on potable water samples. This procedure requires 100ml of sample for each parameter and is to be collected in a pre-sterilized bottle containing a pre-measured quantity of sodium thiosulfate and EDTA. These bottles are obtainable from the ECLS Receiving Laboratory (L-176).

Most Probable Number (MPN) procedure is utilized for stream, lake, estuarine, municipal and industrial discharge samples. When sampling for fecal strep. fecal coliform, and total coliform singularly or in combination of all three, the 120ml sterilized (aluminum foil covered) sodium thiosulfate/EDTA treated bottle will contain sufficient sample for all three analyses in any dilution combinations except requests for fecal strep., fecal coliform, and total coliform at dilutions of 10, 1, and 0.1. When these three parameters are to be requested at the above specified dilutions, the 250ml sterilized (aluminum foil covered) sodium thiosulfate/EDTA treated bottle is to be used. The bottle will hold enough sample for the requested analyses. These bottles are obtainable from the ECLS Receiving Laboratory (L-176).

When sampling for bacteriological parameters, be sure to leave ample air space within the bottle to allow for adequate sample mixing by the laboratory.

J. Any combination of these parameters (color and turbidity) can be made from a 100ml sample.

K. Mercury may be analyzed from a 500ml sample preserved to a pH of less than 2 with nitric acid.

L. Any combination of these parameters can be made from a single, separately bottled, properly preserved 500ml sample.

M. Reserved.

N. These parameters must be bottled separately in acetone rinsed containers.

O. These parameters may be collected within the same bottle provided that the required sample volumes are supplied.

P. These parameters must be bottled separately.

CHAPTER FIVE

SAMPLE COLLECTION, PRESERVATION, AND HOLDING TIMES

PRESERVATIVES

P-1 Cool to less than or equal to 6° C in an ice chest.

P-2 Preserve with concentrated sulfuric acid to a pH of less than 2. Do not add an excessive amount of sulfuric acid as this may inadvertently affect the analytical results.

P-3 Test the sample for the presence of residual chlorine. If present, add 0.6g of ascorbic acid prior to preserving the sample with 10N sodium hydroxide to a pH of greater than 12. After preserving the sample, cool to 4° C in an ice chest.

P-4 Collect the sample using a Dissolved Oxygen Sampler and a 300ml BOD bottle. Remove the completely filled 300ml sample bottle from the sampler. Add 2ml of manganous sulfate solution followed by 2ml of alkaline iodide/azide solution well below the surface of the liquid. Stopper the bottle with care to exclude air bubbles and mix well by inverting the bottle several times. When the precipitate settles, leaving a clear supernatant above the manganous hydroxide floc, shake again. Place a layer of distilled water on top of the glass stopper and cover this opening with the plastic cap provided with the bottle. This produces a water seal that prevents any entrance of air into the sample. This method (Winkler) is not applicable for the determination of dissolved oxygen in chlorinated wastewater effluents.

NOTE: Hach's manganous sulfate powder pillows and alkaline-iodine-azide reagent powder pillows may be substituted for the respective liquid reagents.

When using the Hach Powder Pillow reagents, the sequence is as follows:

- Fill the BOD bottle with sample.
- Add the contents of the manganous sulfate powder pillow to the BOD bottle.
- Add the contents of the alkaline-iodide-azide powder pillow to the BOD bottle.
- Stopper the bottle taking care to exclude air bubbles.
- Mix well by inverting the bottle several times.
- After the precipitate settles, mix well again.
- Stopper the bottle and mix well.
- Without removing the stopper, fill the neck of the bottle with distilled water and place the plastic cap with the foam insert over the flared neck to ensure that the water seal remains intact in the bottle neck.

P-5 Acidify the sample with concentrated nitric acid to a pH of less than 2.

P-6 Preserve the sample with concentrated sulfuric acid to a pH of 2 and cool to 4° C in an ice chest. **Do not add an excessive amount of acid, as this will results in analytical interference.**

P-7 Preserve the sample with concentrated sulfuric or hydrochloric acid to a pH of less than 2.

P-8 Preserve the sample with concentrated sulfuric or hydrochloric acid to a pH of less than 2 and cool to 4° C in an ice chest.

P-9 To 500ml of sample, add 2ml of zinc acetate solution and sodium hydroxide to a pH of greater than 9.

P-10 Approximately 80mg/l sodium thiosulfate is added to the bottle in the laboratory prior to being brought into the field. After collection, the sample is cooled to 4° C in an ice chest.

P-11 Prior to sample bottles being sent into the field, 0.1ml of a 10% thiosulfate solution and 0.3ml of a 15% EDTA solution are added for each 125ml of sample that is to be collected. The bottles should not be rinsed prior to sampling. Once collected, the sample should be cooled to less than 10° C in an ice chest, as per the federal register, Monday, March 12, 2007, Table II.

P-12 Preserve samples with concentrated nitric acid to a pH of less than 2. Do not add an excessive amount of acid. Leave no air spaces. Cool to 4° C. If residual chlorine is present, add 5mg of sodium sulfite crystals at the time of collection.

P-13 Approximately 40 to50mg of sodium sulfite is added to the bottle in the laboratory prior to being brought into the field. After collection, the sample is acidified to a pH of less than 2 with 1:1 hydrochloric acid. The sample is then cooled to 4° C.

P-14 Samples should be preserved with 1:1 hydrochloric acid to a pH of less than 2 and then cooled to 4° C. For samples containing residual chlorine, the appropriate dechlorinating agent (25mg ascorbic acid for EPA 524.2 or 10mg sodium thiosulfate for EPA 624) is added in the laboratory prior to the bottles being taken into the field.

P-15 The sample is acidified to a pH of less than 2 with 1:1hydrochloric acid and cooled to 4° C.

P-16 Adjust the pH of the sample to a range of 2 to 7 with sulfuric acid. Cool to 4° C and protect from light.

P-17 Adjust the pH of the sample to between 4.5 and 5.0 using a combination of 1.0N, 0.2N, and 0.04N hydrochloric acid.

P-18 25mg of ammonium chloride must be added to the sample bottle, either in the laboratory prior to sending the bottle into the field or in the field, and then cooled to 4° C.

P-19 80mg of sodium thiosulfate must be added to the sample bottle, either in the laboratory prior to sending the bottle into the field or in the field, and then cooled to 4° C.

P-20 3mg of sodium thiosulfate must be added to the sample bottle, either in the laboratory prior to sending the bottle into the field or in the field, and then cooled to 4° C.

P-21 10 mg of sodium thiosulfate and 3.6 ml of monochloroacetic acid buffer must be added to the sample bottle, either in the laboratory prior to sending the bottle into the field or in the field. If the test request includes the compounds oxamly, 3-hydroxycarbofuran, aldicarb sulfoxide, or carbaryl, the sample must be preserved to pH 3 with hydrchloric acid and the cooled to 4° C.

P-22 80mg of sodium thiosulfate must be added to the sample bottle, either in the laboratory prior to sending the bottle into the field or in the field, and then cooled to 4° C.

P-23 3.6 ml of monochloroacetic acid buffer must be added to the sample bottle. If the compounds oxamly, 3-hydroxycarbofuran, aldicarb sulfoxide, or carbaryl are requested, the sample must be preserved to pH 3 with hydrochloric acid and then cooled to 4° C.

P-24 No preservation should be performed.

P-25 See requirements listed in Table II of 40CFR136.

P-26 The sample is preserved in the field by adjusting the pH to between 9.3 and 9.7 by addition of the laboratory supplied ammonium sulfate / ammonium hydroxide buffer solution to the sample after filtration. Chlorinated samples must have a free chlorine value of less than 0.1 mg/L.

PRESERVATION PROCEDURE

NOTE: When fixing sample (with an acid or base) to specific pH, add the appropriate preservative and check the sample pH as follows:

- Add the preservative to the sample one or two drops at a time.
- Replace the stopper on the sample bottle and mix thoroughly by inverting the bottle several times.
- Remove the bottle stopper and place a drop of sample from the stopper onto pH test paper.
- If the proper pH has not been obtained, repeat the above steps as necessary.
- Do not add excessive amounts of acid. Only add sufficient acid to reach the required pH. Excessive acid may result in inaccurate results or inability to analyze the sample.

FOOTNOTES

(1) If samples can not be returned to the laboratory in less than 6 hours and the holding time exceeds this limit, the final report will indicate the actual holding time.

(2) Holding time is defined as the length of time between the collection of the sample and the initiation of the analysis. For composite samples (i.e., 4 hour or 24 hour), the holding time begins at the end of the collection of the last sample to be composited. It is the responsibility of the analyst to analyze samples within the prescribed holding times and/or inform their supervisor of any potential problems regarding holding time considerations.

(3) Fill bottle or vial to the top, leaving no air bubbles.

(4) When filling a 1 liter glass bottle for oil and grease analysis, approximately one inch of air space should remain inside the bottle. Do not overflow the bottle with sample because in doing this, the oil and grease phase, being lighter than water, may flow out of the bottle and be lost.

(4) Glass, one-liter bottles, rinsed with acetone and hexane prior to sample collection.

(5) Each sampler will also receive 2 dated and numbered trip blanks, filled with organic free water, for each day of sampling. These are to be kept with the sample vials at all times and turned in to the laboratory with the filled sample vials. These blanks are to show if there is any contamination of the vials while they are in the field. The identification number on the trip blank should be placed on each analysis request form for every sample associated with that particular travel blank. Samples will be rejected when the date on the blank is more than 14 days old.

(6) Metal analyses require an additional amount of sample for quality control measures mandated US EPA and NJ DEP laboratory certification regulations. To correct for this additional volume, determine the volume of sample needed for the metals being requested using the amounts cited in Table 5-1 and the Charts 1 and 2 below and calculate a corrected sample volume as follows:

- If the sample is less than one liter, multiply by 2 and submit this volume as the corrected volume. However, a minimum sample volume of 500ml of sample is required.
- If the sample volume is equal to or greater than one liter, add one liter (for quality control) to the sample volume and submit this as the corrected sample volume.

Chart 5-1
Metal Parameter Groupings

Parameter Grouping	Metal(s)
F	As, Pb, Sb, Se, Sn, Tl
D	Al, B, Ba, Be, Cd, Cu, Cr, Co, Fe, Mn, Mo, Ni, Ag, V, Zn
K	Hg
G	Ca, Na, K, Mg

Chart 5-2
Volume of Sample Required for Metals Analyses

Groups	Volume, ml
F	500
D	500
K	250
G	500
F&D, F&G, D&G	1000

NOTES: These volumes apply if the analysis of one or all of the metals in the group is requested.
For any full regulatory (Tier I) data package, double the volumes listed above.

(7) Air spaces within the sample must be kept at one inch.

(8) See Table II in 40CFR136 for the new specific requirements that samplers are responsible for conducting in the field.

(9) When requesting the analysis of this parameter, field personnel must also request a chloride analysis and provide the necessary additional sample. ECLS will analyze this additional sample to compensate for a possible chloride interference with these analytes.

(10) Sample extracts may be held for 30 days after extraction.

(11) Plastic and glass bottles used for metal analyses are pre-rinsed in the laboratory with nitric acid followed by double distilled water.

(12) Dissolved metals and dissolved minerals have the same sampling and preservation requirements as total metals and total minerals except that the sample must be filtered immediately after sample collection and prior to the addition of the preservative.

(13) Each vial is preserved in the laboratory with 4 mg of ammonium chloride.

(14) When collecting aqueous semivolatile samples (pesticides, PCBs, BNAs, and benzidines), three times the required sample volume (three 1000ml containers) must be submitted for one sample per case per day. The additional sample volume is utilized by ECLS for matrix spike and matrix spike duplicate analyses.

(15) Base/neutral and acid extractable organics may be analyzed from a single 1000ml sample.

(16) Samples may be held for 40 days after extraction.

(17) Glass, 250ml amber bottle with Teflon lined cap to which 23mg of ammonium chloride has been added.

(18) Glass, one liter amber bottle with Teflon lined screw cap, rinsed with acetone. After cleaning and acetone rinse, approximately 80mg of sodium thiosulfate is added prior to field use.

(19) Glass, one liter bottle with Teflon lined screw cap, acetone rinsed.

(20) Glass, 250 or 500ml, amber bottle, with Teflon lined screw cap.

(21) Although there is no regulated maximum holding time for this parameter, whenever possible, ECLS will hold these samples no longer than 28 days. Samples analyzed after 28 days will be so noted.

(22) When collecting water samples for cyanide, 2000ml of sample must be submitted for one of the samples collected with each daily sampling episode. This additional volume is necessary to carry out quality control measures required by US EPA and NJ DEP laboratory certification regulations.

(23) A dechlorinating agent must be added to the volatile organic sample vials when the water to be sampled is from a chlorinated source. It is not recommended when sampling water from a non-chlorinated source. Accordingly, ECLS maintains a supply of treated and untreated vials. Field sampling personnel should request the appropriately pretreated vials depending on the method of analysis that they are requesting. For US EPA 524.2, the dechlorinating agent is 25mg ascorbic acid. For US EPA 624, the dechlorinating agent is 10mg of sodium thiosulfate

(24) The holding time for US EPA method 608 analysis is 7 days if the pH is between 5.0 and 9.0. If not, the holding time is 3 days.

(25) 40ml amber glass vial with teflon lined septum and screw cap. A dechlorinating agent must be added to the vials if the water to be sampled is from a chlorinated source. The appropriate amount for US EPA method 504 is 3mg sodium thiosulfate per 40ml vial.

(26) Sample should be extracted and analyzed within 14 days of collection. The extract may only be held for 24 hours from the time of extraction to the time of analysis.

(27) One liter, amber glass, screw-capped bottle with silicone-Teflon lined cap. If the water to be sampled is from a chlorinated source, sodium thiosulfate must be added at a rate of 80mg per liter.

(28) The extract must be analyzed within 14 days of extraction.

(29) Sample must be extracted within 14 days of collection. The extract must be analyzed within 14 days of extraction.

(30) 250ml, amber glass, screw-capped bottle with silicone-Teflon lined cap. If the water to be sampled is from a chlorinated source, sodium thiosulfate must be added at a rate of 20 mg per 250ml bottle.

(31) Sample should be counted during the 2-4 day "counting window" from the time of sample collection.

(32) Sample should be counted after 3 hours and no later than 7 days from the time of sample collection.

(33) Sample should be collected in accordance with the specific Rn-222 in water collection procedures.

(34) One sample from every group of samples submitted to ECLS for oil and grease and petroleum hydrocarbons shall be submitted in triplicate to allow for the completion of precision and accuracy measurements required as part of the quality control measures for this analysis.

SAMPLE COLLECTION, PRESERVATION, AND HOLDING TIMES FOR SOILS

Measurement	Groupings	Req. Wt., g	Container	Preservative	Holding Time
Fecal Coliform		50	soil jar (1,7)	4° C	6 hours
ABN Extract.		40	Soil jar (2)	4° C	14 days (9)
Aluminum	C	1 (3,4)	Soil jar (5)	none	6 months
Antimony	C	1	Soil jar	none	6 months
Arsenic	C	1	Soil jar	none	6 months
Barium	C	1	Soil jar	none	6 months
Beryllium	C	1	Soil jar	none	6 months
Cadmium	C	1	Soil jar	none	6 months
Chromium-hex	A	1 (3,4)	Soil jar	none	6 months
Chromium-tot	C	1	Soil jar	none	6 months
Cobalt	C	1	Soil jar	none	6 months
Copper	C	1	Soil jar	none	6 months
Iron	C	1	Soil jar	none	6 months
Lead	C	1	Soil jar	none	6 months
Manganese	C	1	Soil jar	none	6 months
Mercury	B	0.2	Soil jar (5)	none	6 months
Nickel	C	1	Soil jar	none	6 months
Selenium	C	1	Soil jar	none	6 months
Silver	C	1	Soil jar	none	6 months
Tin	C	1	Soil jar	none	6 months
Zinc	C	1	Soil jar	none	6 months
TKN		50	Soil jar	none	28 days
Total Phosphorous		50	Soil jar	4° C 7 days	28 days

FOOTNOTES

1. Not filled.
2. Acetone rinsed.
3. Dry weight.
4. At least one sample per group must contain a minimum of 5 g, dry weight.
5. Rinsed with 50% nitric acid.
6. Rinsed with acetone, followed by hexane.
7. A soil jar is a 4 ounce, straight sided glass jar with a Teflon lined cap.
8. At least on sample per case must contain a minimum of 30 g, dry weight.
9. Samples may be held 40 days after extraction. These holding times are from SW 846, 3rd edition.

SAMPLE COLLECTION, PRESERVATION, AND HOLDING TIMES FOR AIR SAMPLES

Parameter	Grouping	Collection Media	Preservative	Holding Time
Aluminum	D	Cellulose ester	none	6 months
Antimony	D	Cellulose ester	none	6 months
Arsenic	D	Cellulose ester	none	6 months
Barium	D	Cellulose ester	none	6 months
Beryllium	D	Cellulose ester	none	6 months
Cadmium	D	Cellulose ester	none	6 months
Calcium	D	Cellulose ester	none	6 months
Chromium-hexavalent	A	PVC membrane	none	6 months
Chromium-total	D	Cellulose ester	none	6 months
Cobalt	D	Cellulose ester	none	6 months
Copper	D	Cellulose ester	none	6 months
Iron	D	Cellulose ester	none	6 months
Lead	D	Cellulose ester	none	6 months
Manganese	D	Cellulose ester	none	6 months
Mercury	B	Hopcalite	none	6 months
Nickel	D	Cellulose ester	none	6 months
Selenium	D	Cellulose ester	none	6 months
Silver	D	Cellulose ester	none	6 months
Tin	D	Cellulose ester	none	6 months
Titanium	C	Cellulose ester	none	6 months
Zinc	D	Cellulose ester	none	6 months
Silica		PVC filter	none	14 days

FOOTNOTES

1. A maximum of 8 compatible metals may be analyzed from one filter. Sample collectors should consult ECLS to verify that all the requested metals can be analyzed from one filter sample.
2. Three blanks are required with each set of samples submitted.
3. For TEM analysis, one blank filter from each new box of filters must be submitted for analysis prior to field usage. In addition, field blanks are to be submitted with samples at a frequency of one blank per week of samples per inspector. Field blanks are required to ensure that the cassettes have not been contaminated prior to reaching the lab as well as that no cross-contamination has occurred within the lab. Therefore, all field blanks must be labeled "Field Blank".

SAMPLE COLLECTION, PRESERVATION, AND HOLDING TIMESFOR BIOLOGICAL TISSUES

Measurement	Grouping	Req. Wt., g	Container	Preservative	Holding Time
Aluminum	D (1)	15	Plastic bag	Freeze	6 months
Antimony	A (1)	15	Plastic bag	Freeze	6 months
Arsenic	A	15	Plastic bag	Freeze	6 months
Barium	D	15	Plastic bag	Freeze	6 months
Beryllium	D	15	Plastic bag	Freeze	6 months
Cadmium	D	15	Plastic bag	Freeze	6 months
Chromium-tot	D	15	Plastic bag	Freeze	6 months
Cobalt	D	15	Plastic bag	Freeze	6 months
Copper	D	15	Plastic bag	Freeze	6 months
Iron	D	15	Plastic bag	Freeze	6 months
Lead	D	15	Plastic bag	Freeze	6 months
Manganese	D	15	Plastic bag	Freeze	6 months
Nickel	D	15	Plastic bag	Freeze	6 months
Mercury	C (1)	15	Plastic bag	Freeze	6 months
Selenium	D	15	Plastic bag	Freeze	6 months
Silver	D	15	Plastic bag	Freeze	6 months
Tin	D	15	Plastic bag	Freeze	6 months
Zinc	D	15	Plastic bag	Freeze	6 months

FOOTNOTES

1. At least one sample per group must contain a minimum of 50 grams.

ECLS also conducts other analyses on samples that do not have regulatory requirements similar to those listed above. In those instances, it is recommended that samples be collected in accordance with the most recent, scientifically accepted procedure. Whenever possible, analyses performed on these samples will be initiated within the corresponding aqueous sample holding time. However, exceeding the aqueous holding times will not invalidate any of the analytical data produced.

CHAPTER FIVE

SAMPLE COLLECTION, PRESERVATION, AND HOLDING TIMES

ECLS does not collect samples. Samples are collected by field personnel employed by the submitting agency or by a contractor of the submitting agency and delivered to ECLS. The samples are collected according to the procedures contained in the NJ DEP Field Sampling Manual. Other State and Federal agencies also collect samples and deliver them to ECLS. These submitted samples also meet the acceptance criteria contained in this manual unless otherwise specified in **the table below:**

SAMPLE COLLECTION, PRESERVATION, AND HOLDING TIMES FOR MISCELLANEOUS MATRICES

Measurement	Grouping	Req. Wt., g	Container	Preservative	Holding Time
Lead	Paint chips	1	Zip lock plastic bag	None	6 months
Metals (2)	Wipes		Soil jar or zip lock plastic bag	None	6 months
Metals	Food		As available	Freeze	1 month
Pesticides (1, 4, 6) and PCBs	Milk	10	As available (6)	Refrigerate	1 month (5)
Silica	Bulk		Soil jar	None	14 days

FOOTNOTES

1. As specifically requested.
2. Three field blanks are required with each set of samples submitted.
3. Small (20 ml) or large (4 oz.).
4. Because food samples may be submitted in non-pesticide/PCB clean containers and/or their original container may be made of phthalate containing plastic, analytical problems may occur.
5. This holding time is not a regulated requirement.
6. For scheduled milk sampling, a glass bottle rinsed with acetone then hexane is required. Other containers may cause analytical problems.

The ECLS Manager, or his designated appointee, is available for advice or comments pertaining to the selection and/or modification of sampling methodologies that are required to meet non-routine analytical requests. Upon delivery of the samples to ECLS, ECLS does check the samples to verify that the requirements listed above are adhered to. See section 6-2.

CHAPTER FIVE

SAMPLE COLLECTION, PRESERVATION, AND HOLDING TIMES

See the description below on how the laboratory staff are informed of specific client information regarding certain specific samples:

INFORMING ANALYSTS OF SPECIFIC CLIENT INFORMATION

There are instances when ECLS is asked to perform an analysis that would constitute a departure from our documented policies or to evaluate whether it is feasible to conduct a new analysis. For each of these instances, it is necessary for both parties to have a clear understanding of each party's desires and what the consequences of any subsequent action would be. Therefore, it is necessary to develop a Quality Assurance Project Plan (QAPP) to memorialize the decisions reached by the parties.

QAPP

Sometimes a client may desire to prepare a Quality Assurance Project Plan for specialized projects and, sometimes, even for routine sampling events. When a client desires ECLS to perform analytical work that is outside ECLS's normal analytical capabilities, a QAPP must be prepared prior to initiating sampling. The following items are addressed by ECLS and the Client when preparing a QAPP:

- Type of samples being submitted e.g., potable water, waste-water, etc.
- The suggested method to be used along with an acknowledgement as to the deficiencies/shortcomings of the method. If the client has a specific analytical method in mind, this should be made available to ECLS since this could shorten the time needed by ECLS to validate the method.
- Requested MDL values. These values will be a driving force to see if ECLS can validate the method at the level of recovery that is being sought.
- MCL or other action levels. If the MCL is too close to the achievable MDL, the method may be inappropriate for the expressed purpose.
- Intended data usage. This is necessary to determine the level of QC that is necessary to be run during the analyses. If enforcement is the objective, then one type of QC would be required. If preliminary information gathering is the objective, then perhaps a less strenuous QC protocol could be used. This determination would influence the type of method validation that would have to be performed.
- Types of QC required. The requested QC may be inappropriate for the intended data usage.
- Whether chain of Custody is requested.
- Turnaround time. This turnaround time is for responding back to the client with data from analytical runs performed on field samples.
- Sampling frequency.
- Date of sampling event initiation. Again, this would play into determining the amount of method validation that is necessary.
- Extent of the event.
- Sampling dates.
- Projected number of samples. If the projected number of samples is too low, it may not be economically feasible to pursue the project.
- Data reporting format. If a format is requested that ECLS currently does not have available, that could have a large impact on the possibility of going forward in a short period of time.
- Listing of any other ECLS and/or submitting agency requirements.
- Agency submitting QAPP.
- Contact person.
- Billing information.

- Sign off by the contact person and the ECLS Laboratory Manager or his designee.

This will allow for no misunderstanding between parties as to what is expected of each party when the uses of non-mandated methods are used to generate analytical data. The QAO will maintain a copy of all the QAPPs.

However, the most likely information that is referred to the analysts deals with sample scheduling and the specifics of the various projects being run by DEP. Informing the analysts of sampling schedules allows them to prepare for the sampling events and to determine if those events would overwhelm the analytical capacity of the laboratory. Informing the analysts of project requirements makes them aware of any additional information that the analysts would need to be in a position to handle the project, e.g., knowing that a certain project is scheduled to come in next week and that it will consist of 20 samples that will have to be analyzed according to total and dissolved procedures. This means that 40 analyses would have to be conducted instead of 20, something the analysts should be in the position to prepare for.

PROCEDURE

1. When ECLS Management has been informed of the specifics of a planned project or has signed off on a QAPP, that information is forwarded, by the ECLS Director or his designee, to the section supervisors so they can inform their staff of such.
2. This notification is to consist of a copy of the QAPP or a copy of the correspondence describing the project or a summary of the project specifics. If a project is already underway, then a re-construction of the project specifics must be prepared and distributed.
3. The analysts keep this information for subsequent referrals.
4. When Sample Receiving reviews the collector's paperwork during the sample acceptance process, they must make sure that when samples are submitted under a defined project, that the project is specified on the submittal forms. *ALL REQUESTED ANALYSES MUST BE DOCUMENTED ON EACH OF THE SAMPLE SUBMITTAL FORMS.*

Sample Receiving must then inform the analysts that samples have been received under a specific project. This notification can be accomplished by placing the information on the white board by the receptionist or by emailing the analytical supervisors or by verbally informing the affected analysts, or, if possible, by clearly defining certain Batch Numbers as specific to a project.

5.2 SAMPLE CONTAINERS AND PRESERVATIVES

ECLS changed to single use pre-cleaned plastic polyethylene bottles for most inorganic analyses in early 2004. These bottles meet the preservation requirements for metals, general chemistry and nutrient analyses. These containers may be ordered in case lots or smaller in 1 liter, 500 ml and 250 ml sizes. Client field personnel and laboratory staff may request them from the ECLS sample receiving area located in room L176. Sampling agencies wishing to obtain sample containers and/or preservatives should obtain these items from the sample custodian. If the sample custodian is not present, assistance may be obtained by asking the receptionist to page a staff member that can assist them. The sample custodian will obtain the containers from the bottle storage cabinets. Field sampling personnel are not permitted in laboratory areas other than the sample receiving area. Therefore, if items are not readily available from the storage cabinets, the items will be obtained from other areas of the laboratory by the sample custodian. For a comprehensive description of the sample receiving procedures see the ECLS Sample Receiving SOP (ECLS-SR-1).

5.3 SAMPLE COLLECTION

At the time of sample collection, the appropriate sample submittal form must be completed **(Attachments 3 to 5).** ECLS has developed three distinctive sample submittal forms for the three different sample types received by the ECLS Sample Receiving Section. They include the inorganic and organic testing (CHEM-44), bacteriological testing (BACT-44), and radiological testing (RAD-4). They are presented in the Attachments 3 to 5, respectively. These forms are available at www.nj.gov/health or, alternatively, through the department intranet and selecting the nj.gov/health link. Then, tab on "topics A-Z" and pick the letter "F". Click on "Forms" and select the appropriate form.

It is ECLS policy that all samples submitted to the laboratory must be handled on a chain of custody basis, and the submittal of each sample shall be documented on, and accompanied by, its own separate submittal form. Each of these forms includes a chain of custody section which must be completed as discussed below.

Each of the above cited submittal forms (CHEM-44, BACT-44 and RAD-4) includes a chain of custody record located on the bottom portion the document. As with all chain of custody documents, these forms must clearly indicate every person who had custody of the sample. This is done by recording the full names (printed) and signatures of each person who took possession of the sample. The names must be legible and signatures must be present. Failure to meet these criteria would break the chain, and the form would be useless in any court proceeding. ECLS reserves the right to reject any sample for which chain of custody has been compromised and/ or the documentation is incomplete.

Also at the time of sample collection, the sample bottles are numbered and labeled with the appropriate colored ECLS bottle labels according to the following:

- Light blue: BOD analyses. The sample collector must note the dilutions required for analysis on the tag.
- Lilac: for volatile organic analyses by US EPA Method 524.2.
- Orange: for volatile organic analyses by US EPA Method 624.
- Red: for pesticide and PCB analyses by US EPA Methods 505 and 508A.
- White: for any other analyses.
- White label with blue lettering: for bacteriology analyses. The sample collector must note the dilutions required for analysis on the tag.
- White label with green lettering: for trace metal analyses.
- White label with black lettering: for general chemistry analyses.
- White label with orange lettering: for preserved nutrient analyses such as total phosphorous, ammonia, and kjeldahl nitrogen.
- White label with brown lettering: for semi-volatile organic analyses by US EPA Method 525.2.
- White label with pink lettering: for pesticide and PCB analyses by US EPA Method 608.
- White label with pink lettering: for semi-volatile analyses by US EPA Method 625.
- White label with burgundy lettering: Chromium Hexavalent
- White label with rust lettering: EPA Method 507
- White label with brown lettering: EPA Method 515
- White label with brown lettering: EPA Method 531
- White label with red lettering: Cyanide
- White label with orange lettering: Phenolic

The sample collector must specify the analyses requested on the tag. The sample collector also indicates on each label the preservation steps, if any, that have been taken for that particular sample container. This is documented in the laboratory by the sample custodian, at the time of receipt, by completing the form **Attachment 7**. This form is maintained in the batch file folder. The labels are water resistant and completed with indelible ink.

5.4 ALIQUOTS

In taking an aliquot of a submitted sample, the analyst makes sure that the sample is well-mixed and then uses the appropriate means to obtain a sub-sample, including filtering the sample if required by the method. Regardless of the manner chosen, the transferring agent should be rinsed with the sample prior to actually taking the aliquot.

5.5 FIELD and TRIP BLANKS

TRIP BLANKS: The trip blank is used to assess the sample transportation mechanism for possible contamination. It contains organic free water that has been sealed in a bottle in the laboratory. It accompanies the sample bottles from the laboratory to the sampling site and back again unopened. It is then analyzed as a "routine" environmental sample.

FIELD and TRIP BLANKS are not required to determine the acceptability of an analytical run. They are used by the data user to determine whether the samples possibly could have been subjected to a contamination source prior to analysis. It is the clients' prerogative to submit, or not, field and trip blanks. It should be clearly understood by the client that these blanks are highly recommended to be supplied with VO samples. They can also be submitted with other types of samples as well. ONLY THE METHOD BLANK IS USED TO DETERMINE THE ACCEPTABILITY OF AN ANALYTICAL RUN.

5.6 FIELD DUPLICATES and "SEQUENTIAL SAMPLES"

In the past, there has been some confusion as to what constitutes a field duplicate. A field duplicate is a sample that has been collected in sufficient volume, in a single container and preserved, and then split between the 2 sample containers prior to their being submitted to the laboratory for analysis. Care must be taken in splitting the sample into 2 separate containers. Each separate sample must be equivalent to each other. As an example, if some sediment is collected into the original sampling container, then that sediment must be included in each of the duplicate samples. If the sediment is only included in one of the submitted samples, they are not true field duplicates. What has been submitted erroneously as field duplicate samples really can be classified as sequential samples. Some sample collectors have described the procedure they use for collecting their "field duplicates." They collect a sample and preserve it and then place that sample in the appropriate sample container. They then collect another sample from the same spot at the sampling location and preserve it and transfer it to the appropriate sample container. They then call these 2 separate samples duplicates.

If the purpose behind submitting field duplicate samples is to place a check on the laboratory's precision in analyzing samples, then true field duplicates, as define above, must be submitted. If the purpose of submitting field duplicates is to test the precision of the sampler's technique, then that can not be accomplished with the true field duplicate since the sampler is only collecting one sample. It also can not be accomplished with the sequential samples since two completely different samples have been collected.

ATTACHMENT 3

Field ID Number	New Jersey Department of Health and Senior Services Environmental and Chemical Laboratory Services PO Box 361, Trenton, NJ 08625-0361 Phone: 609-530-2820 **ORGANIC AND INORGANIC CHEMISTRY SAMPLE SUBMITTAL**	Lab Sample Number (For Lab Use Only)

AGENCY INFORMATION

Submitting Agency	Send Results To	Agency No.	Project Name
Street Address	Final Report Option ☐ Tier 1 ☐ Tier 2 Electronic Report Option ☐ EDD ☐ E-2	Would you like copies of the internal chain of custody forms sent with your report? ☐ Yes ☐ No	Project Code Memo Number
City, State, Zip Code	Phone	Fax	Email

SAMPLE INFORMATION

Sample Point/Station ID Number/Water Facility ID	Collection Date (YY/MM/DD) __ __ / __ __ / __ __	**Sample Type**
Sampling Site/Facility/Supply/Location/Sampling Point ID	Coll. Time (24h) Start __ __ __ __ Coll. Time (24h) End __ __ __ __	**Non-Potable:** ☐ Stream/Surface ☐ Ground Water ☐ Private Well ☐ Septic ☐ Ocean/Saline ☐ Sediment ☐ Tissue ☐ Sewage: ☐ Raw ☐ Effluent ☐ Industrial: ☐ Raw ☐ Effluent
Waterbody Name	Sample Retention Retain? ☐ No ☐ Yes Duration _____	
Municipality/County	Type of Sampling Event ☐ Regular ☐ Compliance ☐ Repeat ☐ Non-Regulatory ☐ Other	**Potable:** ☐ Groundwater Rule ☐ Source ☐ Confirmation ☐ Raw ☐ Finished ☐ Private Well ☐ At Source ☐ Flushed ☐ 1st Draw ☐ Lead Source Line ☐ Surface H_2O Intake ☐ Distribution System
Sampling Point Street Address	If Repeat or GWR, List Original Lab Sample No.	
	Sample Collector	**Fraction:** ☐ Total ☐ Dissolved
PWSID	Trip #	**Other:** ☐ _____
		Priority: ☐ Routine ☐ Priority ☐ Emergency

FIELD INFORMATION

Air Temp °C	Water Temp °C	Stream Flow-CFS
Weather Conditions	Sample pH (Field)	Gage Height-Ft.
Preserved In: ☐ Field ☐ Lab Date: __ __ / __ __ / __ __ Time: __ __ __ __	DO (mg/l)	Spec Cond (µS/CM)
	DO% Sat	Salinity (ppm)
Chlorine Residual	Sample Depth Ft.	Tide Stage
Comments	Barometric Pressure (mmHg)	Turbidity (NTU)

ANALYSIS REQUESTS

Metals

☐ Ag	Silver	☐ Mg	Magnesium
☐ Al	Aluminum	☐ Mn	Manganese
☐ As	Arsenic	☐ Mo	Molybdenum
☐ B	Boron	☐ Na	Sodium
☐ Ba	Barium	☐ Ni	Nickel
☐ Be	Beryllium	☐ Pb	Lead
☐ Ca	Calcium	☐ Sb	Antimony
☐ Cd	Cadmium	☐ Se	Selenium
☐ Co	Cobalt	☐ Si	Silica
☐ CR-T	Chromium	☐ Tl	Thallium
☐ Cu	Copper	☐ U	Uranium
☐ Fe	Iron	☐ V	Vanadium
☐ K	Potassium	☐ Zn	Zinc

Preferred Methodology

☐ EPA 200.7 / 200.9 ☐ EPA 200.8

Residues

☐ Total Suspended Solids (TSS)
☐ Total Solids (TS)
☐ Total Dissolved Solids (TDS)
☐ Settleable Solids (SS)

General

☐ Alkalinity
☐ Bromide by IC
☐ Chloride
☐ Chloride by IC
☐ Chromium, Hexavalent
☐ Color
☐ Conductance
☐ Cyanide
☐ Dissolved Oxygen
☐ Fluoride
☐ Fluoride by IC
☐ Hardness
☐ MBAS
☐ Odor
☐ pH
☐ Phenols (PW)
☐ Phenols (NPW)
☐ Sulfate
☐ Sulfate by IC
☐ Turbidity

Mercury

☐ Mercury by EPA 245.1

Nutrients

☐ Nitrite
☐ Total Phosphorus
☐ Ammonia
☐ Nitrate (Calculated)
☐ Nitrite + Nitrate
☐ Ortho Phosphorus
☐ Total Kjeldahl Nitrogen (TKN)

Other

☐ _____ ☐ _____ ☐ _____

Organics (Drinking Water)

☐ EPA 504.1 - EDB, DBCP, 123TCP
☐ EPA 505 - Organochlorine Pest. & PCB's
☐ EPA 507 - N and P containing Pesticides
☐ EPA 515.3 - Chlorinated Acid Herbicides
☐ EPA 524.2 – Purgeables
☐ EPA 525.2 - Liquid-Solid Extractables
☐ EPA 531.1 - N-Methylcarbamoyloximes and N-Methylcarbamates

Organics (Non-Potable Water)

☐ EPA 608 - Organochlorine Pest. & PCB's
☐ EPA 624 – Purgeables
☐ EPA 625 - Base/Neutral and Acid Extractables

Demands

☐ Total Organic Carbon (TOC)
☐ Dissolved Organic Carbon (DOC)
☐ Chemical Oxygen Demand (COD)

Suggested Dilutions

☐ BOD5 ☐ BOD20 ___ ___ ___
☐ CBOD5 ☐ CBOD20 ___ ___ ___

Relinquished By:	Affiliation:	Received By:	Affiliation:	Date/Time	Reason for Custody Change
Name (Print): _____		Name (Print): _____			
Signature: _____	_____	Signature: _____	_____	_____	_____
Name (Print): _____		Name (Print): _____			
Signature: _____	_____	Signature: _____	_____	_____	_____

CHEM-44
MAR 12

Distribution: White (Original) - Sent With Final Report; Yellow - Chemical Testing Lab; Pink - ECLS Central File; Gold - Sample Collector

ATTACHMENT 4

Field ID Number	New Jersey Department of Health and Senior Services Sanitary Bacteriology Laboratory PO Box 361, Trenton, NJ 08625-0361 Phone: 609-530-8396	Lab Sample Number (For Lab Use Only)

BACTERIOLOGICAL SAMPLE SUBMITTAL

AGENCY INFORMATION

Submitting Agency	Send Results To	Agency No.	Project Name
Street Address	Final Report Option ☐ Tier 1 ☐ Tier 2 Electronic Report Option ☐ EDD ☐ E-2	Would you like copies of the internal chain of custody forms sent with your report? ☐ Yes ☐ No	Project Code Memo Number
City, State, Zip Code	Phone	Fax	Email

SAMPLE INFORMATION

Sample Point/Station ID Number/Water Facility ID	Collection Date (YY/MM/DD) __ __ / __ __ / __ __	**Sample Type** **Non-Potable:** ☐ Stream/Surface ☐ Ground Water ☐ Private Well ☐ Septic ☐ Ocean/Saline ☐ Sediment ☐ Tissue ☐ Sewage: ☐ Raw ☐ Effluent ☐ Industrial: ☐ Raw ☐ Effluent
Sampling Site/Facility/Supply/Location/Sampling Point ID	Coll. Time (24h) Start __ __ __ __ Coll. Time (24h) End __ __ __ __	
Waterbody Name	Sample Retention Retain? ☐ No ☐ Yes Duration _____	
Municipality/County	Type of Sampling Event ☐ Regular ☐ Compliance ☐ Repeat ☐ Non-Regulatory ☐ Other	**Potable:** ☐ Groundwater Rule ☐ Source ☐ Confirmation ☐ Raw ☐ Finished ☐ Private Well ☐ At Source ☐ Flushed ☐ 1st Draw ☐ Lead Source Line ☐ Surface H_2O Intake ☐ Distribution System
Sampling Point Street Address	If Repeat or GWR, List Original Lab Sample No.	
	Sample Collector	Fraction: ☐ Total ☐ Dissolved
PWSID	Trip #	Other: ☐ _____ Priority: ☐ Routine ☐ Priority ☐ Emergency

FIELD INFORMATION

Air Temp °C	Water Temp °C	Stream Flow-CFS
Weather Conditions	Sample pH (Field)	Gage Height-Ft.
Preserved in: ☐ Field ☐ Lab Date: __ __ / __ __ / __ __ Time: __ __ __ __	DO (mg/l)	Spec.Cond. (µS/CM)
	DO% Sat	Salinity (ppm)
Rain Events Rain in the last 24 hours? ☐ Yes ☐ No Rain in the last 48 hours? ☐ Yes ☐ No	Sample Depth Ft.	Tide Stage
	Barometric Pressure (mmHg)	Turbidity (NTU)
Comments		Chlorine Residual

ANALYSIS REQUESTS

				Suggested Dilutions								
				10	1	10⁻¹	10⁻²	10⁻³	10⁻⁴	10⁻⁵	10⁻⁶
Fecal Coliform/100 ml	☐	MPN	SM9221E	☐	☐	☐	☐	☐	☐	☐	☐
Fecal Streptococci/100 ml	☐	MPN	SM9230B	☐	☐	☐	☐	☐	☐	☐	☐
Total Coliform / 100 ml	☐	MPN	SM9221B	☐	☐	☐	☐	☐	☐	☐	☐
	☐	MF	SM9222B								
Escheria coli / 100 ml	☐	MF	EPA-1103.1								

				Suggested Dilutions								
				10	1	10⁻¹	10⁻²	10⁻³	10⁻⁴	10⁻⁵	10⁻⁶
Fecal Coliform by A1	☐	MPN	SM9221E	☐	☐	☐	☐	☐	☐	☐	☐
Enterococci / 100 ml	☐	MPN	SM9230B	☐	☐	☐	☐	☐	☐	☐	☐
	☐	MF	SM9230C								
SPC/HPC	☐		SM9215B								

Relinquished By:	Affiliation:	Received By:	Affiliation:	Date/Time	Reason for Custody Change
Name (Print): _____		Name (Print): _____			
Signature: _____	_____	Signature: _____	_____	_____	_____
Name (Print): _____		Name (Print): _____			
Signature: _____	_____	Signature: _____	_____	_____	_____

BACT-44 (R1)
MAR 12

Distribution: White (Original) - Sent With Final Report; Yellow - Bacteriological Testing Lab; Pink - ECLS Central File; Gold - Sample Collector

ATTACHMENT 5

Field ID Number	New Jersey Departmer Environmental and Chemical Laboratory Services PO Box 361, Trenton, NJ 08625-0361 Phone: 609-530-2820	ıb Sample Number (For Lab Use Only)

RADIOANALYTICAL SERVICES SAMPLE SUBMITTAL

AGENCY INFORMATION

Submitting Agency	Send the Results To (Name)	Project Name	
Street Address	Phone	Project Code	
City, State, Zip Code	Fax	Memo Number	
Agency No.	Email	Final Report Option ☐ Tier 1 ☐ Tier 2	Electronic Report Option ☐ EDD ☐ E-2

SAMPLE INFORMATION

Sample Point/Station ID Number/Water Facility ID	System Name	PWSID
Sampling Site/Facility/Supply/Location/Sampling Point ID	Facility Name	Trip Blank #
Sampling Point Street Address	Municipality/County	Sample Collector

Collection Interval (YY/MM/DD) Time (24h)

Start: ___ / ___ / ___ _____

Stop: ___ / ___ / ___ _____

Type of Sampling Event
☐ Compliance ☐ Regular
☐ New Well Test
☐ Other: _____

Sample Type
☐ Water-POE ☐ Soil/Sediment
☐ Water-Raw ☐ Wipe/Filter
☐ Water-Waste ☐ Vegetation
☐ Water-Distribution
☐ Other: _____

Sample Retention - Retain?
☐ No ☐ Yes - Duration _____

Container Description # of
☐ 1 Gallon Cubitainer ____
☐ 2 Gallon Jug ____
☐ Other: _____ ____

State Container?
☐ Yes ☐ No

FIELD INFORMATION

Background Emission Rate (μR/hr)	Sample Emission Rate (μR/hr)	Water Temp °C	Sample Depth Ft.	Preserved in: ☐ Field ☐ Lab
		Sample pH (Field)	Turbidity (NTU)	Date: __ __ / __ __ / __ __ Time: __ __ __ __

Comments

ANALYSIS REQUESTS

Priority Level
☐ Routine ☐ Priority ☐ Emergency

Gross Alpha
☐ Evaporation –48 Hour (ECLS-R-GA)
☐ Evaporation (EPA 900.0)
☐ Total ☐ Sus. ☐ Dis.
☐ Coprecipitation (ECLS-R-GA-CO)

Gross Beta
☐ Evaporation (EPA 900.0)
☐ Total ☐ Sus. ☐ Dis.

Radium by Gamma Method
☐ Total ☐ Sus. ☐ Dis.
☐ Radium-224 (SM 7500-RA E)
☐ Radium-226 (ECLS-R-RA226/RA228)
☐ Radium-228 (ECLS-R-RA226/RA228)
☐ **Ra-228**, Radiochemical (NJ Method)
☐ **Unsupported Lead-212** (NJ Method)

Uranium
☐ Isotopic Uranium (EPA 00-07)
☐ Total Uranium by ICP/MS (EPA 200.8)
☐ **Radon-222** (EPA 913.0)
☐ **Tritium** (EPA 906.0)

Strontium (ECLS-R-SR89/90)
☐ Strontium-89 and -90
☐ Strontium-90
☐ **Polonium-210** (FERN-RAD. 0002.00)
☐ **Gamma Spectroscopy** (EPA 901.1)
(Specify radionuclides):
☐ K-40 ☐ Co-60. ☐ Zn-65
☐ I-131 ☐ Ba-133 ☐ Cs-134
☐ Cs-137 ☐ Ra-226 ☐ Ra-228
☐ U-238
Other: _____
_____

Relinquished By	Received By	Date	Time	Reason for Change of Custody

RAD-4
MAY 12

Distribution: White (Original) - Sent With Final Report
Yellow - Chemical Testing Lab
Pink - ECLS Central File
Gold - Sample Collector

J0477

New Jersey Department of Health and Senior Services
Environmental and Chemical Laboratory Services
P.O. Box 361
Trenton, NJ 08625-0361

INTERNAL CHAIN OF CUSTODY

Instructions: Use one form for each Laboratory Batch or 20 samples, whichever is smaller.

Analyte/Fraction
Analytical
Laboratory Batch Label

Laboratory Employee Accepting Responsibility for Sample	Data Package Type ☐ SRRP ☐ MRRP	Field Sample Seal #
	Priority Level ☐ Routine ☐ Priority ☐ Emergency	Date Seal Broken: _ _ _ _ _ _ _ _ _ _ _ _
		Time Seal Broken: _ _ _ _ _ _ _ _

Laboratory Sample No.	Field Sample No.	Laboratory Sample No.	Field Sample No.

Date	Time	Relinquished By	Received By	Purpose of Change of Custody
		Printed Name	Printed Name	
		Signature	Signature	
		Printed Name	Printed Name	
		Signature	Signature	
		Printed Name	Printed Name	
		Signature	Signature	
		Printed Name	Printed Name	
		Signature	Signature	
		Printed Name	Printed Name	
		Signature	Signature	
		Printed Name	Printed Name	
		Signature	Signature	
		Printed Name	Printed Name	
		Signature	Signature	
		Printed Name	Printed Name	
		Signature	Signature	

ATTACHMENT 7

Printed: 6/22/2012 3:17:46PM

2060709

NJ PHEAL

Client:	**NJDEP Northern Enforcement**	**Project Manager:**	**Douglas Haltmeier**
Project:	**industrial effluent**	**Project Number:**	**[none]**

Report To:
NJDEP Northern Enforcement
Maria Coppola
7 Ridgedale Avenue
Cedar Knolls, NJ / USA 07927
Phone: (973) 656-4099
Fax: (973) 656-4400

Invoice To:
NJDEP Northern Enforcement
Maria Coppola
7 Ridgedale Avenue
Cedar Knolls, NJ / USA 07927
Phone :(973) 656-4099
Fax: (973) 656-4400

Date Due	07/19/2012 00:00 (30 day TAT)		
Received By	Sandra Camacho	Date Received:	06/07/2012 14:39
Logged In By	Sandra Camacho	Date Logged In:	06/07/2012 14:50

Samples Received at:	1.9°C		
Received On Ice	Yes	Visible suspended mat	No
Containers Intact	Yes		
COC/Labels Agree	No		
Preservation Confirms	Yes		

Analysis	Due	TAT	Expires	Comments
2060709-01 RAMAPO RIVER [Water] Sampled 06/07/2012 11:15 Eastern				**182407**
Solids, Total Suspended (TSS)	06/21/2012 00:00	10	06/14/2012 11:15	
Phosphorus, Total (Total)	06/27/2012 00:00	14	07/05/2012 11:15	
Nitrogen, Ammonia - Distilled (Total)	06/21/2012 00:00	10	07/05/2012 11:15	
CBOD	06/08/2012 00:00	1	06/09/2012 14:39	

Preservation Confirmation

Container ID	Container Type	pH
2060709-01 A	Plastic, 1000mL	
2060709-01 B	Plastic, 250mL	
2060709-01 C	Plastic, 500mL pH<2 H2SO4	

Preservation Confirmed By _____ Date _____

Reviewed By _____ Date _____

CHAPTER SIX

LABORATORY SAMPLE HANDLING PROCEDURES

6.1 SAMPLE SCHEDULING

Routine samples are samples whose analytical requests are based on the "**SAMPLE COLLECTION, PRESERVATION, AND HOLDING TIMES FOR AQUEOUS SAMPLES**" found in Chapter 5. ECLS has specific maximum capacities for certain routine analyses due to limitations in resources, time required to complete certain analyses, quality control requirements and holding time restrictions. The organic methods are most likely to be affected by these concerns. However, other methods may also be affected during periods when sampling loads are heavy. Whenever ECLS approaches the limits of its analytical capabilities, ECLS informs the appropriate clients so they can adjust their sampling schedules. In an effort to prevent an over submittal situation from developing, routine sampling projects are scheduled through ECLS Sample Receiving (609-530-2773 or 609-530-2753) at least 48 to 72 hours before the anticipated sampling collection to verify that the capacity exists for the normal completion of the project. As these projects are scheduled, the staff is informed of such so they can be prepared to analyze them in as an expedient manner as possible. Requests for sample bottles, preservatives, etc., used in the collection of routine samples can also be made through the Sample Receiving.

INFORMING ANALYSTS OF SPECIFIC CLIENT INFORMATION

There are instances when ECLS is asked to perform an analysis that would constitute a departure from our documented policies or to evaluate whether it is feasible to conduct a new analysis. For each of these instances, it is necessary for both parties to have a clear understanding of each party's desires and what the consequences of any subsequent action would be. Therefore, it is necessary to develop a Quality Assurance Project Plan (QAPP) to memorialize the decisions reached by the parties (see Chapter 1).

However, the most likely information that is referred to the analysts deals with sample scheduling and the specifics of the various projects being run by DEP. Informing the analysts of sampling schedules allows them to prepare for the sampling events and to determine if those events would overwhelm the analytical capacity of the laboratory. Informing the analysts of project requirements makes them aware of any additional information that the analysts would need to be in a position to handle the project, e.g., knowing that a certain project is scheduled to come in next week and that it will consist of 20 samples that will have to be analyzed according to total and dissolved procedures. This means that 40 analyses would have to be conducted instead of 20, something the analysts should be in the position to prepare for.

PROCEDURE

1. When ECLS Management has been informed of the specifics of a planned project or has signed off on a QAPP, that information is forwarded, by the ECLS Service Director or his designee, to the Program Managers so they can inform their staff of such.
2. This notification is to consist of a copy of the QAPP or a copy of the correspondence describing the project or a summary of the project specifics. If a project is already underway, then a re-construction of the project specifics must be prepared and distributed.
3. The analysts keep this information for subsequent referrals.
4. When Sample Receiving reviews the collector's paperwork during the sample acceptance process, they must make sure that when samples are submitted under a defined project, that the project is specified on the submittal forms. *ALL REQUESTED ANALYSES MUST BE DOCUMENTED ON EACH OF THE SAMPLE SUBMITTAL FORMS.*
5. Sample Receiving must then inform the analysts that samples have been received under a specific project. This notification can be accomplished by emailing the analytical supervisors or by verbally informing the affected analysts, or, if possible, by clearly defining certain Batch Numbers as specific to a project.

All non-routine samples, samples whose analytical requests are not based on Chapter 5 collection criteria or are intended to be submitted under priority or emergency turnaround times, must be scheduled through the ECLS Sample Receiving Supervisor (609-530-2802), or his designee (609-530-4581), at least 48 to 72 hours before the anticipated sample collection.

As sampling events are scheduled, the number and types of bottles that will have to be distributed for each event and the date of bottle pick-up are entered into the ECLS laboratory information management system (LIMS), referred to as Element, by the person scheduling the event.

Sample submitters should be aware of ECLS analytical capabilities and submit only samples that ECLS can analyze completely. If questions arise regarding ECLS capabilities, those questions are discussed with the ECLS Service Director prior to submittal. If ECLS can not meet the analytical needs of the submitter, the submitter should make other arrangements to meet their needs. In some cases ECLS sub-contracts with other laboratories.

6.2 SAMPLE ACCEPTANCE CRITERIA AND ROUTINE SAMPLE RECEIVING

All samples submitted to ECLS for analysis are logged-in at the sample receiving area, located on the first floor Room L176. The sampler accesses the sample receiving area in the rear of the laboratory. S/He is then met by the receiving staff and the samples are processed. ECLS's sample custodians are available from 8:00 AM to 4:30 PM Monday through Friday. However, samples may be submitted outside of the sample submission hours listed above. Special arrangements should be made through the Sample Management Office as early as possible prior to sample submittal so that a sample custodian may be scheduled to receive the samples. **AT NO TIME ARE NON-LABORATORY PERSONNEL PERMITTED IN THE LABORATORY BEYOND ROOM L176, UNLESS APPROVED BY THE ECLS SERVICE DIRECTOR AND ACCOMPANIED BY ECLS STAFF.**

SAMPLE ACCEPTANCE CRITERIA AND ROUTINE SAMPLE RECEIVING

ECLS has trained personnel whose primary function is receiving samples. Only those people who are trained in the specific functions that they are performing are authorized to receive samples. The sample custodians perform a review of the sample acceptance criteria and, if all the criteria are fulfilled, will take possession of the samples and log the samples into the Element. Refer to ECLS Sample Receiving SOP (ECLS-SR-1) for a more detailed description of sample log-in procedure.

6.3 CHAIN OF CUSTODY LOG-IN

The analytical results of some samples submitted to ECLS for analysis have the potential of being submitted as evidence in a court of law. These samples are considered physical evidence and, as such, their possession must be traceable from the time the samples are collected until they are introduced as evidence in legal proceedings.

A sample is considered under an individual's custody if:

a. It is in his possession.
b. It is in his view after being in his possession.
c. It is in his possession and then is locked up to prevent tampering, or
d. It is in a secure area. A secure area is one where access to a sample can only be achieved by a representative of ECLS.

CHAIN OF CUSTODY LOG-IN

ECLS does not maintain COC records for sample bottles while they are awaiting distribution to the sample collectors. Once cleaned or purchased pre-cleaned bottles are unpacked, all sample bottles are stored in a secure area in ECLS. All sample bottles remain in secure storage until they are released to the sampling personnel.

Every sample submitted to ECLS is treated as chain of custody sample, and the possession history is documented on the bottom portion of each sample submittal form (see Chapter 5 attachments 3, 4 & 5). Upon receipt of the sample the sample custodian signs the COC section of the sample submittal sheet signifying that the sample custodian has taken custody of the designated samples on behalf of the ECLS unit. The sample custodian prepares the Internal

Chain of Custody forms for each bottle submitted. The samples are transferred immediately and locked by the sample custodian in the designated COC refrigerator(s). The signed COC forms are delivered to L176. However, in the case of COC samples requiring pH, or other analyses with limited holding times, the sample custodian may immediately distribute the sample bottle(s) for the parameters to the appropriate analyst and have the analyst sign the Internal COC form for the receipt of the bottle. The COC forms are maintained in A465.

There are several people who function as sample custodians. Receipt of samples by one custodian is equivalent to receivership by all the custodians. This is necessary since the custodian that received COC samples at closing will not be available to release the samples when they are needed by the analysts early the next morning. The custodian may not start work before the samples are needed or he may be out on leave or out sick. If that were allowed to be the case, the analyses could not be started until at least two hours after ECLS starting time. This could very well affect the validity of the sample for those parameters that have a short holding time, i.e., hexavalent chromium.

INTERNAL CHAIN OF CUSTODY

Internal chain of custodies document the movement and possession of samples from the time that are received by the ECLS testing program staff until all analyses are completed. In instances where internal chain of custodies are required, these documents are initiated by ECLS sample receiving personnel when samples are transferred to ECLS testing program staff for analysis.

When analysts come to ECLS sample receiving to retrieve their samples, they must see the sample receiving personnel. The sample receiving personnel facilitates the transfer of samples from ECLS sample receiving to the analyst. This involves the sample custodian relinquishing the samples both by physically handing them to the analysts and by signing the internal chain of custody indicating as such.

The analyst then receives the samples and countersigns the internal chain of custody form and takes possession of the samples on behalf of the laboratory program. The date and time of transfer are documented on the internal chain of custody. **See Attachment 6, Internal Chain Of Custody.**

6.4 SAMPLE REJECTION

As stated above, samples and their corresponding paperwork are checked and reviewed during the sample receivership process. Errors that are found that adversely affect the quality of the analytical data will result in the sample custodian "rejecting" the sample and therefore, the sample will not be analyzed.

The sample custodian will reject samples and fill out a sample rejection form **Attachment 8** when samples are submitted under the following instances:

a. Sample was not properly preserved (stamped "NPP"). This includes those instances when:
   - The preservative was not added at the time of collection.
   - Insufficient preservative was added.
   - Too much preservative was added.
   - The preservative used was not indicated on the sample bottle, or
   - An improper preservative was used.

b. The sample was not properly labeled (stamped "NPL"). This includes those instances when:
   - The wrong sample ID number is affixed to the sample bottle.
   - The wrong sample bottle tag is affixed to the sample bottle.
   - The sample ID numbers on the sample analysis request form and sample bottle tag (also COC form, if used) do not match, or
   - No sample ID number and/or sample bottle tag is affixed to the sample bottle.

c. Samples were submitted in an improper container (stamped "IPC"). This includes those instances when:
   - Samples are submitted in plastic containers when glass bottles are required, or vice versa.
   - Sample bottles were not properly prepared before sample collection, or
   - Sample bottles with screw cap lids do not have the required Teflon inserts.

d. Sample exceeds holding time. This is used on samples that are submitted to ECLS for the analysis of a parameter whose holding time has already been exceeded.

e. Sample will exceed holding time (stamped "Sample will exceed the recommended holding time for the parameter before the analysis can be performed by the ECLS laboratory"). This is used when samples are submitted to ECLS within the holding time for the analysis of a parameter but whose holding time will be exceeded before ECLS can initiate the analysis. Sometimes samples are submitted that possibly may not be analyzed before the holding time requirements are exceeded. These samples/analytes will not be rejected since ECLS will do whatever it can to analyze these samples within holding time considerations. However, if the analyses cannot be analyzed in a timely enough manner, the resultant data will be qualified as questionable. A notation will be made on the sample submittal form at the time of submittal as to which analyses may be in jeopardy. Only in those instances where it is a fact that the analyses cannot be completed in time will this rejection citation be used. For example, an unpreserved VO sample has a 24 hour holding time. Since ECLS has to honor its prior commitments for the analysis of scheduled VO analyses and since these commitments are on a tight time line and scheduled sometimes months in advance, ECLS could not analyze the unpreserved sample before the holding time will expire. That sample would be rejected.

f. Samples submitted for bacteriological analysis that are received after 4:15 PM cutoff time (stamped "Sample delivered to ECLS laboratory after the 4:15 cutoff time").

g. Samples will also be rejected for other reasons affecting analyst safety, data quality and/or reliability, such as:
   - Date and time of sample collection and/or name of sample collector are not indicated on the sample analysis request form.
   - Sample bottle not submitted for the requested analysis.
   - Sterile bacteriological sample bottles exceed the expiration date indicated on the sample bottle.
   - Samples submitted for VO analysis contain air bubbles in all vials of a sample set. If only some of the vials contain air bubbles, the sample is accepted and the presence of air bubbles in some of the sample is so noted in the comment section of the sample analysis request form and the COC form, if present.
   - Air and wipe samples submitted for metal analyses without the required blanks.
   - Samples submitted in chipped or cracked bottles that pose a safety risk.

6.5 SAMPLE REJECTION OVERRIDE

Samples rejected under the procedures described above should not be analyzed due to the resultant data being of questionable quality. However, in some instances the requesting agency may feel that the resultant data may still be of value even though it may be of questionable quality.

a. At the time of sample rejection, a sample rejection form is completed by the sample custodian. **Attachment 8**.

b. The sample collector must then indicate to the sample custodian that they are requesting that the rejection be overridden and that the sample analysis can proceed.

c. The sample collector must confirm this request by signing in the appropriate place on the sample rejection form.

d. This signature authorizes ECLS to proceed with the requested analysis, report the results when available, and qualify the data where necessary.

e. Samples analyzed under the rejection override process will be billed to the sample submitting agency following normal billing practices. The resultant data will be qualified as appropriate and reported. The rejection override form is maintained in the batch file folder.

6.6 ROUTINE SAMPLE HANDLING

Analysts can determine what samples have been received and which tests have been scheduled by querying the Element database and creating a work list. Analysts should perform this function every day to ensure they keep themselves abreast of the current work queue.

Analysts generate work lists (lists of samples that are available for testing) using the *"Query Analysis Status"* module. This module is opened via a drop down menu by clicking on *"Laboratory"* on the main Element menu. The analyst then clicks on *"Query Analysis Status"* which opens the *"Query Analysis Status"* window. This module allows the user to query the database in a number of ways.

One of the more common queries is to search by analysis. The analyst selects the analysis of interest, sets the date range for the query and selects the statuses ("received" or "available") to be searched. When selecting the date range the analyst needs to make sure he spans an appropriate range so as not to miss any samples.

Once the analysis, date range and status have been selected the analyst clicks on the query button and a list of samples that meets the search criteria is generated. Samples listed in the "received" status have been received but have not yet been cleared by sample receiving staff for analysis; those that are in the "available" status have been cleared and need to be tested at the analyst's earliest convenience.

The results of the query can be sorted by selecting the various criteria in the three selection boxes displayed under "Order Results By." Element provides three sort levels. The results of the search will be displayed in the display area at the bottom of the window.

The results may now be printed in the form of a work list by clicking on the "Print" button.

Once the daily analytical workload has been determined, the analyst draws an aliquot of that sample from the appropriate sample container, or in cases where the analysis requires a separately prepared or preserved bottle, the analyst takes the bottle with them to the workstation. If the analysts note any abnormalities with the sample, similar to those listed in the **SAMPLE ACCEPTANCE CRITERIA AND ROUTINE SAMPLE RECEIVING See Chapter 5**, they list the abnormality in their analytical documentation. These observations may or may not be used to qualify the resultant data. However, this information would be invaluable to help determine the reason for any results that may be questioned in the future. The aliquot, or bottle, remains with the analyst, or the analyst's cell, until the analysis is completed. If a digestate etc. is produced during the analysis and must be kept overnight, the analyst follows the storage recommendations listed in the method. If no recommendations are provided, the analyst will store the digestate etc. in a manner that will not adversely affect the analysis.

As the analytical results are produced, they are reviewed by the analyst and uploaded to Element. The supervisor then reviews the raw data and approves the results in Element.

Prior to the preparation of the final report packages, the general chemistry and metal results undergo a final review by their respective section supervisor or designee. In the general chemistry section, a printout of the results, that were entered the previous week, is reviewed by the supervisor and any discrepancies are corrected. For the metals section, Data Management prints a listing of the sample results entered since the last time the program was run. This listing is then checked against the analytical instrument output records to ensure that no transcription or other errors were made.

Organic reports are reviewed by the technical supervisor prior to their being turned over to Data Management.

Once the laboratory supervisor is satisfied, the final reports are printed out by the data management section.
When all requested analyses are completed and the final reports are received by data management, the data management staff assembles the reports into a complete package which is logged out and forwarded to the requesting agency. At this

time, the remaining portions of sample are discarded and the bottles are sent to Central Services area for cleaning, unless long term storage of the samples has been requested at the time of sample submission.

6.7 CHAIN OF CUSTODY SAMPLE HANDLING

COC samples are received and logged-in by the sample custodian in room L176 with the appropriate internal COC forms being prepared at that time, one COC form for each bottle submitted for the sample. Also after log-in, the designated analyst in the VO section is notified. S/He comes to room L176 to take possession of those COC samples and signs all the COC documentation. Any remaining COC samples are placed in the COC refrigerator in room L176 by the sample custodian. There are several sample custodians and receipt by one of them is equivalent to receipt by all of them. This limits access to the COC samples to a small group of trained staff, yet eliminates the possibility that an absence of a single sample custodian could bring laboratory operations to a halt due to the inability to access samples. When an analyst needs an aliquot or sample container, a sample custodian unlocks the refrigerator and remains while the analyst draws his aliquot or takes the sample container. The custodian then re-locks the refrigerator, and together with the analyst, documents the transfer of custody by signing and dating the appropriate internal COC form. In the instances where only an aliquot is taken, the signed COC forms stay with the sample custodian. When bottles are taken by the analyst, the signed COC forms are taken by the analyst and returned with the bottles to the COC room after completing the analyses.

In those instances, where the analyst signing for a COC sample aliquot is the only person who will have possession of the sample through to the completion of analysis, the COC documentation is complete when the analyst enters the COC sample number on his digestion log, analysis log, etc. See below. These types of analyses tend to be the individual inorganic analyses such as ammonia, fluoride, etc.

In those instances where the analyst signing for a COC sample is not the only person within a particular analytical unit (work cell) to have possession of a sample through the completion of analysis, there are no additional COC form signings necessary to document possession changes within the cell. See below for the defining of work cell activities. Therefore, it is possible for an analyst other than the one initially signing the COC form to return the bottle and COC form back to the COC room. This does not break the COC since only members of the work cell had possession and control of the samples throughout the analysis timeframe. These types of analyses tend to be the ones that contain a large number of individual parameters that can be analyzed out of one sample container, such as metals, organics, etc.

In these instances, COC will be established as follows:

- The analyst signing the COC form will keep the samples in his possession, as per section 6.5, until such time as another analyst in his work group takes possession of the sample.
- This change can be for digestion, distillation, sample analysis, etc. and is documented by completing the forms for the specific process (digestion log) in the particular analytical unit by the person taking possession of the sample.
- If change of possession is necessary to conduct the instrumental part of the analysis, this is documented when the analyst creates his run order for the instrument. This is documented in either the analyst's workbook or the instrumental printout.
- Data verification is performed by the Technical Supervisor who initials this process step.
- Data entry into the laboratory information system and that data review is performed and initialed by the analyst doing the entry and review or the supervisor.
- All of the above changes in possessions are dated when they occur.

In this manner, the unbroken COC of the samples within the cell can be reconstructed and documented if necessary. When providing documented evidence of COC, for example, in a data package, a copy of all the signed COC forms showing change of possession will be provided in the COC portion of the data package.

COC samples are usually incorporated into an analytical run along with the routine samples. COC samples are usually discarded within 2 weeks of the completion of the analysis unless prior arrangements have been made to retain samples beyond this time.

WORK CELLS

Work cells are analytical units that perform the same types of analyses on submitted samples. There are 3 separate work cells from the sample collectors and do not share their bottles with any other operational unit within ECLS. The sample bottles remain in the possession of the members of the specific cell. The cell analysts obtain their aliquots from these bottles. Although the analysts within a cell have their individually assigned analyses to perform, the analysts within the cell have been trained on the other analyses that are conducted within the cell and can be re-assigned to the other analyses with a minimum of downtime. Since the analysts are so trained, if one analyst begins an analysis, the analysis can be completed by another in the cell without any decrease in data quality. A cell may assign an analyst to prepare samples for other analysts within the cell to run. Regardless of the specific assignments, receipt of a sample by one person in the cell is the equivalent to the receipt of the sample by all analysts of the cell since the sample is always in possession of the cell.

6.8 SAMPLE STORAGE

Samples are stored away from standards, reagents, food, and other potentially contaminating sources to prevent any type of cross-contamination. Samples are stored according to their preservation protocols until such time that a final report has been sent to the sample submitter. If special sample storage conditions were arranged for at the time of sample submittal, or within one week of submittal, such as, long term storage for up to one year, the requested storage will be implemented. If no prior arrangements were made for storage, the samples are discarded by the Sample Receiving section when the final reports are mailed.

Sample extracts, distillates, etc. are stored as per method requirements until the analyses are completed.

6.9 PROCEDURES FOR SAMPLE DISPOSAL

When analyses are completed, the analysts return their sample bottles/containers to their designated storage areas. Each analytical group is responsible for managing and discarding its own sample containers. Once it has been determined that the results for a particular sample have been reported and there is no longer a need to retain the sample, it can be disposed. As soon as the sample is disposed, a record documenting the disposal must be created.

This record of disposal is created using barcode scanners that are strategically located throughout the laboratory facility. The barcode scanners are interfaced to the laboratory information management system (LIMS). When a sample is disposed, the empty container is immediately scanned by the personnel performing the disposal. Each sample container that ECLS receives is labeled with a barcode upon its submittal. When the container is scanned, the sample information encoded within the barcode is automatically read into the laboratory's information management system (LIMS). This updates the container's status to "disposed" within the LIMS. Additionally, the LIMS database is updated and can be queried at any time to determine who disposed the container and when it was disposed. The LIMS can also be used to generate printed lists of disposed sample containers for purposes of documentation.

Digestates are discarded down the drain. Extracts are discarded as organic waste. Inorganic distillates, with the exception of cyanide, are discarded down the drain. Cyanide is discarded as hazardous waste only if the sample tested positive for cyanide. Organic distillates are discarded as organic waste. More detailed analyte specific instructions for sample and waste disposal are available in the individual method SOP.

APPENDIX 32a

BOD DILUTIONS

Historically, the dilutions listed on the sample submittal forms for the BOD analysis have been selected by the sample collector. The collector used his knowledge of the past BOD results for that particular site to determine the dilutions for the present sample. However, in many cases these selected dilutions have yielded analytical results that had to be qualified as an "estimated value." It has been suggested that ECLS pick the dilutions in an attempt to generate usable BOD data.

ECLS employs a BOD method that is based on method SM5210B. This method is the method that has been adopted by both DEP and EPA as the method of choice for this determination. The method clearly states that the analysis must yield an oxygen depletion of at least 2.0ppm. Any oxygen depletion less than this value is insufficient to yield a valid result. Therefore, the result must be reported as an "estimated value."

The dilutions used to generate BOD results are reported back to the sample collector with the results. The sample collector therefore has a historical database to tap when re-visiting a particular site to draw from when choosing the dilutions to be used. ECLS does not store its results according to sites, cases, etc but according to laboratory ID number. There is no feasible manner in which ECLS could possibly review previous data in order to pick dilutions since ECLS is not privy to DEP sampling schedule, unless there is a planned project in effect, and the historical data very possibly will be in secondary storage causing the constant ordering, retrieval, and replacing of records a logistical nightmare.

It was suggested that ECLS immediately perform a second analytical procedure which would hopefully provide information for picking BOD dilutions. Unfortunately, the ECLS workload would prevent this test from being performed in a timely enough manner to generate the results necessary for it to be of use before the holding time ran out on the BOD sample. In order to perform this test, the test would have to be submitted as an emergency sample thereby greatly increasing the cost of the BOD analysis. There is no guarantee that this other test would indicate that any dilutions, other than the ones chosen by the collector, be used. Therefore, estimated results could still be obtained.

There are a couple of reasons why the BOD test would yield insufficient oxygen depletion even if the BOD sample was analyzed without any dilutions. One would be that there is some type of contaminant in the sample that interferes with the testing process. The second is that the sample is "too clean" to generate the depletion necessary.

It was suggested that instead of the 3 dilutions that ECLS uses for each BOD test the number of dilutions should be increased to 5 or 6. Of course, this would proportionately increase the cost of the test.

The sample submittal form will include a box that the collector could check to have ECLS pick the BOD dilutions. It should be clearly understood that if the collector does check this box, the dilutions at which BOD samples will be analyzed are: 50, 75, and 100% for stream like samples and 5, 10, and 25% for industrial waste type samples.

New Jersey Department of Health and Senior Services
Environmental and Chemical Laboratory Services
P.O. Box 361
Trenton, NJ 08625-0361

INTERNAL CHAIN OF CUSTODY

Instructions: Use one form for each Laboratory Batch or 20 samples, whichever is smaller.

Analyte/Fraction
Analytical
Laboratory Batch Label

Laboratory Employee Accepting Responsibility for Sample	Data Package Type ☐ SRRP ☐ MRRP	Field Sample Seal #
	Priority Level ☐ Routine ☐ Priority ☐ Emergency	Date Seal Broken: _ _ _ _ _ _ _ _ _ _ _ _
		Time Seal Broken: _ _ _ _ _ _ _ _

Laboratory Sample No.	Field Sample No.	Laboratory Sample No.	Field Sample No.

Date	Time	Relinquished By	Received By	Purpose of Change of Custody
		Printed Name	Printed Name	
		Signature	Signature	
		Printed Name	Printed Name	
		Signature	Signature	
		Printed Name	Printed Name	
		Signature	Signature	
		Printed Name	Printed Name	
		Signature	Signature	
		Printed Name	Printed Name	
		Signature	Signature	
		Printed Name	Printed Name	
		Signature	Signature	
		Printed Name	Printed Name	
		Signature	Signature	
		Printed Name	Printed Name	
		Signature	Signature	

ATTACHMENT 8

New Jersey Department of Health and Senior Services
Division of Public Health and Environmental Laboratories
Environmental and Chemical Laboratory Services
PO Box 361
Trenton, NJ 08625-0361
Telephone: 609-292-5838 Fax: 609-984-0646

SAMPLE REJECTION/DISCREPANCY NOTICE

Submitting Agency	Date of Collection
Sample Location	Field Sample Number
Sample Collector	Date of Submission

REQUEST FORM INCORRECT/INCOMPLETE

[ ] No Date
[ ] No Time
[ ] No Collector Name
[ ] Analyses Not Indicated
[ ] Other:

SAMPLE SUBMISSION

[ ] Delivered After 4:15 PM Cut-Off Time for the Following Analyte(s):

[ ] Exceeded Holding Time for the Following Analyte(s):

[ ] May Exceed Holding Time for the Following Analyte(s):

SAMPLE CONTAINERS

[ ] Not Properly Labeled
[ ] Field Number Discrepancy
[ ] Bacteriology Bottle Out of Date
[ ] Separate Containers Required for:

[ ] Insufficient Sample Volume for:

[ ] Not Cooled

SAMPLE CONTAINERS, CONTINUED

[ ] Not Preserved as Required for:

[ ] Air Space Required for:

[ ] Chloride Required for:

[ ] Plastic Container Required for:

[ ] Glass Container Required for:

[ ] Container Not Properly Cleaned for:

[ ] Duplicate Required for QC Purposes for:

[ ] Triplicate Required for QC Purposes for:

[ ] Trip Blank(s) Out of Date
[ ] No Trip Blank Submitted
[ ] Air Bubbles Present in All VO Vials
[ ] Other:

CHAIN OF CUSTODY DOCUMENTATION

[ ] Missing Signature(s) / Date(s)
[ ] Missing / Incorrect Sample Identification

I understand that the sample(s) listed above may be compromised due to the reason(s) noted. Although the results obtained may be questionable, I am hereby requesting that ECLS carry out the requested analyses and report the results with any necessary qualifications.

Name (Print)	Title
Signature	Date

Distribution: White - Returned with Final Sample Report
Canary - ECLS File Copy
Pink - Submitting Agency Lab Services Coordinator
Gold - Submitter At Time of Sample Submission

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CHAPTER SEVEN

ANALYTICAL METHODS

7.1 LABORATORY METHOD MANUALS

ECLS has in-house method manuals detailing the exact procedures employed for each accredited analyte or test procedure (see attachments 9, 10, 11). Each analyst has his/her own copy of the method manuals for which they conduct analyses and a copy of the laboratory's Quality Manual. Additionally, each technical supervisor has copies of the methods that are under his supervision and a copy of the Quality Manual. Each method manual is arranged according to the following chapter headings:

- Identification of the test method.
- Applicable matrix or matrices.
- Detection limit.
- Scope and application, including components to be analyzed.
- Summary of the test method.
- Definitions.
- Interferences.
- Safety.
- Equipment and supplies and maintenance.
- Reagents and standards.
- Sample collection, preservation, shipment, and storage.
- Quality control.
- Calibration and standardization.
- Procedure.
- Calculations.
- Method performance.
- Pollution prevention.
- Data assessment and acceptance criteria for quality control measures.
- Corrective actions for out of control data.
- Contingencies for handling out of control or unacceptable data.
- Waste management.
- References.
- Any tables, diagrams, flowcharts and validation data.
- Appendices

REQUIRED ELEMENTS FOR THE PREPARATION OF METHOD STANDARD OPERATING PROCEDURE MANUALS (SOP)

The following items must be addressed in each of the ECLS SOP. This list of required elements is presented so that each ECLS SOP contains the same type of information located in the same section of the SOP. This list is not meant to represent the entire gamut of information that may be necessary to accurately describe the **"exact procedure"** that is being delineated in each specific SOP. Only the combination of the analysts and section supervisors can make the final determination as to what additional information is necessary. The finished SOP must contain all the pertinent information necessary to completely and accurately describe the entire analytical procedure and the responsibilities of the analysts and supervisors. Sufficient detail must be included so that an auditor is able to read the method and be able to follow what is written and verify that the method is being executed exactly without having to ask the analyst any questions as to what the analyst is doing For example, if you want to state that an extraction is to be performed using a specific reagent, it is not enough to just list it that way in the SOP. This step would be more acceptably written as "extract the sample with so many ml of a specific concentration of reagent, shaking the extraction vessel for a specific period of time, making sure that no foam develops as a result of the extraction."

CHAPTER SEVEN

ANALYTICAL METHODS

During this rewrite of the SOP, it may be advisable to consider the type of information that is currently recorded in the body of the SOP. Some information that must be included in the SOP is by their nature, things that may change over the time that the current revision is in effect, for example, the Demonstration of Capability (DOC), MDL values, and Reporting Limit values. By placing this type of information in an appendix of the method, one would not have to rewrite the entire method each time there is a change to those values. If a change is made to the Appendix information during the period of time that the SOP is in effect, add the new information to the Appendix while also keeping the old information. The new information should contain a statement to the effect that this information is replacing the previous information along with the date that the change took place. When the SOP is next revised, only a copy of the newest information is to be incorporated in that version. At that time, the Appendix revision number can be changed.

The designation of the in-house method must include the assigned in-house name and the revision number. Whenever a request is made for the method that is used to perform an analysis, both pieces must be provided.

Since the SOP represents what is being done by ECLS during the analysis, it is written in the ACTIVE VOICE. Therefore, verbs like "is" and "are" are used to describe the procedures and words like "should" are not to be used. Some reference methods contain wording such as "The analyst should..." which is not acceptable. The proper way of stating this is "The analyst does..."

Some of the following sections require the presentation of information that may be more easily listed as an Appendix to the method rather than in the body of the method. When situations like this arise, a reference to that Appendix is to be listed in the appropriate section.

The header information for each page of the SOP including the cover page must include:

- The in-house method name.
- The date that the in-house method was first prepared.
- The revision number of the SOP.
- The revision date for the most recent version of the SOP. The revision date is the date that the method updating was completed and forwarded to management.
- In either the header or footer of every page, including the cover page, that this page is "page x of the total number of pages."

The body of the cover page must include the Seal of DHSS and contain the following information:

- The physical address of laboratory where the analyses/calibrations are being performed. [A brief definition of the method, for example, determination of metals by ICP-AES, determination of volatile organics by GC/MS, etc.
- Spaces for the signatures, titles, and signature dates for: the primary analyst, the analytical supervisor, the section chief, the QAO, and the laboratory director/manager.
- A space for recording the effective date of the current revision. The effective date will be supplied by management and will most likely be a date approximately one to two weeks following the date that the final signature has been entered on the SOP, unless a later subsequent date is requested.

Section 1 Identification of the Test Method must include:

- The types of analyses that the method is used to conduct.
- The in-house method name which includes the ECLS designation and the current revision number of the method.
- A listing of the reference method(s) that the in-house method is based upon and where those reference methods can be located in the laboratory either the hard copy or electronic version of that method.
- If all of the acceptance limits listed in the in-house method are obtained from the reference method, a statement to that affect can be made in this section. If all of the acceptance limits are not obtained from the reference method,

then whenever an acceptance limit is listed in the SOP, it must be indicated as to where or how that limit was obtained or generated.

Section 2 Applicable Matrix or Matrices must include:

- All the matrices for which ECLS is currently employing this method. The only matrices that can be listed are those for which the method has been approved for use by USEPA, NJDEP, or some other nationally recognized compendium of analytical methods.

Section 3 Method Detection Limits must include:

- A listing of the current MDL values and the MDL completion date. A reference can be made that the completion date is listed on the Summary report. This information could be listed in an Appendix to the SOP.
- The procedure used to determine the MDL values. This section must be written out to document the exact procedure that was used to generate the values and must include: decision rationale used during this process, including the decision used to terminate the process; the formulas used to perform the calculations; the number of replicates used; and the Student t value employed. The Student t values are listed in Appendix B of 40CFR136.
- The raw data used to make the MDL determinations. Raw data is all the chart recordings, instrument printouts, etc. that were generated for the purpose of determining MDL. A Summary Report of this information can be listed in an Appendix to the SOP along with a statement indicating where all the raw data is located that was used to generate that information.
- When using a previous MDL value as the starting point for the generation of anew MDL, the evaluation criteria used to determine if the new calculated MDL is acceptable, must be included in the SOP. This could be statement such as, "If the new MDL value is +/-20% of the previous value, it is acceptable."
- List the RL value for the method along with calibration range employed for typical routine analyses.

Section 4 Scope and Application must include:

- A listing of the symbol or abbreviation used to identify the parameter in the raw data, etc. There are abbreviations that could refer to different parameters. For example, "TCE" could refer to trichloroethylene or tetrachloroethane, etc. Each such abbreviation must be defined as it is used in-house.
- Some form of designation indicating which of the parameters, that are currently being analyzed for by ECLS, were not listed in the reference method as being a parameter that was initially included in the reference validation of the method by the method developer. This would include those parameters that were explicitly requested by DEP to be added to the analytical process as well as any parameters that were requested by other clients and parameters that were added by ECLS to provide "analytical capability" for the clients. If ECLS is only analyzing parameters that were originally contained in the reference method, a statement to that effect must be made here.
- A listing of the Maximum Contaminant Levels (MCL) for the compounds that have an established MCL. It is necessary to list these MCL since obtaining analytical values that exceed the MCL requires that ECLS take appropriate steps to notify the client of such an incident.

Section 5 Summary of Method must include:

- A brief summary of the process, both manual and instrumental, used to conduct the analysis.

Section 6 Definitions must include:

- Only those definitions used to explain the terms used in that particular SOP should be included. Terms like "field duplicates" should not be included since it does not appear in the reference method and it is not used by the laboratory to determine the acceptability of an analytical run. That is a term coined by outside agencies to describe something that they use to evaluate, incorrectly, the accuracy of the laboratory results.
- Since ELEMENT uses different wording than we have in the past to express activities, etc., the terms being defined in this section must be correlated with the proper ELEMENT nomenclature.

Section 7 Interferences must include:

- A listing of the potential sources of interference that could affect the analytical accuracy of the generated data along with the steps that are/could be taken to eliminate/lessen the effects of that particular interference. If a previously defined data qualifier does not exist for the particular situation, documentation can be made through the use of a "custom qualifier."
- A statement is to be made indicating that the definitions of the previously defined, routine qualifiers are located in the QM.

Section 8 Safety must include:

- A listing of the general safety precautions taken by the analysts: lab coats, safety glasses, etc. along with any safety precautions specific to the analysis that also must be employed.
- Location of the Material Safety Data Sheets (MSDS).
- A listing of the hazardous chemicals used along with a listing of the "Health Effects", "Target Organ", and "Incompatibilities" and any special safety precautions that must be employed when handling a particular chemical.

Section 9 Equipment, Supplies, and Maintenance must include:

- A listing of the specific equipment and supplies used to perform the analyses along with their instrument identification numbers. The instrument identification numbers are those numbers that are assigned to the instruments based upon the naming system contained in the QM. A statement should be made indicating that the identification of the various components that comprise the instrument are listed in Appendix 17 of the QM. If a component is changed, the identification information is to be forwarded to OQA so that Appendix 17 can be kept current.
- A listing of the manufacturer's required preventative maintenance and frequency. If this information is not contained in the instrument manual, it must be obtained from the manufacturer, in writing. List all of the maintenance activities and the frequencies at which these activities are performed by the analysts that are separate from those that are required by the manufacturer. If there are no manufacturer required routine maintenance activities necessary for the upkeep of the instrument, this should be so indicated. A listing of the "as needed" maintenance activities should also be included along with the observations that would be seen that would indicate that these "as needed" activities would have to be performed.
- A reference to where these maintenance activities are documented such as the run logs, instrument maintenance logbooks, in ELEMENT. If these activities are documented within the body of a run log, the activities should be highlighted so as to make them easy to recognize when an audit takes place.
- A reference to where the manufacturer's instrument manuals are kept.

Section 10 Reagents and Standards must include:

- A listing of the reagents used in the preparation of the samples for analysis including their quality grade and vendor. Since it is possible that the desired vendor may change during the time that the current version of the SOP is in effect, the term "or equivalent" may be added. This will prevent the SOP being rewritten every time a vendor changes. However, during the next SOP update, the name of the vendor must be changed.
- A listing of all the stock standards purchased along with the name of the vendor and the initial parameter concentrations. As in the item immediately above, the term "or equivalent" can be added.
- A listing of any intermediate standard solutions, the parameter concentrations, the procedure used to prepare the solution, and the "equipment type" used to perform the preparation, such as, syringe, pipette, etc.
- A listing of the final standard solutions, the parameter concentrations, the procedure used to prepare the solution, and the "equipment type" used to perform the preparation. The intent here is to provide sufficient information so that the preparation and calculations associated with those preparations can be verified as being correct. Additionally, this documentation will also show traceability back to a nationally recognized standard.
- The use of the prepared standard solutions: initial calibration, continuing calibration, internal standard, control samples, interference check, reporting level check, etc.

- A reference to where to where the manufacturer Certificates of Analysis are maintained.
- A listing of the length of time that the particular item can be used while maintaining its viability is to be made for all the prepared solutions and standards. If this information is not contained in the reference method or by the manufacturer, **the specifics of assigning a usage time to material are addressed in the QM.** Therefore, a reference to the QM can be made here to cover this topic.

Section 11 Sample Collection, Preservation, Shipment and Storage must include:

- The type of container that must be used for sample submittal.
- The volume of sample that is necessary to perform the initial analysis, dilution analysis, if needed, and the requisite quality control analyses.
- The type of preservation that is required.
- Where are samples stored when they are picked up from Sample Receiving.
- How and when unused samples are discarded along with the disposal of the sample bottle. **This process is addressed in the QM.**
- Holding times: before the analysis is initiated, after initiation; e.g., the analyst may have a 7 day period in which to extract a sample but after the extraction is completed there may be another 28 day window in which to complete the analysis.

Section 12 Quality Control must include:

- A listing of all the various types of blanks, performance check solutions, quality control solutions, laboratory duplicates, LFM and LFMD, spectral interference checks, reporting level checks, internal standards, check sources, background checks, etc. along with their intended uses, acceptance ranges, the frequency of their inclusion within the daily run, and designations as to which of these items are used to determine whether the analytical sequence can begin or not. Since the acceptance limits for each of these items may vary from method to method, these are to be listed in each of the individual method SOP.
- A listing of the analytical sequence that is employed during the batch analysis.
- A listing of the data that is recorded on Control Charts along with the frequency of chart updating and supervisor review.
- A listing of the steps used to determine if peak tailing is a problem and how is the tailing problem overcome and documented. There may be certain instances that occur more frequently during a specific analysis that would necessitate this determination.
- A listing of reasons why a manual integration may be performed and how such manual integrations are conducted and documented.

Section 13 Calibration and Standardization must include:

- Describe the process for the initial calibration: the number of standards analyzed the minimum number of standards that are necessary for completing the calibration process, the acceptance criteria for a valid calibration, the source for the acceptance criteria (reference method, DEP requirement, in-house limits, etc.) and the period of time for which the calibration is valid.
- Describe the conditions under which a calibration point may be dropped in order to achieve the required R^2 value. Dropping a point just to achieve an acceptable correlation coefficient is unacceptable. A point must be an outlier in order to be dropped. The basis for determining how the point was determined to be an outlier must be included in the SOP. Describe the continuing calibration check process (for those methods that require one): the acceptance criteria for the specific compounds and the number of CCC that may fail before the method is determined to be "out of compliance."
- A listing of the parameters that are being analyzed by the method along with the concentration range over which the analysis of each parameter is being conducted; i.e., concentration range over which the calibration curve is constructed.

Section 14 Analytical Procedure must include:

- The process for picking up your samples from Sample Receiving.
- Describe the process for preparing the samples for analysis: acid digestions, extractions, conditions that the sample must obtain before analysis (prepared sample must be clear and not colored, no particulate matter allowed, pH, etc.) etc.
- The process for preparing the instrument to conduct the analysis: instrument readings that must be achieved to indicate that the instrument is operating normally, keyboard commands necessary to complete this process, etc.
- The conditions that the instrument adheres to during the analytical run: ramping temperatures, the number of instrumental determinations that comprises a result, type of washings and durations, etc.
- A listing of the analytical sequence showing the order in which the calibration standards, all QC samples, blanks, and samples are analyzed during a normal analytical run. This may be entered in an Appendix.
- A listing of the items that must be checked during the run to verify that the instrument is still operating normally. A statement can be made indicating that this information is contained in sections 12 and 18.
- A description of the process used to report results to the Data Management and enter into ELEMENT.
- For those methods that rely entirely or partially on the use of Retention Time (RT) windows for the identification of analytes, the source of the RT must be specified as well as whether the RT are strictly adhered to all times, whether the RT are recalculated at certain specified periods, or whether they are adjusted from run to run.
- A breakdown of the analytical responsibilities for those analysts associated with the production of the analytical results

Section 15 Calculations must include:

- Describe how the calibration curve is prepared; i.e., by the instrument software, linear or quadratic equations, by analyst, etc.
- List the formulas used to prepare the standard curves and to calculate the sample and QC sample results. For those established methods that are currently in use and for which the instrument performs these calculations, the inclusion of this information is not required. However, for those methods that will be placed on-line after January 1, 2008, this information will be required.
- List the formulas used to calculate: percent recovery, relative percent difference, and percent difference for serial dilutions along with any other calculations that must be performed as part of the analytical process.
- Describe the process used to calculate the error associated with radiochemical analyses.

Section 16 Method Performance must include:

- List the type of sample that the analyst analyzes to document their Demonstration of Capability (DOC) and the acceptance limits that are used to show this capability. When using a PT result for a procedure that has multiple analytes to show continuing DOC, list what will constitute an acceptable demonstration, e.g., 80% correct.
- List the frequency at which the DOC is performed; i.e., yearly around December – January and after when there is a change to the instrumentation or when the instrument is moved.
- The analyst certification statement (obtained from OQA), and the summary statements for the DOC can be listed as an Appendix to the SOP.
- A listing of the accuracy and precision statements for the method.

Section 17 Pollution Prevention must include:

- Describe the process used to discard digestates, extracts, samples etc. This item is meant to address the discarding of the types of materials that are not considered to be hazardous waste. Discarding of hazardous waste is addressed in Section 21.
- Describe the process used in the laboratory for cleaning up spills that occur in the laboratory.

Section 18 Data Assessment and Acceptance Criteria for Quality Control Measures must include:

- List the analyst and supervisor responsibilities for determining whether the "in-control" status is achieved, for: initial calibration, continuing calibration, surrogate analysis, instrumental check analyses, blank analyses,

duplicate analysis, control sample analysis, LFM/LFMD analyses, and reporting limit check analyses if the results fall outside of the acceptance limits listed in Section 12.
- List the data qualifiers that can be used for the particular analysis and conditions under which they are used.
- Describe the process used to determine the acceptance of the entire analytical run, portions of the run, etc. based on the results of the QC information generated during the run.
- Describe the responsibilities of the analyst and supervisor in the data assessment process.

Section 19 Corrective Action for Out of Control Analyses must include:
- List the analyst and supervisor responsibilities for determining the cause of the **isolated failure** of the analyses to achieve "in-control" status.

Section 20 Contingencies for Handling Continuing, Persistent Out of Control Analyses must include:
- **A statement can be made indicating that this process is defined in the QM.**

Section 21 Waste Management must include:
- Describe the process used by the analyst to discard those materials that are designated as hazardous waste from the laboratory work area; e.g., contact Frank Gordon to arrange for the discarding of the waste to the waste storage area until a pick-up can be arranged by Frank Gordon.
- List the items that are used in the analysis or generated by the analysis that are deemed to be "hazardous waste." To make this determination, consult Frank Gordon.

Section 22 References must include:
- A listing of where the reference method can be found or from whom it was obtained.
- A listing of other sources of material used in the preparation of the SOP.

Section 23 Tables, Diagrams, and Flowcharts must include:
- Any materials that fit the heading.

Section 24 Appendices must include:
- A listing of the different appendices and the type of information that is contained in each one.

Each method contains a listing of: the method's original issue date, the current revision number of the method in-use, the effective date of the latest revision and the signatures of the analyst, technical supervisor and the QAO. The methods are to be reviewed every year beginning in November and December so that a finalized method is available before the analysts begin their yearly Demonstration of Capability and MDL determinations. The DOC and MDL should be completed by the end of January every year. A copy of the finalized, updated method is to be provided to OQA. It is the responsibility of the QAO to act as the repository for all the official methods that are currently in use and to keep a running record of the revisions made to the existing methods for historical purposes. These records will be kept for an indefinite time period but no less than 5 years.

Whenever new revisions are made to the method SOP, only the most recent revision is to be maintained by the analyst in the laboratory.

NOTE: The proper way to refer to an in-house method is by listing the in-house designation given to that method ALONG WITH THE LATEST REVISION NUMBER.

CHAPTER SEVEN

ANALYTICAL METHODS

7.2 INORGANIC/GENERAL CHEMISTRY METHODS

See Attachment 9.

7.3 ORGANIC CHEMISTRY METHODS

See Attachment 10.

7.4 RADIO CHEMISTRY METHODS

See Attachment 11.

7.5 DEPARTURES FROM DOCUMENTED POLICIES AND PROCEDURES

Occurrences that have an immediate and profound effect on the health of the citizens of New Jersey have resulted in samples being delivered to ECLS for analyses. Similar incidents may arise again where ECLS will be required to conduct analyses that fall outside of its established and documented policies and procedures. This may mean that ECLS will have to test a matrix not ordinarily analyzed, test a matrix that is ordinarily analyzed but for compounds not routinely tested for, or use methods for which ECLS has no practical experience. The Agency requesting these emergency analyses of samples must bring this request to the attention of the both the Laboratory Manager and Laboratory Director of ECLS. The Agency must be in a position to provide the following: nature of the emergency, suspected cause, nature of the injuries caused, matrix, type of testing requested, and data quality objectives. A determination will be made as to whether ECLS can assist the Agency in any manner. If ECLS can not accommodate the request, the QAO will prepare a document indicating the specifics of the request and the reasons for ECLS's decision not to accept the samples in question.

If ECLS can accommodate the request, the analyses will be performed under the supervision of the appropriate Technical Supervisor. The QAO will prepare a document listing: the specifics of the request, steps taken by ECLS to perform the analysis including the quality control measures used, how well the data met the data quality objectives, and providing an indication as to the quality of the data provided. This document will accommodate the reported data or, if it is not practical to do so, will be forwarded to the Agency as soon as possible after the reporting of the data. NOTE: data will not have ECLS's normal data qualifiers attached to the data since the analyses were conducted outside of ECLS's normal analytical procedures.

Another manner in which ECLS may conduct analyses that are outside of its currently established policies and procedures is if a request is made to go strictly to a Performance Based Methodology. If this type of request is made, the requesting Agency must submit a Quality Assurance Project Plan (QAPP). This will allow ECLS to determine if it can accommodate the request and to select the method that will give the Agency the type of data for which they are asking. After establishing a specific QAPP, this can then be incorporated into the routine analytical capabilities of ECLS.

7.6 NEW METHOD EVALUATION

There are times when analyses are requested that require the use of methodologies not usually performed by ECLS. The requested analytical turnaround time determines the amount of methodology validation that can be performed

prior to sample analysis. Since it is impossible to say for certain how much lead time ECLS will have to verify a methodology, one can not list a definitive methodology verification sequence. Listed below are the two "extremes" of methodology verification. The actual steps employed by ECLS most likely will fall between these extremes.

a. When the immediate analysis is requested, the following samples will be included in the analytical scheme: Standards, a set of duplicate spiked blanks, a set of duplicate spiked natural samples, a set of duplicate natural samples, and an OQA control sample, when available. The results will be forwarded without being qualified, to the requesting agency along with all the results of the QC samples. The method will be identified as experimental or non- certified. The requesting agency must make its own judgement as to how much confidence can be placed in the results.

b. When sufficient lead-time is supplied, QC data will be generated before sample analysis begins that will establish: an accuracy statement for percent recovery, a precision statement for duplicate analyses, a target acceptance range for control sample analyses and the analyst's Demonstration of Capability. Data reported under these circumstances will be validated in the manner addressed below. The method validation data will be maintained by ECLS.

New Method Validation Checklist

Method Name

Instrumentation

Method ECLS-X-YY-1

- **SOP** ☐
- **Accuracy** ☐
- **Precision** ☐
- **Interference** ☐
- **Concentration Range** ☐
- **Limit of detection** ☐
- **Quality Control** ☐

When the use of Performance Based Methods (PBMS) is allowed, each client will be required to submit a Quality Assurance Project Plan (QAPP). See **Chapter 1**.

Program: Inorganic Chemistry

Attachment 9

Lab Method Number	Lab Method Revision Number	Reference Method	SOP Description	Sign-off	Date
ECLS-I-ICP-1	9	EPA 200.7	Aluminum, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Barium, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Beryllium, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Boron, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Cadmium, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Calcium, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Chromium, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Cobalt, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Copper, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Hardness (Calcium)		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Hardness (Total)		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Iron, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Magnesium, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Manganese, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Nickel, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Potassium, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Sodium, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Strontium, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Tin, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Zinc, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Molybdenum, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Silica, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Silver, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Titanium, ICP		12/10/13
ECLS-I-ICP-1	9	EPA 200.7	Vanadium, ICP		12/10/13
ECLS-I-ICPMS-1	5	EPA 200.8	Aluminum, ICPMS (WS)		4/14/13
ECLS-I-ICPMS-1	5	EPA 200.8	Antimony, ICPMS (WS)		4/14/13
ECLS-I-ICPMS-1	5	EPA 200.8	Arsenic, ICPMS (WS)		4/14/13
ECLS-I-ICPMS-1	5	EPA 200.8	Barium, ICPMS (WS)		4/14/13
ECLS-I-ICPMS-1	5	EPA 200.8	Beryllium, ICPMS (WS)		4/14/13
ECLS-I-ICPMS-1	5	EPA 200.8	Cadmium, ICPMS (WS)		4/14/13
ECLS-I-ICPMS-1	5	EPA 200.8	Chromium, ICPMS (WS)		4/14/13

5/23/14

Lab Method Number	Lab Method Revision Number	Reference Method	SOP Description		Date
ECLS-I-ICPMS-1	5	EPA 200.8	Copper, ICPMS (WS)		4/14/13
ECLS-I-ICPMS-1	5	EPA 200.8	Lead, ICPMS (WS)		4/14/13
ECLS-I-ICPMS-1	5	EPA 200.8	Manganese, ICPMS (WS)		4/14/13
ECLS-I-ICPMS-1	5	EPA 200.8	Nickel, ICPMS (WS)		4/14/13
ECLS-I-ICPMS-1	5	EPA 200.8	Thallium, ICPMS (WS)		4/14/13
ECLS-I-ICPMS-1	5	EPA 200.8	Zinc, ICPMS (WS)		4/14/13
ECLS-I-ICPMS-1	5	EPA 200.8	Mercury, ICPMS (WS)		4/14/13
ECLS-I-ICPMS-1	5	EPA 200.8	Molybdenum, ICPMS (WS)		4/14/13
ECLS-I-ICPMS-1	5	EPA 200.8	Selenium, ICPMS (WS)		4/14/13
ECLS-I-ICPMS-1	5	EPA 200.8	Uranium, ICPMS (WS)		4/14/13
ECLS-I-ICPMS-1	5	EPA 200.8	Uranium, Radiation		4/14/13
ECLS-I-ICPMS-1	5	EPA 200.8	Vanadium, ICPMS (WS)		4/14/13
ECLS-I-ICPMS-2	2	EPA 200.8	Aluminum, ICPMS (WP)		4/11/14
ECLS-I-ICPMS-2	2	EPA 200.8	Antimony, ICPMS (WP)		4/11/14
ECLS-I-ICPMS-2	2	EPA 200.8	Arsenic, ICPMS (WP)		4/11/14
ECLS-I-ICPMS-2	2	EPA 200.8	Barium, ICPMS (WP)		4/11/14
ECLS-I-ICPMS-2	2	EPA 200.8	Beryllium, ICPMS (WP)		4/11/14
ECLS-I-ICPMS-2	2	EPA 200.8	Cadmium, ICPMS (WP)		4/11/14
ECLS-I-ICPMS-2	2	EPA 200.8	Chromium, ICPMS (WP)		4/11/14
ECLS-I-ICPMS-2	2	EPA 200.8	Copper, ICPMS (WP)		4/11/14
ECLS-I-ICPMS-2	2	EPA 200.8	Lead, ICPMS (WP)		4/11/14
ECLS-I-ICPMS-2	2	EPA 200.8	Manganese, ICPMS (WP)		4/11/14
ECLS-I-ICPMS-2	2	EPA 200.8	Nickel, ICPMS (WP)		4/11/14
ECLS-I-ICPMS-2	2	EPA 200.8	Thallium, ICPMS (WP)		4/11/14
ECLS-I-ICPMS-2	2	EPA 200.8	Zinc, ICPMS (WP)		4/11/14
ECLS-I-ICPMS-2	2	EPA 200.8	Molybdenum, ICPMS (WP)		4/11/14
ECLS-I-ICPMS-2	2	EPA 200.8	Selenium, ICPMS (WP)		4/11/14
ECLS-I-ICPMS-2	2	EPA 200.8	Uranium, ICPMS (WP)		4/11/14
ECLS-I-ICPMS-2	2	EPA 200.8	Uranium, Radiation		4/11/14
ECLS-I-ICPMS-2	2	EPA 200.8	Vanadium, ICPMS (WS)		4/11/14
ECLS-I-GFAA-1	10	EPA 200.9	Antimony, GFAAS		12/10/13
ECLS-I-GFAA-1	10	EPA 200.9	Arsenic, GFAAS		12/10/13
ECLS-I-GFAA-1	10	EPA 200.9	Lead, GFAAS		12/10/13
ECLS-I-GFAA-1	10	EPA 200.9	Thallium, GFAAS		12/10/13
ECLS-I-GFAA-1	10	EPA 200.9	Selenium, GFAAS		12/10/13

Lab Method Number	Lab Method Revision Number	Reference Method	SOP Description		Date
ECLS-I-CVAA-2	2	EPA 245.1	Mercury, EPA 245.1		5/9/12
ECLS-I-ION-4	9	EPA 300.0	Bromide by Ion Chromatography		9/11/13
ECLS-I-ION-4	9	EPA 300.0	Chloride by Ion Chromatography		9/11/13
ECLS-I-ION-4	9	EPA 300.0	Fluoride by Ion Chromatography		9/11/13
ECLS-I-ION-4	9	EPA 300.0	Sulfate by Ion Chromatography		9/11/13
ECLS-I-FIA-6	7	EPA 335.4	Cyanide, Total		9/11/13
ECLS-I-FIA-5	5	EPA 351.2	Nitrogen, Total Kjeldahl (Dissolved)		9/11/13
ECLS-I-FIA-5	5	EPA 351.2	Nitrogen, Total Kjeldahl (Total)		9/11/13
ECLS-I-VIS-6	13	EPA 420.1	Phenols		9/20/13
ECLS-I-GEN-3	10	SM 2120 B	Color		12/5/13
ECLS-I-GEN-1	11	SM 2130B	Turbidity		11/6/13
ECLS-I-GEN-4	9	SM 2150B	Odor		9/11/13
ECLS-I-ALK-1	5	SM 2320B	Alkalinity		11/4/13
ECLS-I-GEN-2	12	SM 2510B	Conductivity		11/4/13
ECLS-I-GRAV-3	11	SM 2540B	Solids, Total (TS)		11/6/13
ECLS-I-GRAV-1	11	SM 2540C	Solids, Total Dissolved (TDS)		11/6/13
ECLS-I-GRAV-2	12	SM 2540D	Solids, Total Suspended (TSS)		11/4/13
ECLS-I-SS-1	5	SM 2540F	Solids, Settleable		11/6/13
ECLS-I-VIS-4	12	SM 3500-Cr B	Chromium, Hexavalent		11/6/13
ECLS-I-VIS-7	13	SM 426 C (15th Ed.)	Sulfate, Turbidimetric, Non-Drinking Water		9/20/13
ECLS-I-ISE-1	12	SM 4500-F C	Fluoride by ISE		12/5/13
ECLS-I-PH-1	4	SM 4500H-B	pH		11/6/13
ECLS-I-FIA-3	8	SM 4500-NH3 H	Nitrogen, Ammonia - Distilled (Dissolved)		11/19/13
ECLS-I-FIA-3	8	SM 4500-NH3 H	Nitrogen, Ammonia - Distilled (Total)		11/19/13
ECLS-I-FIA-2	9	SM 4500-NH3 H	Nitrogen, Ammonia - Undistilled (Dissolved)		11/19/13
ECLS-I-FIA-2	9	SM 4500-NH3 H	Nitrogen, Ammonia - Undistilled (Total)		11/19/13
ECLS-I-FIA-1	8	SM 4500-NO3 F	Nitrogen, Nitrite (Total)		11/19/13
ECLS-I-FIA-1	8	SM 4500-NO3 F	Nitrogen, Nitrite (Dissolved)		11/19/13
ECLS-I-FIA-1	8	SM 4500-NO3 F	Nitrogen, Nitrite + Nitrate (Dissolved)		11/19/13
ECLS-I-FIA-1	8	SM 4500-NO3 F	Nitrogen, Nitrite + Nitrate (Total)		11/19/13
ECLS-I-O-1	5	SM 4500-O C	Dissolved Oxygen		9/10/13
ECLS-I-FIA-7	9	EPA 365.1	Phosphorus, Ortho (Dissolved)		8/26/13

Lab Method Number	Lab Method Revision Number	Reference Method	SOP Description		Date
ECLS-I-FIA-7	9	EPA 365.1	Phosphorus, Ortho (Total)		8/26/13
ECLS-I-OD-1	8	SM 5210B	CBOD		11/19/13
ECLS-I-OD-1	8	SM 5210B	BOD		11/19/13
ECLS-I-VIS-8	13	SM 5220 D	COD - Low Level		11/19/13
ECLS-I-VIS-1	15	SM 5220 D	COD - Standard		11/19/13
ECLS-I-TOC-2	6	SM 5310 C	Organic Carbon (Dissolved)		10/25/13
ECLS-I-TOC-2	6	SM 5310 C	Organic Carbon (Total)		10/25/13
ECLS-I-VIS-2	14	SM 5540 C	MBAS		11/19/13
ECLS-I-FIA-10	4	SM4500-Cl E	Chloride		11/6/13
ECLS-I-FIA-11	4	EPA 365.1	Total Phosphorous		4/11/14
ECLS-I-FIA-12	1	EPA 375.2	Sulfate		1/30/13
ECLS-I-ION-CR6	0	EPA 218.6	Chromium, Hexavalent		10/31/13

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ATTACHMENT 10

Program: Organic Chemical Testing and Sample Receiving

Lab Method & Revision #	Reference Method	SOP Description	Reviewer Initials/ Date	Reviewer Initials/ Date	Reviewer Initials/ Date	Comments
ECLS-O-504.1 Revision 11.0	EPA 504.1 Revision 1.1	EDB by GC	5/14/14			
ECLS-O-505 Revision 8.0	EPA 505 Revision 2.1	Organohalide Pesticides by GC	5/14/14			
ECLS-O-507 Revision 10.0	EPA 507 Revision 2.1	N and P Pesticides by GC	5/14/14			
ECLS-O-515.3 Revision 9.0	EPA 515.3 Revision 1	Herbicides by GC	5/14/14			
ECLS-O-531.1 Revision 13.0	EPA 531.1 Revision 3.1	Carbamates by HPLC	5/14/14			
ECLS-O-524.2 Revision 9.0	EPA 524.2 Revision 4.1	VOs by GC/MS	5/14/14			
ECLS-O-525.2 Revision 6.0	EPA 525.2 Revision 2.1	Organic Compounds by GC/MS	5/14/14			
ECLS-O-608 Revision	EPA 608	Organochlorine Pesticides by GC	NA			
ECLS-O-624 Revision 9.0	EPA 624 1982	VOs by GC/MS	5/14/14			
ECLS-O-625 Revision 8.0	EPA 625 1982	BNAs by GC/MS	5/14/14			
ECLS-SR-1 Revision 2	NA	Sample Receiving	5/14/14			
ECLS-SR-2 Revision 0	NA	Scanning Radiological Samples	5/14/14			

RECEIVED 5/14/14 SIR

Attachment 11

Program: Radioanalytical Services					
Lab Method Number	Lab Method Revision Number	Reference Method	SOP Description	Revision Date	Reviewer Initial/Date
ECLS-R-GA/GB-T	5	EPA 900.0	Gross Alpha/Beta Test, Total, Evaporation	3/6/14	BP 3/7/14
ECLS-R-GA	7	NJ ECLS-R-GA	48-Hour Gross Alpha Test	3/6/14	
ECLS-R-GA-CO	6	NJ ECLS-R-GA-CO	Gross Alpha Test, Coprecipitation	3/6/14	
ECLS-R-Ra226/Ra228	4	NJ ECLS-R-Ra226/Ra228	Ra-226 and Ra-228 by Gamma Spec	3/6/14	
ECLS-R-Ra224/Ra226/Ra228	2	NJ ECLS-R-Ra224/Ra226/Ra228	Ra-224, Ra-226, and Ra-228 by Gamma Spec	3/6/14	
ECLS-ECLS-R-Ra228	5	NJ Ra-228 Method	Ra-228 Analysis in Water	3/6/14	
ECLS-R-Gamma-W	7	EPA 901.1	Gamma Emitters in Water	3/6/14	
ECLS-R-H3	4	EPA 906.0	Tritium in Water	3/6/14	
ECLS-R-Rn222	5	EPA 913	Rn-222 in Water	3/6/14	
ECLS-R-Sr89/90	3	NJ ECLS-R-Sr89/90	Sr-89 and Sr-90 in Water	3/6/14	
ECLS-R-Po210	2	FERN-RAD.0002.00	Po-210 in Water	4/29/13	
ECLS-R-Gamma-S	6	DOE HASL-300 4.5.2.3	Gamma Emitters in Soils /Sediments	10/1/2013	
ECLS-R-GA/Ra	1	FERN-RAD.0001.00	Gross Alpha, Ra-224, Ra-226, and Ra-228	3/6/2014	

CHAPTER EIGHT

QUALITY CONTROL

8.1 ROUTINE INSTRUMENT MAINTENANCE AND QUALITY CONTROL

The following is a list of the routine maintenance and QC measures performed by the ECLS staff. For those analyses that require more detailed instrumental QC, those QC measures are contained within the various analytical method manuals.

CONDUCTIVITY METER

Maintenance:

- The cell is cleaned, as needed, with a solution of isopropyl alcohol, ethyl ether, concentrated hydrochloric acid and distilled water.
- The cell is re-platinized as needed.
- The cell is immersed in distilled water when not in use.

Quality Control:

- The conductivity meter is calibrated monthly using a NIST traceable conductivity standard.
- The cell constant is checked monthly using a 0.01M potassium chloride solution.
- The meter is checked daily against two levels of quality control solutions.
- The cell is rinsed several times in distilled water before and after every determination.
- The cell is immersed in the sample several times before the final reading is made.
- A temperature compensating probe is employed during the analysis with the compensated value being digitally displayed.

TURBIDITY METER

Maintenance:

- The light source is changed as needed.

Quality Control:

- The instrument is calibrated quarterly against sealed stabilized formazin standards.
- Sample cuvettes are protected from scratches.
- A constant orientation of the cuvette in the holder is maintained for all the analyses.
- There are no air bubbles in solution during the analysis.
- Samples with turbidity readings of greater than 40 NTU are diluted and re-analyzed.

CONTINUOUS FLOW ANALYZERS (FLOW INJECTION AND BUBBLE SEGMENTED)

Maintenance:

- The pump tubes are changed as needed.
- The pump tubes and coils are cleaned approximately twice per month.
- The pump motor is oiled as needed.
- The light source is changed as needed.
- Back flush the flow cell as needed.
- Check the roller alignment semiannually, if required by the manufacturer.
- Replace the platen annually, if required by the manufacturer.

Quality Control:

- There are no specific quality control procedures for this instrument other than those analytical requirements listed below.

UV/VIS SPECTROPHOTOMETER

Maintenance:

- Change the light source as needed.
- Change the photocell as needed.

Quality Control:

- Absorption cells are kept clean and free from scratches.
- Matched cells are employed where necessary.

- Wavelength alignment is checked annually by the manufacturer under the service contract.
- The instrument is checked annually under a maintenance contract with the manufacturer.

GRAPHITE FURNACE ATOMIC ABSORPTION SPECTROMETER (GFAAS)

Maintenance:

- The graphite furnace tube is changed approximately every 3-4 days or as needed. The graphite tube must also be replaced whenever a significant change in sensitivity or replicate precision is observed.
- The quartz lenses are cleaned daily with methanol.
- The graphite contact rings are replaced every 6 months or when a significant change in precision or sensitivity is observed.
- Auto-sampler rinse water is replaced as needed.
- Argon or Ar-H_2 gas is changed as needed.
-

Quality Control:

- Daily, prior to calibration, a precision test is performed to verify auto-sampler function and instrument reproducibility. If the percent relative standard deviation is ≤ 5, calibration can be performed.
- For daily verification of the calibration standards and instrument performance, a quality control sample (QCS) is analyzed. The QCS is prepared at two concentration levels, SSL (low) and SSH (high). The acceptance limits are ± 10%. If either QCS does not meet the acceptance criteria, the analysis is stopped and the instrument re-calibrated. The SS in this instance stands for Second Standard.

TOTAL ORGANIC CARBON ANALYZER (TOC)

Maintenance:

- Pump tubing is changed as needed.
- The lithium hydroxide scrubber is checked for moisture and replaced as necessary.

Quality Control:

- Gas flow rate @200cc/min is checked for each day of use.
- IR zero and span adjustment is checked for each day of use.

HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC)

Maintenance:

- The rubber diaphragms are changed as needed.
- The pump oil is changed and seals replaced as needed.
- Tubing is changed periodically.

Quality Control:

- Instrumental QC is highly dependent upon the particular analysis undertaken at any time and, as such, is addressed in the particular method manuals.

GAS CHROMATOGRAPH (GC)

Maintenance:

- Change the glass wool at the injection port as needed.
- Change the glass inserts as required.
- Clean the air filters and vacuum dust in and around the GC as required.
- Change the septa as required.
- Change or clean the detectors as required.
- Serviced under a maintenance contract at least once per year.

Quality Control:

- Instrumental QC is highly dependent upon the particular analysis undertaken at any time and, as such, is addressed in the particular method manuals.

GAS CHROMATOGRAPH/MASS SPECTROMETER

Maintenance:

- In addition to the maintenance steps listed above for GC, change the pump oil as needed.
- Clean the source as needed.
- Change the air filter on the computer system as needed.
- Checked under a service contract once per year.

Quality Control:

- Instrumental QC is highly dependent upon the particular analysis undertaken at any time and, as such, is addressed in the particular method manual.

INDUCTIVELY COUPLED PLASMA SPECTROMETER (ICP)

Maintenance:

- All peristaltic pump tubing is changed before each use of the instrument.
- The sampling probe is cleaned before each use.
- The sample introduction is rinsed thoroughly before and after each use of the instrument.
- The peristaltic pump rollers are inspected before each use, to make sure they are clean and move freely.
- The purge extension window is checked monthly for fogging and cleaned or replaced if necessary.
- The ceramic interface cone is checked monthly for fogging and cleaned or replaced if necessary.
- Daily cleaning of the low-flow Gem Cone ® nebulizer and cross-flow nebulizer is performed as part of the sample introduction system cleaning.
- Daily inspection of the torch is performed.

Quality Control:

- For daily verification of the calibration standards and instrument performance, a quality control sample (QCS) is analyzed. The QCS is prepared at two concentration levels, SSL (low) and SSH (high). The acceptance limits are ± 5% for SSH and 10% for SSL. If either QCS does not meet the acceptance criteria, the analysis is stopped and the instrument re-calibrated.

COLOR TEST APPARATUS (HELLIGE AQUA TESTER)

Maintenance:

- Light source is replaced as needed.
- Sample tubes and sample chamber are kept clean.
- Light diffusing base plate is cleaned regularly.

Quality Control:

- The color wheel is standardized against platinum-cobalt standard solutions as per directions in Standard Methods. This is performed quarterly.

8.2 NEGATIVE CONTROLS

Negative controls are used to determine whether the samples in question could have been exposed to contaminants or other interferences during their collection, transportation, preparation, and/or analysis. The negative controls consist of travel, field and method blanks.

METHOD BLANK: also referred to as Laboratory Reagent Blank (LRB): The method blank is used to assess the preparation batch for possible contamination during the preparation and processing steps. It consists of a matrix that is similar to the associated samples and is known to be free of the analytes of interest. It is processed along with, and under the same conditions as the associated samples, to include all steps of the analytical procedure. Any affected

samples associated with a contaminated method blank shall be re-analyzed or the results reported with the appropriate data qualifying codes. The blank is contaminated if the concentration of the targeted analyte in the blank is at or above the reporting limit, as established by the test method or by regulation, **AND** is greater than 1/10 of the amount measured in any sample. The blank is also contaminated if the results otherwise affects the sample results, as per the test method requirements, or the individual project data quality objectives. If contamination is observed, every effort will be made to locate and eliminate the source of the contamination. If ECLS can not eliminate the contamination, the reported data will be so qualified.

The method blank is analyzed at a minimum of 1 per 20 samples. In those instances for which no separate preparation method is used (VOs), the batch is defined as the environmental samples that are analyzed together with the same method and personnel, using the same lots of reagents, and consists of approximately 20 environmental samples. In those instances when more than 20 samples are analyzed, the method blank will be re-analyzed, as a minimum, after every additional 20 samples.

FIELD BLANKS: The field blank is used to assess the sample collection process for possible contamination. It is usually submitted for samples that are requesting various organic analyses and, as such, contains organic free water that has been sealed in a bottle in the laboratory. If field blanks are submitted for metal or other determinations, the water supplied by the laboratory is free of contaminants for that specific analysis requested. At the collection site, it is subjected to the same sampling procedure that the environmental samples are subjected. Preservatives are added, if necessary, and submitted for analysis.

TRIP BLANKS: The trip blank is used to assess the sample transportation mechanism for possible contamination. It contains organic free water that has been sealed in a bottle in the laboratory. It accompanies the sample bottles from the laboratory to the sampling site and back again unopened. It is then analyzed as a "routine" environmental sample.

FIELD and TRIP BLANKS are not required to determine the acceptability of an analytical run. They are used by the data user to determine whether the samples possibly could have been subjected to a contamination source prior to analysis. It is the clients' prerogative to submit, or not, field and trip blanks. It should be clearly understood by the client that these blanks are highly recommended to be supplied with VO samples. They can also be submitted with other types of samples as well. ONLY THE METHOD BLANK IS USED TO DETERMINE THE ACCEPTABILITY OF AN ANALYTICAL RUN.

8.3 POSITIVE CONTROL-METHOD PERFORMANCE

The positive control used to assess method performance is the Laboratory Control Sample (LCS). The standards used to prepare the LCS and the specific controls are all of a second source, or at least of a second lot number, than the standards used in the calibration process.

LABORATORY CONTROL SAMPLE (LCS), also referred to as Laboratory Fortified Blank (LFB), or Spiked Blank (BS): THE LCS IS USED TO EVALUATE THE PERFORMANCE OF THE TOTAL ANALYTICAL SYSTEM, INCLUDING ALL PREPARATION AND ANALYSIS STEPS. The results of the LCS are compared to the established analytical criteria (see section 8.7) and, if found to be outside of these criteria, indicates that the analytical system is "out-of-control". Any affected samples associated with an out of control LCS are re-analyzed or the results are reported with the proper data qualifiers. The LCS is analyzed at a minimum of 1 per every 20 samples except for those parameters for which no spiking solutions are available. The LCS is prepared in a controlled matrix known to be free of the analytes of interest. For those test methods that have a long list of analytes, a representative number may be chosen according to these criteria. For methods that include 1-10 targets, spike all components. For methods that include 11-20 targets, spike at least 10 or 80%, whichever is greater. For methods that have more than 20 targets, spike at least 16 compounds. Over a two year period, all the target compounds shall have been included in the LCS. ECLS is attempting to incorporate all compounds of interest in the spiking solution. If feasible, that will become ECLS routine practice. If not, then the percentages outlined above will be followed.

8.4 SAMPLE SPECIFIC CONTROLS

SAMPLE SPECIFIC CONTROLS ARE USED TO DETERMINE THE EFFECT OF THE SAMPLE MATRIX ON METHOD PERFORMANCE AND CONSIST OF MATRIX SPIKE, MATRIX SPIKE DUPLICATES, MATRIX DUPLICATES, and SURROGATE SPIKES. If situations arise where ECLS has the option to decide if matrix spiked duplicates or matrix duplicates are to be analyzed, preference will be given to analyzing the spiked duplicates. THESE CONTROLS ARE NOT USED TO JUDGE LABORATORY PERFORMANCE AS TO THE ACCEPTABILITY OF THE ANALYTICAL RUN.

MATRIX SPIKES, MS (also referred to as Laboratory Fortified Matrix, LFM) and MATRIX SPIKE DUPLICATES: Matrix specific QC samples indicate the effect of the sample matrix on the precision and accuracy of the results generated using the selected method. The information from these controls is sample/matrix specific and would not normally be used to determine the validity of the entire batch. The frequency of analysis is specified by the required mandated test method. If not so specified, then analysis will occur at a frequency of at least one per every 20 samples. Since ECLS does not collect their own samples but accepts them primarily from DEP, it is not possible to rotate choosing client samples to spike. If DEP notifies ECLS that they wish a specific sample used for this purpose, ECLS makes every effort to do so. If no such designation is made, a sample is randomly chosen by ECLS. The components to be spiked are specified by the mandated method. For those test methods that have long lists of analytes, a representative number may be chosen according to the schedule listed in section 8.3. The results of the matrix spike are expressed as percent recovery and relative percent difference and are compared to the acceptance criteria as published in the mandated method or to in-house developed acceptance limits. For matrix spike results outside established criteria, the data is reported with the appropriate data qualifying codes (section 9.5) for the sample in question if a MRRF or SRRF package is requested.

MATRIX DUPLICATES: are replicate aliquots of the same sample taken through the entire analytical procedure. The results from this analysis indicate the precision of the results for the specific sample using the specific method. The matrix duplicate provides a usable measure of precision only when target analytes are found in the sample. The frequency of the analysis of matrix duplicates is specified in the mandated methods. If not so specified, then analysis will occur at a frequency of at least one per every 20 samples. Since ECLS does not collect their own samples, but primarily accepts them from DEP, it is not possible to rotate choosing client samples to run in duplicate. If DEP notifies ECLS that they wish a specific sample analyzed in duplicate, then it is so analyzed. If no such designation is made, a sample is chosen at random by ECLS. The results are primarily designed to assess the precision of the analytical results in a given matrix and are usually expressed as relative percent difference. Results are compared to the acceptance criteria in the mandated method or to in-house developed acceptance limits. For results that are outside established criteria, the data is reported with appropriate data qualifying codes for the sample in question if a MRRF or SRRF data package is requested.

SURROGATE SPIKES: Surrogates are compounds (usually organic) chosen to reflect the chemistries of the targeted components of the method and for their unlikely occurrence as an environmental contaminant. They are added prior to sample preparation/extraction and provide a measure of the recovery for every sample matrix. Except where the matrix precludes its use or when surrogates are not available, surrogates are added to all the samples, standards, and blanks for all the appropriate test methods. The results are compared to the acceptance criteria published in the mandated method. Surrogates results outside the acceptance criteria are reported with the appropriate data qualifiers for the sample in question if a MRRF or SRRF data package is requested. The specific surrogates used by the individual methods are contained in the method.

EXAMPLES OF QUALITY CONTROL SAMPLES INCORPORATED WITHIN AN ANALYSIS SEQUENCE

As an example of how these quality control samples are incorporated into a routine run, below is the NORMAL RUN ORDER FOLLOWED BY THE TRACE METAL LABORATORY for a batch of 20 samples. The inorganic general analytical laboratory follows a similar QC scheme.

- Standards
- IPC (+/- 5%)
- Blank
- Reporting limit check
- C
- D
- LRB
- LFB
- Sample
- Sample duplicate
- Sample spike (LFM)
- Up to 3 samples
- IPC (+/- 10%)
- Blank
- Sample spike duplicate (LFM DUP)
- Up to 9 samples
- IPC (+/- 10%)
- Blank
- Up to 7 samples
- IPC (+/- 10%)
- Blank
- End of run
- If there are more than 20 samples, another LRB, LFB, duplicate, LFM and LFM DUP must be run.

IPC: is a control sample made up from the same stock solution as the standards at a concentration of one-half the concentration of the high standard.

Blank: is a control made up of the same water used to make the reagents.

C: is a control made up from a separate stock solution at the concentration of the second standard after the blank. This can be identified as Second Source Low (SSL) in the general analytical laboratory documentation.

D: is a control from a separate stock solution at the concentration of the next to the highest standard. This can be identified as Second Source High (SSH) in the general analytical laboratory documentation.

Spike Sample: is a sample spiked at the level of the IPC. This is designated as the laboratory fortified matrix (LFM).

Duplicate Sample: is a separate aliquot of a sample taken through the entire preparation and analysis procedure.

LRB: is an aliquot of reagent water taken through the entire preparation and analysis procedure.

LFB: is an aliquot of reagent water spiked at the level of the IPC and taken through the entire preparation and analysis procedure.

An example of the QC samples involved in a VO run is as follows:

- BFB tune
- QC Check Sample (Continuing Calibration Check)
- Reagent Water Blank
- Trip Blank (if one is provided) or sample
- Samples analyzed through the next 9 analytical spots
- Matrix Spike
- Matrix Spike Duplicate

NOTE: Whenever a RPD is calculated, it is always expressed as a positive number. When the RPD calculation is listed in the method SOP, place the calculation within absolute value signs.

8.5 INITIAL and CONTINUING CALIBRATIONS

Prior to analysis, calibrations are performed on the instrumentation that is used to conduct the specific analysis. These calibrations are of two different types: initial and continuing. The INITIAL CALIBRATION is a more thorough calibration process that establishes the working range of the specified analysis. Standards are analyzed throughout the expected working range and a standard curve is constructed.

For inorganic analyses, the correlation coefficient for the curve is calculated and compared to previously established acceptance criteria. If the correlation coefficient is acceptable, the analytical run proceeds. If not, the calibration process is repeated. The initial calibration is directly used for quantitation since a new calibration curve is prepared daily.

For organic analysis, an average response factor is calculated, as per the method, for the individual analytes and compared against the acceptance criteria contained in the mandated method. If the factors are acceptable, the analytical runs can begin. If not, the calibration process is repeated. The initial calibration is directly used for quantitation. CONTINUING CALIBRATION is a daily check of the initial calibration responses. All inorganic analyses, for those parameters for which an initial calibration can be performed, have an initial calibration performed daily. The initial calibration for the organic test methods take an excessively long time to complete and would allow no time for any analyses of real world samples to be performed if an initial calibration were performed daily. The continuing calibration addresses this situation. A spiked blank is analyzed and the response factors for the individual parameters are compared to the initial calibration response factors. If the continuing response factors fall within the acceptance ranges, the instrument is considered to still be calibrated and the initial calibration response factors are used to calculate any positive results generated during that day's analytical run.

Manual manipulation of the raw data is permissible under certain method specific reasons. These reasons are listed in the individual method manuals.

INORGANIC INITIAL CALIBRATION

INORGANIC INITIAL CALIBRATION: The process for performing the initial calibrations for Graphite Furnace Atomic Absorption (GFAA) Analyses, Cold Vapor Atomic Absorption (CVAA) Analyses, Inductively Coupled Plasma (ICP) Emission Analyses, and Colorimetric and Continuous Flow Analyses are addressed below:

- GFAA: A calibration blank and 6 standards are analyzed for each element. The absorbance reading for each standard is actually the average of 3 replicate readings of the separate aliquots pipetted by the instrument's auto-sampler. The instrument software takes the absorbance readings and does a least squares regression analysis giving a plot of the standards, correlation coefficient (R), slope and intercept.

The correlation coefficient, a measure of the strength of the linear relationship, must be 0.999 or greater (R^2= 0.998) the analysis can proceed. If a value less than 0.999 is obtained, the analyst may drop one of the standards (one that may have yielded a spurious result in relation to the other standard results) and recalculate the correlation coefficient. Additionally, the intercept of the calculated standard line must be below 0.005 absorbance units. If not, one of the standards may be dropped and the intercept recalculated. However, every final correlation coefficient must be calculated and every acceptable intercept generated with the blank result and the results from 5 standards. If these situations cannot be achieved after dropping one standard, the calibration process is repeated in its entirety. If repeated calibrations runs fail to yield an acceptable standard curve, operation ceases and troubleshooting is undertaken.

- CVAA for Mercury: A calibration blank and 5 standards are analyzed. The instrument performs 3 replicate analyses of the blank and standards and uses the average as the absorbance reading. The software performs a regression analysis giving a plot of the standard curve, correlation coefficient, slope and intercept. The correlation coefficient must be at least 0.999 before proceeding (R^2= 0.998) with the analysis. Like above, a standard may be dropped to recalculate the correlation coefficient. However, every final correlation coefficient must be calculated using the blank result and the results from 4 standards. If an acceptable correlation coefficient cannot be achieved after dropping a standard, the calibration process is repeated in its entirety. If repeated calibrations fail to yield an acceptable result, operation ceases and troubleshooting is undertaken.
- ICP: Similar to the above citations. A calibration blank and 4 to 6 standards are analyzed depending on the element. If the required correlation coefficient of 0.995 is not achieved (R^2= 0.990), a standard can be dropped and the correlation coefficient recalculated. Every final correlation coefficient must be calculated from the blank result and 6 standard results. If an acceptable result is not obtained, the calibration process is repeated in its entirety. If continued calibrations fail to yield acceptable results, operations cease and troubleshooting is undertaken.
- COLORIMETRIC and CONTINUOUS FLOW: The calibrations for these analyses are addressed in the same manner as listed above for GFAA with the exceptions that the results are not a composite of 3 replicate readings but a single reading and the coefficient of determination (R^2) must obtain a value of 0.995 (R= 0.9975). Also, the number of calibration standards required by each method are defined in that method.

Each calibration has the following information recorded:

- Calibration date.
- Test method.
- Instrument identification.
- The identification of all analytes.
- Concentrations.
- Responses.
- Calibration curve and correlation coefficient.

Whenever the limitations of the analytical procedures and or the ability to purchase standards of the appropriate concentrations permit it, at least one standard will be at the regulatory limit for the specified analytes.

INORGANIC CONTINUING CALIBRATION: ECLS does not perform any inorganic continuing calibrations. All inorganic results generated are as a result of using daily initial calibrations.

REPORTING LIMIT CHECK: as part of the calibration or continuing calibration check, a reporting limit check (RLC) is analyzed.

REPORTING LIMIT CHECK

Reporting Limit Checks (RLC) are performed after a calibration curve has been established. The RLC is a sample prepared at the same concentration as the low standard used to generate the calibration curve. The acceptance limit that EPA stated should be used as a first approximation to the laboratory's ability to obtain reproducible results at that concentration level is +/-50% of the standard concentration. As data points are produced over a year's period, ECLS will review that data and make a determination as to whether the acceptance limits should be modified. This modification should hopefully be toward lessening the limits. However, this may not be the case for all of the organic compounds since the listed compound recoveries obtained by EPA during the method validation process indicate that these compounds can have a wide variability of reproducibility in the analysis.

The RLC is analyzed near the beginning of the analytical sequence and serves as a go/no go indicator for the rest of the sequence. If the RLC fails, the analyst can re-analyze the RLC. If acceptable results are obtained on the second analysis, the sequence can continue. If the RLC fails the second time, analysis cannot proceed until the cause of the failures can be identified and corrected. The analyst is to document what the cause was for the failures and the corrective action that was taken. This process can be addressed by the analyst and the section supervisor and does not need to have OQA as part of the process. OQA will have to be notified only if the corrective actions fail to resolve to situation.

Altering any of the RLC acceptance limits can only be accomplished through ECLS OQA.

INITIAL AND CONTINUING ORGANIC CALIBRATIONS

ORGANIC INITIAL and CONTINUING CALIBRATIONS: Due to the number of organic analyses and the complexity of their respective initial and continuing calibration processes, these items are not addressed here but are addressed in depth in the respective Method Manuals along with their respective acceptance criteria. However, each initial calibration will consist of at least a blank and four standards if the reference method does not indicate otherwise.

Given the excessive number of compounds in these methods, it is extremely unrealistic to expect that all of the compounds will yield acceptable response factors on the continuing calibration check (CCC) analysis. This fact has been recognized by both DEP and EPA. When a compound fails the CCC, analysis for that compound will continue. However, when data packages are prepared, the compounds failing the CCC are identified to the data user. This allows the data user to interpret the results and assign a certain level of significance to the analytical data.

DROPPING A CALIBRATION POINT: the occurrence of an unacceptable instrument response(s) from the analysis of calibration standards, e. g., unacceptable coefficient of determination, RSD, etc., is an indication of an analytical problem with the selected calibration range for the analysis and must be corrected before sample analyses are conducted. Sample analyses may not proceed until the resulting calibration curve is fully acceptable according to the established criteria identified in the QM.

DROPPING A CALIBRATION POINT

Sometime it is apparent by looking at the calibration data that one of the standards is an outlier as compared to the other standards and that by eliminating that one calibration point would yield an acceptable Coefficient of Determination (R^2) value. A calibration point may be dropped provided that the remaining number of calibration points is at least equal to the minimum number of calibration points necessary to produce a valid calibration curve. For example, if a method states that 5 calibration points are necessary for the calibration process, then after dropping a calibration point there must still exist 5 calibration points.

Elimination of a calibration point is an acceptable practice under the following special conditions:

- In multi-analyte tests in which the calibration solutions are prepared from mixtures, analyzed concentrations that are outside the established calibration range for a given analyte should not be included in the calibration situation because the stock solutions are mixtures.
- The lowest calibration point may be eliminated from the calibration curve but this action should take place only as a last resort. If the low calibration point is eliminated, that does not change or affect the calculated MDL that was derived for that test.
- The highest calibration point may be eliminated if all sample concentrations and all associated QC data are bracketed by the remaining calibration standards. This action should take place only as a last resort.
- An outlier calibration point may be eliminated if that point can be shown to be an outlier and not done solely to improve performance relative to calibration curve acceptance criteria.
- In all cases, when a calibration point has been eliminated from the instrument calibration curve, to assure that this is not a continuing problem, the section supervisor must be notified. Additionally, the reasons for the elimination and all the data associated with that elimination must be included in the laboratory records that document the affected analyses.

MANUAL INTEGRATION

MANUAL INTEGRATION POLICY: Manual integration may be required because the compound identification and integration results produced by the quantitation software may not always be accurate for the following reasons:

- The automated integration routine may not find the target analyte as a result of retention time shift, co-eluting interference, or inappropriate (too high or too low) peak intensity.
- A peak area may be incorrectly integrated by the automated integration routine as a result of poor peak shape, co-elution with other peaks, peak tailing, or a significant baseline drift.
- If one or more peaks elute within the retention time window, the automated integration routine may not select the peak with the retention time that best matches the retention time established by the calibration.

It is the analyst's responsibility to review the integration report generated by the computer software for every sample and calibration analysis. When errors are detected in the compound identification and peak integration, the analyst must conduct manual integration to correct the errors.

The manual integration must be reasonable, scientifically valid, and logically sound. The manual integration must meet the following criteria:

- The manual integration must be performed for one or more of the reasons listed above.
- The entire area and only the area of the peak is to be integrated for that peak. This integration shall not extend past the point where the sides of the peak intersect with the baseline. Conducting peak-shaving to eliminate part of the subject peak or including peaks not belonging to the subject peak is prohibited. Excluding peaks not part of the subject peak is allowed. Manual integration performed solely to meet QC criteria is unacceptable.

Manual integration must be documented in the following manner:

- The reason for performing the Manual Integration must be listed in the documentation.
- The Manual Integration is signed and dated by the person performing the integration if that person is not the analyst who originally generated the raw data associated with file number for that particular sample.

Just by the nature of the testing, organic analyses generate a large amount of paper work that is necessary to document the generation of the analytical result. There is a certification requirement that states that the analyst performing the analytical work must be identified in the work records. The manner in which the ECLS LIMS systems, associated with the organic instrumentation, are set up, they assign a file number for the analysis. Under that file number, all the

raw data associated with that particular analysis is stored. This file number is printed on every page of the printout of that raw data that the analyst reviews during the normal completion of the analysis.

It is unrealistic to expect the analyst to sign every page for every sample analyzed especially given the fact that the file number appears on every page. Therefore, ECLS has taken the approach that when the analyst signs next to the file number on the first page of the printout, that signature indicates that all the raw data, and any notations made during the evaluation of the data, were made by the signing analyst. Therefore notations indicating 'manual integrations', 'computer match is incorrect', etc. do not require the analyst signature. Only in those instances where the person who performs such evaluations is not the analyst who generated the raw data, would require that person's signature next to those evaluations.

There are instances when entries must be initialed and dated by whoever makes the entries. Examples of these are: whenever a cross out or correction is made to the printed data and who prepares the finished final report.

8.6 DEMONSTRATION OF CAPABILITY (DOC)

This evaluation is performed to verify that the analysts have the capability to perform an analysis within the requisite method accuracy and precision. At a minimum, this demonstration is performed yearly. An additional demonstration will be performed whenever there is a significant change in instrumentation type, personnel, or test method. Work cells are employed in two areas of ECLS: metals and certain organic analyses. In each instance there are personnel dedicated to the preparation of samples and personnel dedicated to the instrumental analyses of those samples. In these instances, the sample preparation and analysis personnel have their names associated with that DOC which reflects that analyst's involvement with the analytical process. There is no one specific cell DOC, only DOCs for the individual analysts. However, it is true that more than one analyst name can appear on a DOC. When a new member is added to the work cell, that person receives training from a competent analyst until such time that the new analyst is capable of handling the activity by his or herself. This is documented by the preparation of a new DOC. Additionally, the type and length of training received is documented in the personnel files maintained by OQA. If the analyst produces an unacceptable DOC, he receives additional training until such time as he can pass the DOC. This also becomes part of his training record.

The DOC is usually performed by correctly analyzing at least four consecutive LCS at a concentration of about 10 times the MDL or the low LCS, completing the appropriate forms, and placing the raw data in the appropriate Method Manual. However, the DOC can also be achieved by successfully analyzing an internal performance audit sample. Forms are maintained by OQA. The yearly continuing DOC can be accomplished by the same conditions as the initial DOC.

8.7 ESTABLISHING ACCEPTANCE LIMITS

To determine LCS acceptance limits, a minimum of seven and a maximum of twenty determinations are made. The average value and standard deviation are calculated. The acceptance limit is set at +/- 3 SD or +/- 15% of the true value or +/- 10% where required by the method. Regardless of the calculated limits, if acceptance limits are listed in the methods, those limits are used. If it is determined that the calculated limits are excessively tight and could lead to too frequent re-analyze, the acceptance limits can be adjusted through consultation with OQA. Acceptance limits for matrix and surrogate spikes are established in an analogous manner. Acceptance limits for duplicate analyses are established by calculating the relative percent difference (RPD) based on between seven and twenty duplicate analyses. If the calculated RPD is less than +/- 20%, the acceptance limit will be set at +/-20%. If the calculated RPD is > +/- 20%, the acceptance limit is set at that value, provided that this value is allowed by the method.

In those instances where no officially recognized methods exist, as a first approximation, limits derived from similar methods will be applied until limits can be established for that particular method.

Acceptance limits for newly prepared LCS etc. must be derived before the old solution has been depleted. This allows for the continuous coverage of the analysis by fully documented check samples. Calculations for developing all acceptance limits are performed by the analysts.

8.8 METHOD DETECTION LIMIT (MDL)

MDLs are determined using the procedures outlined in the individual methods or according to the procedure outlined in 40CFR141 appendix B. These are performed at least yearly, as required by EPA, or when there is a significant change in personnel, instrumentation, or analytical procedure. MDLs are determined for the individual matrices that are analyzed in the laboratory. The raw data used in these calculations are generated over a period of at least 3 days. This method of determining MDLs can yield some MDLs that are below the concentration value of the blank analysis for that method. This occurs in some colorimetric analyses where a certain threshold concentration has to be achieved before the reaction can take place. Until such time as the regulatory agencies guide us on how to handle this situation, ECLS will continue to calculate MDLs as currently required.

For analyses for which there is a linear response, the MDL will be calculated from the first iterative concentration that yields a %RSD of >10% for all seven (or more if additional analyses are routinely used in this determination) of the analyses used in this calculation or according to any method specific requirement, provided that the calculated MDL is below the reporting level and below the MCL. For non-linear response analyses, the calculation of the MDL will be addressed on a case by case basis.

ECLS does not relate the MDL data to quantitation levels (QL). Some laboratories establish a QL by defining it as 5 times the MDL. ECLS has defined its reporting level as the concentration of the lowest standard on the calibration curve. This concentration may be approximately 5 times the MDL but it may not. There are instances where the calculated MDL is so low that the instrumentation is not able to detect a concentration of 5 times the MDL. ECLS does relate the MDL to reporting levels as follows:

- Data reported at concentrations greater than the lowest standard are reported normally.
- Data reported at concentrations below the lowest standard are reported with a numerical value plus the data qualifier "JR" meaning an estimated value below the reporting level.
- Data seen at levels below the MDL are reported the numerical value of the MDL plus the qualifying code "K" meaning less than.

8.9 MANUAL CALCULATIONS

There are still occasions where results have to be calculated manually and not read off of a computer printout. In those instances, randomly selected examples of the manual calculation performed by the analyst are checked by the technical supervisor during their data review process to verify their accuracy.

8.10 VERIFICATION OF SOFTWARE CALCULATIONS

Verification of the software calculations must be performed when a new instrument has been installed; when new software has been implemented; when an analyst's Demonstration of Capability is being performed; and at least annually. The analysts determine the equations used by their computer system to perform the various calculations, either from the information supplied with the system or by directly requesting this information from the company. The analyst then checks the instrument generated results by manually calculating results using the provided equations and verifying that the results match. These results are then verified by the technical supervisor. For those analyses that consist of multiple analytes, it is only necessary to check the results for a few of the analytes. The equations and the documentation of the manual check then becomes part of the Method Manual by incorporating this information into the Calculations Section of the Method Manual. The records of the manual verifications are kept by the analysts at the appropriate laboratories and a copy with OQA.

The internal transfer of data is checked indirectly every day when the analysts and technical supervisors verify that collected or entered data has been received correctly. This process entails the entry of data, transfer of data to the LIMS, and the transfer back to the workstation. To date, the only mistakes encountered during this process have been manual entry mistakes.

Some analytical data is transferred electronically via the LAN into our LIMS System. The accuracy of the transfer of this data is checked by the technical supervisor of the Data Management section by comparing the copied data to the original data that is being reported. A record of this check is maintained by the technical supervisor.

CHAPTER NINE

DATA HANDLING

9.1 ANALYSIS WORKBOOKS/PRINTOUTS: INORGANIC TESTING

Raw data, calculations, analytical results, and control data are either recorded in bound workbooks or computer printouts. Any computer printouts are then placed in loose-leaf binders that document the analytical runs undertaken. Any handwritten entries are made in ink. Pencil is never used on analytical documentation. Erasures and the use of whiteout or correction tape are also forbidden. The workbooks fall into three categories: reagent and standard workbooks, instrument logbooks, and analysis workbooks.

REAGENT AND STANDARD WORKBOOKS contain the following information:

- Method reference.
- A listing of preparation procedures that are followed. This could be a copy of the preparation procedures copied from the analytical method or a reference to the procedure in the write-up.
- The unique identifier assigned to each of the solutions. This identifier is based on the workbook number, page number, and the position on the page on which the preparation is documented. For example, if the preparation is documented in workbook 2121, page 45, in the second position on the page, the unique identifier for that solution is 2121-45b. The first position on the page is designated "a", the second "b", etc. If the reagent/standard has been assigned a number in Element, the Element ID for this reagent/standard is recorded as well.
- The date of the solution preparation along with the analyst's initials.
- Any readings and/or calculations employed during the standardization of the solution along with the appropriate units of measure.
- A reference to the stock standard material that was used to produce the standard solution. This reference is to the bottle ID assigned to it at the time of receipt in the laboratory and to its certificate of analysis that the manufacturer supplied with the shipment.

In some cases, the reagent workbook may be "combined" with the analytical workbook in order to closely monitor the preparation of the critical reagents and standard solutions.

INSTRUMENT LOGBOOKS are maintained for each major piece of instrumentation. The log lists:

- The type of instrument along with the make, model, and serial number.
- Each day that the instrument is used, an entry is made to indicate the analyses performed on that instrument.
- Any maintenance performed on the instrument.
- If a problem is observed, the nature of the problem is listed along with the corrective action steps undertaken.
- All entries are accompanied by the initials of the analyst.

ANALYSIS WORKBOOKS can be divided into two categories: those resulting from tests and analyses that are carried out using manual techniques, and those resulting from analyses carried out using instrumental techniques. The Manual Analysis Workbooks are permanently bound and paginated books that contain the following information:

- A reference to the analytical method and analytical SOP being used.
- Date the sample was prepared or analyzed.
- Laboratory identification number that was assigned to the sample during the sample receivership process.
- Volume of sample taken for the analysis.
- A listing of any subsequent dilutions undertaken during analysis. These are listed serially until an on-scale reading is obtained. In some cases, it is not practical to perform the required sample dilutions

during the initial analytical run. In these cases, any required dilutions are performed in subsequent analytical runs.

- Value of the reading obtained during analysis.
- The analyte concentration corresponding to the value of the reading obtained from the standard curve.
- The final results.
- The concentration of the standards and their respective readings that were analyzed to generate the standard curve for the analysis. The inorganic laboratory prepares a standard curve with each day's analyses. No "continuing calibration check" is required.
- The laboratory ID numbers of the samples that were analyzed in duplicate (if required).
- The calculated Relative Percent Difference (RPD) of the duplicate analyses along with the acceptable RPD range.
- The laboratory ID numbers of the samples that were analyzed as Matrix Spiked Samples (if required).
- The calculated Percent Recovery for the matrix spike analysis along with the acceptable percent recovery range.
- A listing of all the in-house Quality Control Samples analyzed along with their target values and acceptable ranges.
- A listing of the analyst's initials and the section supervisor's initials.

The INSTRUMENT "WORKBOOKS" are in many cases loose-leaf binders that contain the instrumental printouts generated during the analytical run. These printouts are generated by the instrument's software and they contain:

- The name of the analysis and a method reference.
- The name of the analyst.
- The date and time of analysis.
- Instrument ID and/or serial number.
- A tabular representation of the calibration standards and their raw measurement values.
- A graphical representation of the calibration curve including the calculated correlation coefficient (R) or the coefficient of determination (R^2).
- A tabular representation of the sample and quality control results (as listed above).
- Where applicable (ion chromatography, continuous flow analysis), the strip chart of the analytical run showing the peaks for all the samples analyzed.
- The analyst's initials.

9.2 ANALYSIS WORKBOOKS/PRINTOUTS: ORGANIC TESTING.

ORGANIC WORKBOOKS AND PRINTOUTS

An INSTRUMENTAL LOGBOOK is maintained for each GC, GC/MS and HPLC. This log lists the type of instrument along with its make, model and serial number and functions as the record for the daily analyses performed by the instrument. The analysis of each sample is documented by entering into the log the laboratory ID number of the sample, the injection size, the time of the analysis (if the data is being acquired by a system that does not automatically record the analysis time), and the data file number (if, as is usually the case, the data is being acquired by a laboratory data system). Any maintenance performed on the instrument is also entered on the log. For each instrument that has not been formally taken out of service, at least one entry must be made each day in its log even when the instrument is not in operation even if it is to note that the instrument was not in use. If an instrument is to be formally removed from service, an entry to this effect, including the removal date, will be placed in the log. When the instrument is restored to service, a dated entry indicating restoration must be made in the log. If maintenance is performed on the out of service instrument, entries covering the maintenance must be placed in the log even though the instrument is out of service. All entries are initialed by the analyst.

STANDARD PREPARATION WORKBOOK documentation includes: the unique ID number of the solution (generated as above), date of preparation, name of the compound(s), lot number of the primary standard, final weight, tare weight (unless automatic tare is employed on a digital balance), correction for purity of the primary standard, dilution volume, solvent(s), and final concentration. When a new working standard is prepared, its chromatographic behavior is carefully compared with the latest chromatograms of the previous standards so that any response irregularities can be noted before incorporating the standard into routine use. The response characteristics of the future analyses may be compared against the initial chromatographic data to determine whether the standard is decomposing during use.

CHROMATOGRAM DOCUMENTATION (ALL ORGANIC CHROMATOGRAPHIC INSTRUMENTS ARE INTERFACED WITH THE LABORATORY DATA SYSTEM): The instrument's computer system assigns a unique data file name to each run. The analyst records this data file name in the Instrument Log. The data system then stamps this name on all subsequent copies of that particular chromatogram. The data file name can be used to determine the operating conditions under which the chromatographic run was made by referring to the data file name in the instrument log.

QUALITY CONTROL DOCUMENTATION: The results of all the QC procedures associated with a particular instrument and analysis are documented as the information is generated. Items documented in this manner include: initial instrument calibration, continuing calibration checks, MDL determinations, MS tune results, blank analyses, surrogate spike recoveries, matrix spike recoveries, duplicate sample analyses and/or duplicate matrix spike recoveries. All these results are compared against the acceptance criteria contained in the specific methods.

9.3 DATA REVIEW

There are several reviews of the raw and final data that generated by the laboratory prior to reporting the data out of the laboratory. These reviews are conducted by the analysts and the analytical section supervisors.

DATA REVIEW

ANALYST REVIEW: The analysts are the first people to review the raw data of the analytical run. They review all the QC data associated with the particular runs to verify that the QC data is within the stated acceptance limits. If all QC associated with the run is found to be acceptable, the analyst initials and dates the workbook or printout and enters the results into Element (**see Attachment 12**, The Promium Element Laboratory Information Management System, for a detailed procedure to perform this operation), changing the status of all affected samples to "Analyzed". If the QC data is not within the acceptance limits, the analyst must re-analyze the run from the spot of the last acceptable QC values if there is sufficient sample volume to do so, and the sample has not exceeded the required holding time. If this corrects the situation, the data can be addressed as above. If the re-analysis does not correct the situation, the sample data generated between the points of acceptable QC results can be forwarded as above but the rest of the data is to be rejected and new analyses performed after the analyst corrects the situation that led to unacceptable results. If the unacceptable results are still being generated, the analyst shuts-down the analytical system and notifies the section supervisor and OQA. The supervisor and the QAO investigate the problem and the QAO documents the solution and what steps were taken to correct the problem.

SUPERVISOR REVIEW: The section supervisor verifies that the analyst correctly evaluated the QC data, and correctly entered the analytical results into Element. He or she also checks for certain parameter correlations, e.g., TKN>ammonia; and TP>hydrolyzable phosphate>orthophosphate.

CHAPTER NINE

DATA HANDLING

During the course of the data review process, it may be necessary for the analyst or supervisor to make certain markings on the pages containing the raw data. These markings are for internal references for the ECLS staff and are not meant to convey any relevant information to any client. Therefore, those markings are not defined on the raw data that is reported to the clients. Any markings that appear on the report forms are identified to the clients.
The supervisor then signs the applicable workbook, and changes the status of the affected samples to "Reviewed" in Element. See Attachment 12, The Promium Element Laboratory Information Management System, for more detailed information. After all results for a given work order are entered and reviewed in Element, the data management section generates a laboratory report

9.4 DATA DELIVERY

ECLS provides sample analysis reports, data feeds and billing information to our clients and Billing Unit. All data is stored in the Element LIMS LTDB SQL Server 2005 database. Both reports and data feeds are customized based on agency specifications and requirements. Billing information is generated on a monthly schedule and produces monthly invoicing data along with summary information used by client to reconcile billing.

DATA REPORTING

ECLS generates two types of reports the TIER 2 report which contains qualified results data and the TIER 1 report that requires extensive amount of supporting data. The client specifies what type of report they need by checking the proper box on the COC form. If it becomes necessary to change to a report, this is handled as a "Supplement to Test Report." This supplement would be necessary if the laboratory ascertained that some aspect of the laboratory operation caused questionable data to be reported. The QAO prepares the supplement report and retains a copy for a period of 5 years.

TIER 2
This is the routine data report generated for the majority of the regular sample analyses testing performed by ECLS. The Data Administration production report team reports all final reviewed reports every day at 2:00 pm. They also generate reports on demand at any time during the working day. TIER 2 reports are created using Crystal Report software submitted in Element from the Project Management\Reports menu. These are custom reports created as PDF files. Reports are then delivered to the client and also provided to ECLS program manager for review. Clients have the choice of having reports sent to them by email, hard copy regular mail or moved into a shared drive using Citrix. All reports along with all scanned source and supporting documents are saved on the Shared V drive in the ALLREPORTS folder in pdf files. These files are accessible to the entire lab for data review and the shared folder provides a data store of all reports sent to clients. When a client requires more supportive information they are required to request this through the ECLS Laboratory Manager in charge of the project.

TIER 1
A Standard Regulatory Report Format (SRRF), or Tier 1 data package, includes: the analytical results along with all the QC data produced during the course of the analysis, all raw analytical data, a laboratory chronicle, and a case narrative. The requisite information is produced, compiled, and reviewed by the analytical sections and given to the Data Administration Section for processing. The Data Admin group compiles then scans all documents creating the Tier 1 data package into a PDF format file. This file is then used to create a CD-ROM or DVD along with the data feed file if required and then distributed to the clients as required.

SRRF REPORTS (TIER 1 DATA PACKAGES): SRRF reports vary slightly, depending on the type of analysis conducted, and the instrumentation used to do so. All pages beyond the Table of Contents in this report are numbered.

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DATA HANDLING

All tables and X - Y graphs are set broad side, i. e., the open edge of the paper toward the reader. The package includes all of the following sections:

- Title page containing the case name, field sample numbers, laboratory batch number, laboratory sample numbers, sample location, date, time of sample collection, laboratory manager and quality assurance officer signatures.
- Table of contents listing all major sections of the document with referenced pages.
- Sample analysis request forms that list the type of analyses that were requested for the sample and all pertinent field information.
- Chain of custody forms detailing the change of possession of the samples from the time of collection to delivery to the laboratory and the internal laboratory forms detailing the change of possession of the samples in the laboratory.
- Laboratory chronicle contains a dated sequence of the sample analysis and re-analysis. This is provided as a summary in addition to the chain of custody forms. It addresses sample receipt, refrigeration, and storage; preparation by fraction; extractions; and section supervisor's review and approval with signatures.
- Methodology review contains a brief narrative outlining the essential points of each method used.
- Case-Narrative/Non-conformance summary that presents in appropriate narrative or tabular form, such that all data falling outside the QC criteria specified in the individual methods and/or this manual is highlighted so the data user can evaluate the data and determine the significance it wishes to place on the impact to that data.
- Quality control summary listing the surrogate recovery summary, matrix spike/matrix spike duplicate summary, reagent blank summary, laboratory fortified blank summary, and GC/MS tuning and mass calibration summary.
- Sample data package includes the sample result summary with detection limits, sample chromatograms and mass spectral data, quantitation reports, and library searches.
- Standard data package includes the initial calibration data, continuing calibration data, and the standard chromatograms, quantitation reports and summaries.
- Raw QC data package includes the DFPTT and BFB spectra, and the reagent blank data.

In addition to all of the above, there are additional reporting requirements under SRRF for certain analyses e. g., GC/MS analysis of volatile and semi-volatile organic compounds, pesticides by GC/ECD, and metals by ICP and PFAA. The additional reporting requirements for GC/MS are as follows:

- Targeted analyte summary consists of the quantitation results (uncorrected for blank); MDLs, method blank, and spiked blank results. The following data reporting qualifiers are used: "J" indicates an estimated value. It may also be used to indicate an estimated value resulting from factors, such as, questionable QC results, exceeding holding times, etc. "JR" indicates an estimated value that is below the reporting level but above the MDL. "K" indicates a compound was analyzed for but not detected. When using the "U" qualifier, report the minimum detection limit also (e.g., 100U). "B" indicates that the analyte was found in the laboratory reagent blank and, as such, alerts the data end user that a possible contamination has occurred. The targeted analytes are reported as a minimum. Results are reported to two significant figures. For rounding rules, the USEPA handbook of Analytical Quality Control in Water and Wastewater Laboratories, USEPA-600/4-79-019 is followed.
- Matrix spike/matrix spike duplicate analyses have their percent recoveries (%R) and relative percent difference (RPD) are calculated. Alternately, duplicate analyses may be performed on unspiked samples and the matrix spike run separately. The RPD and %R are reported.
- GC/MS tune summary data is reported.
- Calibration curve validation data consists of the initial calibration curve data and the continuing calibration curve check data.
- Surrogate compound recovery summary data.

- Non-targeted analyte summary consists of searching a NIST spectra library (1998 version with approximately 130,000 spectra) and presenting the following: scan number, analyte, CAS number, absolute retention time, molecular weight, and the estimated concentration.
- Supportive confirmation spectra used for comparison for positive targeted compounds is presented.
- Extracted ion current profile for characteristic and secondary ions versus RIC or TIC showing maximum +/- 1 scan is reported. Presentation is within a limited window near the expected RT of the analyte.
- NBS library search presentation of non-targeted compound spectra with the 3 best matches. If possible, additional classification of the unknown compounds is presented, e. g., unknown aromatic, unknown chlorinated compound, etc.
- Actual data output is submitted for all runs.
- Quantitation report includes the following: summary of all the analytes, comparison of compounds found v. the library entry, and the method of quantitation.
- Handwritten decision by the mass spectroscopist indicating negation or confirmation of the software's tentatively identified compounds values is reported.
- Chromatograms, either RICs or TICs, and a m/z tabular listings are included for all the tune compounds.
- Chromatograms for method blanks, spiked blanks, calibration standards, field samples, matrix spike, and matrix spike duplicate are included. Each internal standard and surrogate compound is clearly labeled on the chromatograms.

The special reporting requirements for pesticides and PCBs by GC/ECD are as follows:

- Targeted analyte summary consists of the following: quantitative results (either the primary or confirmatory result), MDLs, method blank, and spiked blank results. The external standard quantitation method is used to quantitate all pesticides/PCBs. Quantitative results are on a dry weight basis for soil and sediment samples. Every identifiable peak is quantified unless interference with individual peaks persists after cleanup.
- Matrix spike/matrix spike duplicate results.
- Surrogate compound recovery data.
- Chromatograms are submitted for field samples, method blanks (both primary and confirmatory), calibration standards, matrix spike, and matrix spike duplicates. The chromatograms are labeled with the following: sample ID, volume injected, date and time of injection, GC column identification, GC instrument ID, and positively identified analytes have their retention times printed over the peak or on a printout of retention times.
- If using manual data reduction, retention times and peak areas are provided.
- If using data reduction by using software retention time windows for each analyte, documentation is furnished.

Special reporting requirements for metals analyses include the following:

- For ICP: analytical results, method blank data, spiked duplicate data, initial calibration, calibration verification data (quality control samples), blank data, matrix spike data, and the ICP interference check sample data. The ICP check is used to verify inter-element and background correction factors. This is analyzed at the beginning and end of every run. This sample contains all the elements analyzed by ICP and functions as the control sample analysis listed above. Results must fall within the established control limits of +/- 20% of the mean value. If not, the analysis is terminated, the problem is corrected, the instrument is re-calibrated, and the samples re-analyzed.
- For platform furnace: the items listed above are reported. If the Method of Standard Additions (MSA) is required, the following is also included: the absorbance and concentrations for zero, first, second, and third additions; and the slope, intercept and correlation coefficient data.

9.5 DATA PACKAGE REVIEW

The SRRF packages are compiled by the manager of the section in which the analyses were performed. They verify that all the requested analyses have been completed and then obtain all the necessary data and supporting documentation. The data is collated, placed in a binder, the pages consecutively numbered, and the signature page added. The package is given to the QAO who reviews it for completeness and spot checks the data to verify that no mistakes have been made during the analysis and collation of the data. See **Appendix 55**. The QAO and the laboratory manager sign the package. It is returned to the Data Management section for copying and distribution. A record of the QAO package review is maintained by the QAO.

9.6 DATA QUALIFYING CODES

Sometimes it is necessary to qualify the reported data to indicate to the data user specific information that could be relevant to the user's interpretation of that data. The codes employed by the Inorganics laboratory are based on the US EPA STORET data qualifiers. However, when the codes are used to qualify BOD results, they have a slightly different meaning. This is due to the uniqueness of the BOD test. The definitions of the BOD codes were supplied to ECLS by an US EPA Region II Laboratory Certification Officer. The codes used in the Organics laboratory are modeled on the CLP format. The meanings of all the ECLS codes have been forwarded to NJ DEP, our primary contractor. However, when compiling a data package, the meanings of all these codes appear at the end of the analytical report. The ECLS and Sanitary Bacteriology laboratories data qualifying codes are presented in **Attachment 13.**

9.7 RECORD STORAGE

Analytical results and the supporting documentation are maintained by ECLS for a period of time established by the State Archives Commission. All the hard copy material is kept at ECLS for a period of about one year, depending on the storage capacity available at any given time. This includes the final reports, workbooks, instrument printouts, etc. After the initial in-house retention of the records, the records are transferred to a secondary holding facility operated by a contract vendor. The transfer of all these records is handled through the ECLS Management Assistant. The analyst informs the Supervisor of the need to transfer records, and is given the appropriate forms to complete. The records are boxed and inventoried and the contents so noted on the forms. The boxes are given an ID number, and that number is entered on the form. The records are then transferred to the other facility where they are stored until permission is given to discard the records. The storage forms are maintained by the ECLS Management Assistant.

If the need arises, the records can be retrieved from storage. Again, this operation is handled through the ECLS Management Assistant. The ECLS Management Assistant informs the DHSS Forms Control and Records Management Office of the ID numbers of the boxes that contain the required material. The boxes are delivered to ECLS and the material is subsequently returned to the storage facility. Again, the documentation of the retrieval and return of documents is maintained by the ECLS Management Assistant.

The records will remain in storage until such time as ECLS provides written permission to discard the records. The permission document is prepared by the DHSS Forms Control and Records Management Office and then reviewed by ECLS Management Assistant and the QAO before being forwarded to the facility for disposition.

Recent Organic data that is stored electronically is kept in the instrument data systems for an unspecified period of time. The data is backed up and is also forwarded to a Department's Server where it is maintained. The Server's contents are then additionally backed up to another server. Some of the GC data will be backed-up to stand alone hard

drives rather than the server. Once the data is deleted from the instrument's system, it has already been saved to at least two different sites. The Inorganic data is stored in the instrument data system for a period of up to 6 months before it is backed up in a similar fashion.

However, all laboratory data is also stored as hard copy. This precludes the need of having to maintain an antiquated computer system in order to retrieve stored data.

9.8 REQUESTS FOR DATA VERIFICATION

Sometimes ECLS receives requests to verify that the data that was reported was actually reported correctly. Requests are sometimes made because the reported data does not agree with some historical data that the client has for a specific site. Sometimes requests are made simply because the data "does not look right". Requests for data verification are considered by ECLS to be a form of a complaint and, as such, requests are made through the QAO.

REQUESTS FOR DATA VERIFICATION

Requests for data verification are sometimes requested of ECLS. Sometimes these requests are made directly to the analysts and sometime through management. These requests usually take the form of wanting ECLS to verify that the results reported were not the result of some transcription error or the result of faulty quality control data associated with that particular analysis. These requests are made because the data user has received results that do not meet their expectations of what the data should look like.

Sometime ECLS is requested to forward partial analytical results to the sampling agency. The data associated with this type of partial reporting is considered to be preliminary data. If a request is made for data verification on these preliminary results, the analyst may perform an examination of the raw data to determine if the test was performed correctly and accurately and so inform the requesting agency verbally PROVIDED THE ANALYST ABSOLUTELY KNOWS FOR SURE THE IDENTITY OF THE PERSON TO WHOM HE IS PROVIDING THE INFORMATION. IF THERE IS ANY DOUBT, REFER THE MATTER TO MANAGEMENT.

When a request is received for data verification of data that has already been reported to the submitting agency, those requests are forwarded to QAO for handling. See **Appendix 64a** for the information that must be supplied with the data request.

The QAO starts a Complaint/Observation form and obtains the following information from the person making the request: name, agency, telephone number, basis for the request, and the laboratory ID numbers of the affected samples. This information is used to investigate the complaint with the section supervisor. Although not specifically stated as a complaint, any request made by an outside agency to check the work produced by ECLS is considered by ECLS to be a complaint since they are calling into question the operation of the laboratory. The result of the investigation, any corrective actions taken by ECLS, a copy of the written response and the date of the response entered or attached to the Corrective Action form. The final report of the findings is reported by the QAO back to requester. These forms are maintained by the QAO for a period of five years.

9.9 RECORD CORRECTIONS.

If a correction has to be made to a hard copy entry, it is made by placing a single line through the incorrect entry, in such a way, so the incorrect entry is still legible, and the correct entry is placed next to it. The person making the correction initials the cross out, dates when the correction was made, and cites the reason for the correction when the

correction is not obvious. Under no circumstance is "white out" to be used in this process. Before a correction is made, permission must be obtained from at least the Technical Supervisor of that unit.

After data has been entered into the mainframe, it can still be changed prior to printing the final report. These changes are made, generally speaking, by members of the Data Management staff. However, it can also be changed by the technical supervisors. Data Management prints out, by analyte, a report listing the data that has been entered since the last report and forwards it to the supervisors. These printed results are compared to the actual analytical results. If an error is noted, the correction is noted on the printout. The supervisor initials the printout and returns it Data Management where the change is affected. A "user profile" has been established for each analyst that sets limits to what they can perform on the data system. It is these profiles that provide the ability of certain personnel to make data changes. When a change is made, the computer creates an "audit trail". This audit trail records who made the changes, the type of change, and when the change was made.

If an error is observed after the data has been reported, a written correction is prepared by the QAO within 2 days of the observation and forwarded to the client as a "Supplement to Test Report".

9.10 SIGNIFICANT FIGURES AND ROUNDING OFF

At the current time, it is ECLS policy to report analytical results to 3 significant figures. For radiochemistry results, the number of significant figures used will be based on the error calculation for that analysis. If there is reason for the analyst to believe that some data should be reported to more than 3 significant figures, the analyst should consult the QAO to affirm this decision.

The following are the rounding off rules that are in effect in ECLS:

- Increase the last retained digit by one if the leftmost dropped digit is greater than 5 or is 5 followed by other numbers.
- Leave the last retained digit unchanged if the leftmost dropped digit is less than 5.
- If the leftmost dropped digit is exactly 5, increase the last retained digit by 1 if it is odd and leave it unchanged if it is even.

The example below is for rounding off to the third decimal place for results produced to 5 decimal places. If these numbers had to be rounded to 3 significant figures, all the results would be 1.24. This is presented for illustrative purposes.

1.23742	1.237
1.23751	1.238
1.23750	1.238
1.23650	1.236
1.23749	1.237

In addition and subtraction, retain only the number of decimal places in the result as are in the component with the fewest number of decimals.

32.7	
3.62	
10.008	
46.328	46.3

APPENDIX 55

DATA PACKAGE REVIEW CHECKLIST

DATA PACKAGE: **REVIEWER:**

LABORATORY RECEIPT DATE: **BATCH NO.:**

DATE REVIEWED: **SUBMITTING AGENCY:**

SAMPLE COLLECTOR: **METHODS REVIEWED:**

A. SAMPLE IDENTIFICATION	**Y,N,NA**
A. 1. Analysis request form for each sample; field sample numbers; laboratory sample numbers; date and time of sample collection.	
B. EXTERNAL CHAIN OF CUSTODY FORMS FOR EACH SAMPLE	
B. 1. Analyses requested.	
B. 2. Names, dates, and times of change in sample custody.	
B. 3. Field sample numbers.	
C. INTERNAL CHAIN OF CUSTODY FORMS	
C. 1. Names, dates, and times of transfer of custody between the sample receiving custodian and the analysts.	
D. LABORATORY CHRONICLE	
D. 1. Dates of sample receipt and refrigeration.	
D. 2. Dates of sample extractions, digestions, and analyses.	
E. CASE NARRATIVE	
E. 1. Condition of submitted forms and samples at time of receipt in the laboratory.	
E. 2. Details of any observed sample/paperwork deficiencies.	
E. 3. Laboratory personnel performing the analyses.	
E. 4. Analytical and reporting protocols including the definitions of the data qualifiers used.	
E. 5. ORGANICS: Internal standards data.	
E. 6. ORGANICS: Surrogate spike recoveries.	

E. 7. ORGANICS: Matrix spike/matrix spike duplicate results.	
E. 8. INORGANICS: Method blanks.	
E. 9. INORGANICS: Laboratory fortified blank results.	
E. 10. INORGANICS: Control sample data.	
E. 11. INORGANICS: Duplicate sample data.	
E. 12. INORGANICS: Spiked sample results.	
E. 13. INORGANICS: Instrument check results.	

ORGANICS	504	505	507	SIM	515.3	524.2	525.2	531.1	608	624	625
F. QUALITY CONTROL SUMMARY											
F. 1. Method blank data.											
F. 2. Spiked blank data.											
F. 3. Tuning and mass calibration data.											
F. 4. Internal standard data.											
F. 5. Matrix spike/matrix spike duplicate data.											
F. 6. Surrogate Recoveries.											
G. ANALYTICAL RESULTS											
G. 1. Results for target and non-target compounds.											
G. 2. Quantitation reports.											
H. STANDARD RESULTS											
H. 1. Initial calibration data.											
H. 2. Continuing calibration data.											
H. 3. Internal standard data.											
H. 4. Raw data reports for calibration standards.											

TRACE METALS	200.7	200.8	200.9	245.2	1631
I. QUALITY CONTROL SUMMARY					
I. 1. Method blank data.					

APPENDIX 55

DATA PACKAGE REVIEW CHECKLIST

I. 2. Laboratory fortified blank data.					
I. 3. Quality control sample data.					
I. 4. Duplicate sample data.					
I. 5. Matrix spike/matrix spike duplicate data.					
I. 6. IPC interference check sample data.					
I. 7. SIC instrument check sample data.					
I. 8. Reporting Level Check Standard.					
J. ANALYTICAL RESULTS					
J. 1. Analysis report forms.					
K. STANDARD RESULTS					
K. 1. Initial calibration data.					
K. 2. Standard curve and coefficients of determination (R^2)					
L. RAW DATA RESULTS					
L. 1. Digestion logs.					
L. 2. Run logs.					
L. 3. Analytical chromatograms.					
L. 4. Analytical printouts.					

GENERAL CHEMISTRY	Y, N, NA
M. QUALITY CONTROL SUMMARY	
M. 1. Method blank data.	
M. 2. Spiked blank data.	
M. 3. Quality control sample data.	
M. 4. Duplicate analysis data.	
M. 5. Matrix spike/matrix spike duplicate data.	
M. 6. IPC interference check sample data.	
M. 7. Reporting level check.	
N. ANALYTICAL RESULTS	
N. 1. Analysis report forms.	

O. RAW DATA RESULTS	
O. 1. Digestion/distillation logs.	
O. 2. Run logs.	
O. 3. Analytical chromatograms.	
O. 4. Analytical printouts.	
O. 5. Workbook pages.	

ANALYTICAL FAILURES MENTIONED IN PACKAGE:

PROBLEMS OBSERVED WITH PREPARATION OF DATA PACKAGE:

NUMBER OF COMPLAINT/OBSERVATION FORM:

OBSERVATIONS:

Laboratory Information Management System (LIMS)

OVERVIEW

ECLS uses the **Promium® ELEMENT®** LIMS product to improve the process flow of its Laboratory work. The system was entered into production service in September of 2009. ELEMENT is a client server system built on Microsoft Windows-based platform that utilizes Microsoft SQL SERVER for the back end data base. The ELEMENT LIMS system is supported by the ECLS Data Administration group. SOP's are developed by each of the ECLS laboratory program groups detailing how they manage analytical data using the ELEMENT LIMS. Promium ELEMENT includes the following components:

ECLS FACILITIES

The ECLS Laboratory uses the ELEMENT multiple facilities feature to separate LAB groups analytical data processing within ELEMENT. Each Lab groups sample data is logically partitioned within the labs database (LTDB) based on facility code while sharing the same Client information. This provides the ability to customize and default different features for processing like different report formats based on LAB group requirements. Every LAB group has its own set of users defined to their facility code. Below chart maps the LAB group to facility code.

LAB Facility and Reference Chart

LAB Group	*Facility Code*	*Citations*
Inorganics LAB	*A*	All Method SOPs, Appendix B
Organics LAB	*A*	All Method SOPs, Appendix A
Radioanalytical LAB	*B*	All Method SOPs sections 13,14,15,20 Radioanalytical Services Element Guidelines
Bacteriology LAB	*C*	Sanitary Bacteria Water SOP Promium Section Ver. 1
CT – Medical Marijuana Lab	*D*	*Under Development*
Data Administration IT	*A,B,C,D*	Data Handling Section 9.4
Sample Receiving	*A,B,C,D*	SOP ECLS-SR-1 Section 3.2.2 and Attachments 5-8

ACCESS SECURITY

LIMS access is protected through system logins and user restrictions. A user needs valid credentials to be able to access the NJDOH server. It's important to note that all desktops using Element attached to an instrument gain access thru a VLAN for security reasons. Next a valid copy of ELEMENT needs to be loaded onto client computer. Finally when the user launches ELEMENT from their desktop they need an ELEMENT userid and password. The ELEMENT userid is administered by the Data Admin group that grants specific permissions controlling user functionality and access to ECLS facility codes. User rights are determined by each ECLS Program Manager.

ANALYTICAL DATA PROCESS

The ELEMENT LIMS fundamental design is to control the ECLS analytical data process by changing status based on the state of the data within the LIMS. Using this status change the data is moved through the LIMS controlled by the ELEMENT programming logic. The following are the major status types used by ELEMENT.

- Received - sample analysis have been entered into ELEMENT by the ECSL Sample Receiving group.
- Available - samples have been released to the different lab groups for analysis.
- Reviewable - sample analysis is complete and results are ready for the review process.
- Reportable – after the final review process is finished, analysis result data is released for data delivery and billing.

ELEMENT FUNCTIONALITY

- SAP Crystal Reports application is used to create both the standard and the custom reports.
- In depth User guide is used for both help information and the main point of reference for the laboratories SOP's.
- Utilizes a bar code reader for sample COC and final bottle disposal disposition.
- Manages Clients conveniently through the ability to customize Projects.
- Ability to maintain and control different Lab Facilities.

REFERENCE

USER MANUAL – ELEMENT LIMS Version 6 from
PROMIUM®

Qualifier	Textbody/Description
TNTC with	TNTC W/Positives
#LA	Lab Accident
_<1est	<1 CFU/mL EST
_>16000	>16000
_A	Absence
_P	Presence
< 18	<18
< 180	<180
< 1800	<1800
<1.1	< 1.1
<1.8	<1.8
> 160000	>160000
>1600	>1600
>16000	>16000
B	Analyte is found in the associated blank as well as in the sample.
C	Presence of compound may be due to combination of samples during laboratory processing.
CN	Refer to the Case Narrative located at the end of the sample results page.
Confluent+	Confluent with Positives
CP	Contaminated Plates
D	Result obtained from a dilution of the sample.
DLF	Failed to meet NJDEP, BSDW detection limit (DL). NJ, BSDW adopted the DL as the miniumun detectable concentration (MDC) . This differs from the SDWA DL,asdefinedin10CFR40 141.25 (c)
DUP	Sample and duplicate analyses failed acceptance criteria.
E	Result exceeded calibrated range.
F	Holding time exceeded in the field.
G	Equipment failure
H	Analysis exceeded the holding time.
H-01	Your sample exceeded holding time for the gross alpha 48-hour, double-count procedure.
I	Insufficient quantity
IS	Internal standard area response failed acceptance criteria.
J	Approximate Value
JR	Approximate value. Result is below the reporting level but greater than the method detection limit.
K	Value below the method detection limit.
L	Value above the quantitation Limit. For BOD: the residual remaining after 5 days is less than 1.0 ppm (reported as a greater than value).
LFB	The laboratory fortified blank (LFB) failed acceptance criteria.
LFM	Matrix spike (MS) or laboratory fortified matrix (LFM) failed acceptance criteria.
LRB	The laboratory reagent blank (LRB) failed acceptance critieria.
M	Matrix interference
MI-CL	Matrix interference - sample contained elevated chloride levels.
MI-Color	Matrix interference - sample was highly colored.
ND	The activity concentration was less than the calculated MDC.
NE1	RPD not evaluated - the difference between the sample and duplicate was </= the MDL.
NE2	MS/MSD not evaluated - the concentration of the spiking material added was less than 30 percent of the sample background concentration.
NE3	RPD not evaluated - the concentrations of one or both replicates were below the reporting limit.
P	Results obtained from primary and confirmatory columns differ by more than the method allows.
Q	Approximate value. Compound failed continuing calibration check (CC) or QC check criteria.
S	Surrogate recovery failed acceptance criteria.
T	Hardness by calculation method
UFL	The planchtted sample was NOT flamed.
Z-01	[Custom Value]
*	Analysis was performed by EPA-approved method ECLS-R-Ra 226/228, which is documented in SM 7500-Ra E.

Sharon Y Robinson QAO

CHAPTER TEN

QUALITY ASSURANCE

10.1 QUALITY ASSURANCE PROGRAM (QAP)

Implementing and maintaining the QAP is the responsibility of the Quality Assurance Officer (QAO). Activities performed by the QAO are listed in the sections that follow immediately below.

10.2 DEVELOPING THE QUALITY SYSTEMS CONTAINED IN THIS QUALITY MANUAL (QM).

The QAO, together with input from the ECLS and PPRC Service Directors and the ECLS Program Managers, developed the quality systems that appear in the QM. QA continues to be an evolving field and, as such, it is anticipated that future additions and/or refinements will have to be made to the existing quality systems. Any such modifications to those quality systems contained in this QM can only be affected by the QAO. The QAO will affect these changes by: informing management of the type of change that is necessary, informing management of the reason for that change, informing management of the affect that it may have on laboratory operations, providing a listing of what will be required to effect that change, developing any forms or a listing of the documentation steps that will have to be implemented as a result of the change, and providing an anticipated date for the change.

It is anticipated that as changes to the quality systems become necessary as a result of regulatory requirements those changes will be implemented as soon as possible after being informed of the changes in the requirements. When changes are made to the QM, updated versions of the manual will be distributed to all laboratory personnel. At a minimum, the Quality Manual will be reviewed annually and redistributed to the ECLS staff. The QAO will retain copies of all previous versions of the QM as a historical record for a minimum of five years.

10.3 IMPLEMENTING AND MAINTAINING THOSE QUALITY SYSTEMS

It is the QAO's responsibility for implementing and maintaining the quality systems. The first step in the implementation process is holding training sessions for the Program Managers, supervisors, and analysts. See section 2.5 of the QM. The sessions detail the nature of the changes that are taking place in the existing laboratory quality systems and the responsibilities that these changes would place on everyone working in the laboratory. As additional changes are made to the quality systems, other informational sessions will also be scheduled. When the Quality Manual is revised and finalized, all analysts will receive a copy.

Maintenance of the quality systems will be affected by the use of system audits and performance audits. A system audit will be conducted in each analytical section of the laboratory at least once per year. This will verify that the quality systems have been implemented and are being followed by laboratory personnel during their day-to-day activities in the laboratory. An auditing checklist will be completed for each section for each auditing event. These will be maintained by the QAO for a period of at least five years. Performance audits will also be supplied to each unit in ECLS during the calendar year. The system and performance audits are not coordinated so that the same unit may undergo both audits at the same time.

10.4 DEVELOPING AND IMPLEMENTING THE REQUISITE DOCUMENTATION PROTOCOLS NECESSARY TO VERIFY COMPLIANCE WITH ALL THE PROCEDURES CONTAINED IN THE QM.

As such, the forms used in the documentation of the use of the established quality systems are contained in the QM. This allows the laboratory personnel to know specifically what documentation they must make and the types that will be made by the supervisors and the QAO. As additional forms are added or as forms are modified, they will replace the forms in the QM but the old forms will be kept for a period of at least five years. Where appropriate, changes to pertinent sections of the QM will also be affected.

10.5 PERFORMING THE REQUISITE NUMBER OF SYSTEM AND PERFORMANCE AUDITS CALLED FOR IN THE QUALITY SYSTEMS

SYSTEM AUDITS

INTERNAL SYSTEM AUDITS:
Internal system audits are conducted in each analytical section of ECLS at least once per calendar year to verify compliance with the requirements of this manual, including looking for any evidence of improper, unethical, and illegal activities. The audits cover the following areas of laboratory operation on a rotating basis: Inorganics (Metals and General Chemistry), Organics (VO, Pesticides and BNA), Radiochemistry, Sample Receiving and Data Management. Not all of the methods performed in each area will be audited during every auditing event. Prior to conducting the audits, the QAO reviews the appropriate SOP to familiarize him/herself with the methods to be audited, to verify that the SOP is in the ECLS accepted format, and contains all the requisite information. A checklist (**Appendix 59a**) will be completed for each section. Besides covering the material contained in the QM, the checklist also contains a section for adding auditing items based on the material contained in the SOP. This allows making each auditing checklist to be specific to the method being audited. An audit report is then issued detailing the findings of the audit. If any deficiencies are noted, a statement will detail the reasons for citing that deficiency along with references to the appropriate sections in the QM and/or SOP from which the deficiency was derived. An e-mail is sent by the QAO to the ECLS Director, the Program Manager, the analyst, the analyst's supervisor, and the Director of PPRC notifying them that deficiency summary is available on the shared Q drive for review and response with a suggested 30 day response. The Program Manager/Technical Supervisor will then respond to the audit findings by a written report to the QAO and it will be added to the monthly QA/QC Meeting agenda for review, discussion and determination of acceptability. The response should provide an implementation date, set by the Program Manager for the completion of the corrective actions that are detailed in his response. Upon learning of the implementation date, the QAO will conduct a follow-up to verify that the corrections have been implemented. Once completed it will be noted and attached to the original audit report. The QAO maintains copies of all audit reports.

If a deficiency is of such a nature that reported analytical data is compromised, the QAO:

- Determines all samples so compromised.
- Inform the Service Director of the need for potential client notification
- Make recommendations following course of action
- If possible, have ECLS re-analyze samples and submit a Supplement to Test response.
- If necessary, have clients submit new samples.

- Document causes for the deficiency and the corrective actions undertaken by completing Appendices 13 and 14.
- Change any necessary quality system that failed to detect the deficiency.

Regularly scheduled system audits are conducted at least 10/12 months/ year. Additional audits will be necessary to verify that corrective actions have been implemented and, of course, management may request additional audits at any time.

EXTERNAL SYSTEM AUDITS

These audits are conducted by NJDEP and USEPA, the ECLS certifying authorities, on a schedule of approximately every 2 to 3 years. Making the arrangements for the audit, providing pre-audit information to the auditing agencies, corrective action responses back to the auditing agency and implementing the corrective actions within the time frames mentioned in the corrective action response are the responsibility of the QAO. The findings made during these audits then form the basis of revising the QM to make sure that these corrective actions are contained in that document. Depending on the timing of the audit, this revision can be made during the yearly review of the QM or it may entail making an immediate change and distributing the amended sections of the QM to the analysts. Whichever process is taken, the corrective actions are implemented immediately.

EXTERNAL PERFORMANCE AUDITS: PROFICIENCY TESTING SAMPLES.

At least two sets of WP PT and two sets of WS PT samples are analyzed during each calendar year. These PT samples are obtained from approved PT vendors. The PT samples are delivered to the QAO who verifies the completeness of the order. S/he also checks to see that the lot numbers on the PT samples match the lot numbers on the report form. Any discrepancies are reported to the vendor. The PT samples are logged and distributed to the analysts. The PT samples are incorporated into the routine analytical schedules of the laboratory. **PT samples are tested the same number of times as a client sample.** PT results are given to the QAO, after having been checked by the analyst and the technical supervisor, for completion of the final laboratory report. All the results are entered on-line by the QAO. (NJDEP and US EPA, Region II, receives copies of the PT results directly from the PT provider.)

Upon receipt of the PT event summary evaluation report, the raw data used to produce any unacceptable results are reviewed to try to ascertain the possible cause for the unacceptable results. A completed External PT CAPA form (**Attachment 14)** is forwarded to the QAO by the program Managers. Since it is required for ECLS to maintain an evaluation of at least two 'Acceptable' determinations in the last three testing events for each testing parameter, the acquisition and performance of additional PT samples may be necessary. If necessary, the additional PT samples are obtained by the QAO from a vendor accredited to provide such samples. The vendor forwards the results of these follow-up PT samples directly to EPA. EPA has stated that the use of these make-up PT samples is an appropriate course of action. DEP also has the 2 out of 3 correct requirements for maintaining certification. However, unlike EPA, DEP only accepts results from regularly scheduled PT events. DEP may decertify the method when this performance standard has not been met for a period of six months.

Additional PT samples are also received from: the Centers for Disease Control for CT; USGS for nutrients; and Wadsworth Center of the NYSDOH for trace elements in clinical samples.

The results of PT samples may also be used as part of each analyst's annual demonstration of capability documentation. As such, PT samples must be rotated among the method qualified analysts each time they are received.

10.6 PROVIDING REGULAR REPORTS TO MANAGEMENT DETAILING THE FUNCTIONING OF THE QUALITY SYSTEMS.

There are regularly scheduled reports or data to management by the QAO. The first is a copy of the monthly audit report; the second involves monthly proficiency testing results and copies of all External PT CAPA submissions. These data are reported monthly in PHEL's Performance Improvement Indicator Report.

In addition, the QAO can make available to both the ECLS and PPRC Service Directors any Complaint/Observation and Correction Actions Forms; External PT CAPA forms; legal requests for analytical data; and any client notifications of amended or corrected analytical reports.

10.7 CONDUCTING AN ANNUAL REVIEW OF THE QUALITY SYSTEMS WITH MANAGEMENT.

ECLS Management is committed to making whatever changes are necessary to the quality systems to maintain the quality of the data generated and provide sufficient documentation in support of that data. The QA and Performance Improvement Program are assessed annually by the PPRC Service Director. Therefore, the QAO will meet regularly with the PPRC Service Director to discuss the current state of the QA Program. This will allow for anticipated changes to the QA manual to be worked out well in advance of being updated. The ECLS Director and program Managers also participate in the annual updating of the QA manual.

10.8 NOTIFICATION TO CLIENTS.

ECLS Providing Client Notifications

Whenever it becomes necessary to inform ECLS clients of pertinent information regarding the laboratory, this notification will be provided by the Service Director or his/her designee. Those notifications that do not require immediate attention/action on behalf of either the laboratory or the clients will be in writing. This notification will be used to convey the specifics of impending actions giving ample time for both the clients and ECLS to plan for its implementation. It could be used for notifying clients of upcoming changes: in methodology, in certification status, to sampling requirements, etc.

Those notifications that require immediate attention/action on behalf of either the laboratory or the client will be made verbally first and followed-up in writing. It could be used for notifying clients: of an instrument break down so the client could stop sampling for that testing procedure. or of laboratory analytical capacity being exceeded, etc.

ECLS Providing Information To Client Inquiries

There are instances when clients request: follow-up information on reported results, a check of QC data associated with certain analytical results, replacement copies of lost data, etc. *ALL INQUIRIES ARE TO BE MADE THROUGH THE ECLS QAO BY FORWARDING THE COMPLETED FORM CONTAINED IN* ***appendix 64a***. The form is to be completed and electronically emailed to Sharon.Robinson@DOH.state.nj.us. All fields listed on the form are required fields and must be completed before the request can be addressed by ECLS. When the information has been assembled, the response back to the requesting personnel will also be made by the ECLS QAO.

NOTE: Please be cognizant of the fact that any request for follow-up information may require the pulling of records from secondary storage. This process may still take several days for retrieval and, consequently, the response may not be immediately available.

10.9 OTHER OQA RESPONSIBILITIES

There are other miscellaneous responsibilities that the QAO must perform to document compliance with the quality systems. These are regularly scheduled activities that are of a more intermittent nature than the ones listed above. These activities are:

- Handling legal requests for information. Section 2.6.
- Handling complaints. Section 2.8.
- As needed, send the OQA standard weights out for re-calibration and maintain records indicating the results of those calibrations. (NIST traceable calibration is good for five years). This re-calibration is performed by the State of New Jersey, Department of Law and Public Safety, Division of Consumer Affairs, Office of Weights and Measures, Avenel NJ 07001-1647, 732-815-4840, or some other equally qualified vendor. These weights are used to perform the monthly balance checks and for rechecking the other in-house weights.
- As needed, send the OQA thermometers out for re-calibration and maintain records indicating the results of those calibrations. (NIST traceable calibration is good for five years). This re-calibration is performed a by qualified vendor. Section 4.4.
- Retain records for automatic pipet calibrations. Section 4.2.
- Assign workbook identification numbers. Section 4.4.
- Annually, check the in-house weights against the re-calibrated OQA weights and maintain a record of those checks. Section 4.4.

APPENDIX 59a

SYSTEM AUDIT CHECKLIST - METHODS

AUDITOR: **AUDIT DATES:**
AUDITED METHOD: **REFERENCE METHOD:**
ANALYST: **ANALYST SUPERVISOR:**

QUALITY MANUAL ITEMS TO BE CHECKED

No.	Audit Checklist	Yes	No	NA	Comments
1	Has the analyst attended a Data Integrity meeting within the last year (S2.5)?				
2	Has the analyst signed their Legal Policy (S2.6); Confidentiality Policy (S2.7), and Attestation Statement (S2.9)?				
3	Are the pieces of equipment that the analyst uses contained in Appendix 17 (S4.1)?				
4	Check to verify that the information contained in Appendix 17 is complete and accurate.				
5	Do the analyst assigned unique ID numbers for the equipment appear on or near the equipment?				
6	Have the analyst describe the support equipment that is used and the Quality Control procedures that are in effect. [Balances, pH Meter, DO meter, Ovens, Refrigerators, Freezers, Burettes, and Pipettes (A21),] Are these procedures adequate (S4.2)?				
7	Are the pipette calibrations performed quarterly and documented, including pipette ID numbers (S4.2)?				
8	Where are calibration records maintained and who performed the pipette calibrations?				
9	Are pipette calibrations performed according to A21?				
10	Have copies of the pipette calibrations been forwarded to OQA for filing (S4.2)?				
11	What maintenance is being performed on the instruments and at what frequency (S4.3)?				
12	Verify the accuracy of the maintenance schedule against the manufacturer's instructions.				
13	Where are the maintenance activities documented by the analyst (S4.3)?				
14	If maintenance activities are documented in a workbook, are all the scheduled activities listed along with their frequency?				

APPENDIX 59a

SYSTEM AUDIT CHECKLIST - METHODS

No.	Audit Checklist	Yes	No	NA	Comments
15	Are the manufacturer's required maintenance procedures available for review (S4.3)?				
16	Are all of the manufacturer's requirements being performed (S4.3)?				
17	If maintenance activities are documented in a maintenance log book, are all required entries being made and non-used entry sites being indicated as "not required" or some other appropriate designation (S4.3)?				
18	If maintenance is documented in the daily run logs, are they highlighted for easy identification by auditors (S4.3)?				
19	If a balance is required to perform the analysis or prepare reagents or standards, is a set of calibrated weights available to check the balance prior to use including their correction factors (S4.4)? Are the correction factors being employed to obtain the correct weighing?				
20	Verify that the balance is checked, and the checks bracket the weights of interest, by reviewing the balance logbook for the appropriate entries (S4.4) (A18).				
21	If the use of thermometers is required, are calibrated thermometers, with correction factors, available (S4.4)?				
22	Are the correction factors used when recording the temperatures in the temperature logbook (S4.4)?				
23	What is the process used by the analyst to prepare reagents and standards?				
24	Is all of the required documentation listed in Appendices 23, 24, and 25 being made and where is it being recorded?				
25	Are the preparations labeled with unique identification numbers and what constitutes those identification numbers (S4.4)?				
26	Has the analyst received written information from management concerning the specifics of any current or upcoming special projects (A31)?				
27	Do the analysts prepare daily "new arrivals" printouts to determine if samples requiring their analyses have been received (S6.8)?				
28	When, during the day, is the "new arrivals" form printed and is it a single printout or a printout that is made a couple times a day (S6.8)?				
29	Does the analyst run a backlog list every Monday to verify that they have not missed the submission of samples or any amendments to previously listed samples whose changes were made during the week (S6.8)?				

APPENDIX 59a

SYSTEM AUDIT CHECKLIST - METHODS

No.	Audit Checklist	Yes	No	NA	Comments
30	Does Sample Receiving notify the analyst regarding any changes to previously logged-in information, and if so, how?				
31	Have the analysts been given copies of any QAPPs that have been developed for certain projects (A31)?				
32	From where does the analyst receive COC samples (S6.5), (A35) and (A39)?				
33	Has all the required information been entered onto Appendix 35a at the time of sample transfer?				
34	Is the analyst part of a work cell (A39) and (A39a)? If so, how is the work cell "defined" as to the delineation of their duties?				
35	Is this delineation part of the method SOP?				
36	How does the analyst obtain their sample container or aliquot (A38)?				
37	Are abnormalities with the sample documented in the work records (A38)? Where specifically is this information documented?				
38	Are the observations of abnormalities reported to OQA so that a Supplemental Report can be provided for inclusion with the final results that go back to the client?				
39	Who enters the data into the data system and who verifies that the data entry was correct (A38)?				
40	How is this entry and verification documented?				
41	Where does the analyst place the sample container when the analyses are completed?				
42	Are routine metal and organic sample containers disposed of by the analyst and documented (A40)?				
43	Is Appendix 40a used to document the disposal of samples?				
44	Review OQA method SOP before beginning the audit. Does OQA copy of the SOP contain all the headings (S7.1) and content that it should contain (A41)?				
45	Is the QM required instrument maintenance being performed (S8.1)? Conductivity Meter? Turbidity Meter? Continuous Flow Analyzers? UV/VIS Spectrophotometer? GFAA? TOC Analyzer? HPLC? GC? GC/MS? ICP? Color Test Apparatus?				
46	Observe at least 3 separate analytical runs to determine the frequency at which each of the various QC samples are analyzed?				

APPENDIX 59a

SYSTEM AUDIT CHECKLIST - METHODS

No.	Audit Checklist	Yes	No	NA	Comments
47	Are the negative controls analyzed at the correct frequency (S8.2)? Method Blank? Field Blank? Trip Blank?				
48	Are the positive controls analyzed at the correct frequency (S8.3)? Laboratory Control Sample? Laboratory Fortified Blank?				
49	Are the Sample Specific Controls analyzed at the correct frequency (S8.4)? MS/MSD? Sample Duplicates? Surrogate Spikes?				
50	Has the equivalent QC outline described in Appendix 45 been incorporated into the analytical scheme?				
51	Review the raw data used to construct the most recent Initial Calibration Curve and the latest Continuing Calibration Check.				
52	Have in initial inorganic calibrations been developed with the criteria stated in Appendix 46?				
53	Have calibration points been dropped to achieve acceptable calibration (A48)? If so, what rationale was used to drop the calibration point?				
54	Have Reporting Limit checks been analyzed (A46a)?				
55	Have Manual Integrations been performed (A49)? If so, were they performed according to the criteria in A49? If manual integration was not necessary during the analyses observed during the audit, have the analyst go back in the records until one is observed by the auditor.				
56	How has the analyst documented producing the raw data and the reported results (A49a) (A51) (A52)?				
57	Is the analyst's latest Demonstration of Capability (DOC) attached to the method SOP (S8.6)? [Not specifically mentioned at this site.]				
58	How have the various QC acceptance limits been established for this method (S8.7)?				
59	Is the latest determination of the method MDLs attached to the method SOP (S8.8)? [Not specifically mentioned at this site.]				
60	How were the MDLs determined (S8.8)? Was the determination spread over a several day period?				
61	Have the software calculations been verified by hand (A50)?				
62	How is inorganic raw data documented (S9.1) and (A51)?				
63	How is organic raw data documented (S9.2) and (A52)?				

APPENDIX 59a

SYSTEM AUDIT CHECKLIST - METHODS

No.	Audit Checklist	Yes	No	NA	Comments
64	How is data reviewed prior to reporting data to Data Management (S9.3) (A53)?				
65	What data is forwarded to Data management when providing results for routine, MRRF, and SRRF reports (A54)?				
66	How is the use of data qualifying codes determined? Who determines which ones to use and are the codes checked prior to reporting to Data Management (A56)?				
67	How are the records stored for long term storage (S9.6)?				
68	Are the analysts aware of the fact that requests for data verification must be referred to OQA (A57)?				

GENERAL SOP ITEMS TO BE CHECKED

Some of the items below were determined by reviewing the specific method SOP prior to initiating the audit. Those items for review are specific for this method SOP and probably, but not necessarily, fall outside the items contained in the QM. The rest of the review items are applicable to all SOP.

No.	Audit Checklist	Yes	No	NA	Comments
1	Does the analyst have their own copy of the method SOP? QM?				
2	Does each page of the SOP contain a page number and the total number of pages in the SOP beginning with the Cover Page?				
3	Header Information. • In-house method name and revision number? • Date that the in-house method was first prepared? • Revision date of the most recent version?				
5	Cover Page • Seal of DHSS? • Address of the laboratory where the analyses are being performed? • Brief definition of the method? • Spaces for signatures, titles, and dates for primary analyst, analytical supervisor, section chief, the QAO, and laboratory director? • Space for listing the effective date? • Page numbering begins on Cover Page and lists the total number of pages?				

APPENDIX 59a

SYSTEM AUDIT CHECKLIST - METHODS

No.	Audit Checklist	Yes	No	NA	Comments
6	Section 1: Identification of the Test Method • Types of analyses? • In-house method name? • Reference methods? • Are all acceptance limits derived from the reference method?				
7	Section 2: Matrix • Matrices for which method can be used?				
8	Section 3: MDL • Listing of the current MDL and completion date? • Procedure used to generate MDL? • If using a previous MDL, is evaluation criteria for the new MDL listed? • Raw data? • Listing of Reporting Limits?				
9	Section 4: Scope and Application • Listing of parameters and the concentration range over which the calibration curve is constructed? • MCL? • Listing of symbols, abbreviations used to identify the parameters? • Designation of parameters not originally covered by the reference method?				
10	Section 5: Summary of Method • Summary of manual and instrumental processes?				
11	Section 6: Definitions • Only terms used in the SOP?				
12	Section 7: Interferences • Potential interferences? • Potential corrective actions?				
13	Section 8: Safety • List of general safety precautions? • Location of MSDS? • Hazardous chemical listings with health effects, target organ, and				

	incompatibilities?				
No.	**Audit Checklist**	**Yes**	**No**	**NA**	**Comments**
14	Section 9: Equipment, Supplies, and Maintenance • Equipment serial numbers and in-house instrument ID numbers? • Manufacturer's preventive maintenance and frequency? • Where are the maintenance activities documented? • Where are the manufacturer's manuals located?				
15	Section 10: Reagents and Standards • Listing of reagents, quality grade, and vendor. Qualifying with a statement such as "Or equivalent" is acceptable. • A listing of the stock standards, vendor, and initial concentrations. "Or equivalent." • Procedure for preparing stock, intermediate, and working standards, concentrations, and equipment used (pipettes, syringe)? • The intended use of the standards? • Expiration dates for all of prepared solutions and standards? • Reference to where the Certificates of Assay are maintained?				
16	Section 11: Collection, Preservation, Shipment and Storage • Type of container? • Total volume of sample necessary for analysis and QC? • Preservation requirements? • Color of labels on sample containers? • Storage of sample when picked up from Sample Receiving? • Holding times? • How and when discarded?				
17	Section 12: Quality Control. List: intended uses, acceptance ranges, which items are used to determine if an analytical sequence can begin, and which ones are used to determine if data must be qualified, for each of the following: • Blanks? • Surrogates? • Performance check samples? • QC samples? • Duplicate samples? • LFM/LFMD? • Reporting level checks? • Internal standards? • Check sources? • Background checks? • Listing of the data recorded on Control Charts?				

APPENDIX 59a

SYSTEM AUDIT CHECKLIST - METHODS

	• Determining if peak tailing is a problem and what to do about it? • Manual Integration: reasons for using and how to document?				

APPENDIX 59a

SYSTEM AUDIT CHECKLIST - METHODS

No.	Audit Checklist	Yes	No	NA	Comments
18	Section 13: Calibration and Standardization • Initial calibration: number of standards used, minimum number of standards required for acceptable calibration, acceptance criteria, source of acceptance criteria, duration for which the calibration is valid? • When can a calibration point be dropped in order to achieve a valid calibration? • Basis for determining if a point is an outlier? • Continuing calibration check: acceptance criteria, number of compounds that can fail and still achieve acceptable compliance?				
19	Section 14: Analytical Procedure • Process for obtaining samples? • Process for preparing samples? • Instruments settings? • Instrument conditions during analysis; e.g., ramping temperatures, types and number of washings, etc.? • Analytical sequence? • Retention Time windows: reference method, in-house, constant use, recalculating RT? • Procedure for reporting results? • Sequence in which the QC samples are evaluated to determine run acceptance? • Work Cell and delineation of analytical responsibilities?				
20	Section 15: Calculations • How is the calibration curve prepared; e.g., instrument, analyst? • List the formula used to prepare the curve for methods placed on-line after January 2008? • How are results calculated by the software? • List formulas used to calculate: percent recovery, relative percent difference, and percent difference for serial dilutions? • Reasons for performing manual integrations and how they are done?				
21	Section 16: Method Performance • List the type of sample that is used to determine the initial DOC and the continuing DOC and the frequency for performing the DOC? • Acceptance limits for DOC especially for multiple analyte methods? • DOC certification and summary statements? • Listing of the accuracy and precision statements that the method must meet?				

APPENDIX 59a

SYSTEM AUDIT CHECKLIST - METHODS

No.	Audit Checklist	Yes	No	NA	Comments
22	Section 17: Pollution Prevention • Process used to discard samples, digestates, extracts, etc? • How are spills cleaned up? .				
23	Section 18: Data assessment • List the analyst and supervisor's responsibilities for determining the cause of an isolated analytical failure? • List data qualifiers and the conditions under which they can be used? • Process for determining the acceptance of the entire run, portions of the run?				
24	Section 19: Corrective Action for Out-of-Control Analyses. • List the analyst and supervisor's responsibilities for determining the cause of the persistent failure to achieve in-control status? • Document corrective actions and forward a summary report to OQA? • Circumstances at which point OQA is notified, in writing, of unsuccessful resolution of the persistent problem?				
25	Section 20: Contingencies for Handling Continuing, Persistent Out-of-Control Analyses. • Informing QA? • Instrument shut down? • Process for bring the instrument back on-line? • Notification to clients? • Process for re-establishing analytical capabilities?				
26	Section 21: Waste Management • • How are hazardous wastes discarded from the laboratory area? • List of items that are deemed to be hazardous waste?				
27	Section 22: References • Listing of where the reference method can be found? • Listing of other source material used in the preparation of the SOP?				
28	Section 23: Tables, Diagrams, Flowcharts, and Validation Data • Raw data used to determine the MDL and DOC or a reference to where it can be found?				

APPENDIX 59a

SYSTEM AUDIT CHECKLIST - METHODS

No.	Audit Checklist	Yes	No	NA	Comments
29	Section 24: Appendices Collection of appendices mentioned in the body of the SOP?				

ITEMS SPECIFIC TO

ISSUES THAT NEED TO BE DISCUSSED AND RESOLVED

APPENDIX 64a

FORM FOR REQUESTING FOLLOW-UP INFORMATION FROM ECLS

NAME OF PERSON REQUESTING INFORMATION:

PHONE NUMBER:

REQUESTING AGENCY/PROGRAM:

FIELD AND/OR LABORATORY SAMPLE NUMBERS OF THE SAMPLES FOR WHICH THE INFORMATION IS BEING REQUESTED:

TYPE OF INFORMATION REQUESTED:

REASON FOR THE REQUEST:

Environmental and Chemical Laboratory Services
Proficiency Testing Exception Report
ATTACHMENT 14
Corrective Action/Preventive Action Report Form

Program: ECLS: Category: Due Date:

Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description	Survey/Date

Error*: reported value lower than the lowest acceptance level value

Root Cause: A. Methodology Problem B. Technical Problem: C. Clerical Error D. Survey Sample Problem E. Other (describe) See key for more specific problem list
First Time Occurrence **Repeat** Occurrence (Within the last 24 months)

Impact on Client Testing:

Issued: June, 2014
Revision Number: 7
Effective Date: July 1, 2014
NJDOH/PHEL/ECLS-QM

Corrective Action(s)*

Effective Date: Supervisor Signature / Date:

Recommended Preventive Action(s)*

Effective Date: Supervisor Signature Date:

Verification of Implementation of Corrective & Preventive Action(s) by Program Manager (Within 7 days)

Program Manager Signature / Date:

Verification of Effectiveness of Corrective & Preventive Action(s) by QA (30-45 Days)

QA Signature / Date:

Laboratory Director Review

Service Director / Designee Signature / Date:

* Attach separate sheet(s) if necessary

ERROR/FAILURE KEY

A. Methodology Problem

1. Instrument problem
2. Standard or reagent problem
    a. Expired standard or reagent
    b. Contaminated standard or reagent
3. Incorrect calculation
4. Method problem
5. Lack of stain or growth medium
6. Sensitivity
7. Error/problem in sample preparation

B. Technical Problem

1. Misinterpretation or misidentification
2. Incorrectly reconstituted
3. Time delay between reconstitution and analysis
4. Pipeting error (other than reconstitution)
5. Calculations(s) performed incorrectly
6. Linearity
7. Incorrect incubation temperature
8. Incorrect standard or calibrator used
9. Samples lost or delayed
10. Carryover
11. QC not acceptable
    a. Blank contamination
    b. Poor duplicate reproducibility
    c. Continuing calibration check failed criteria
    d. Calibration did not meet criteria

C. Clerical Error

1. Results transcribed on to questionnaire incorrectly
2. Incorrect peer group code used
3. Incorrect master file code used
4. Incorrect units reported
5. Decimal point error
6. Results transcribed incorrectly
    a. into LIMS
    b. onto PT provider forms
    c. onto PT provider website

D. Problem With Survey

1. Hemolyzed specimen
2. Contaminated specimen
3. Instability of survey
4. Survey shipment arrived too late
5. Survey shipment did not arrive

E. Other (attach explanation)

CHAPTER ELEVEN
HEALTH AND SAFETY

11.1 OBJECTIVE

It is ECLS's goal to provide a safe and healthful workplace for all employees. This goal can be met only through the cooperation of all parties involved. The very nature of laboratory work requires that employees utilize materials, equipment, and procedures not commonly found in other areas of employment. Reagents, chemicals, compressed gases, electrical equipment, etc. are all potentially hazardous when used carelessly or without taking proper precautions. All employees, technical, professional, and supervisors alike must constantly be aware of these potential hazards and must take all necessary precautions to reduce or eliminate the risks involved.

Accordingly, employees are expected to comply with established safety standards and policies. Managers and Supervisors are responsible for the enforcement of these standards and policies. Supervisors and employees alike should be diligent in identifying potential safety hazards and in ensuring that these hazards are reported to management and corrected expeditiously.

Above all other work objectives, safety is the number one priority. No work operation should be initiated unless the employee is certain that the procedure can be carried out and completed in a safe manner.

The rest of this chapter details the ECLS Policies concerning various safety practices. The Department maintains a fulltime Safety Officer on the premises should a situation arise that is not covered by the existing policies.

11.2 GENERAL SAFETY RULES

- Eating or drinking in laboratory areas is PROHIBITED along with eating or drinking from laboratory glassware. Food and beverages are not to be stored in laboratory areas, or in refrigerators that contain, or have contained, specimens, chemicals/reagents.
- Always wash hands thoroughly before exiting the laboratory area.
- Wear prescribed personal protective equipment:
  - Labcoats or lab gowns are mandatory for all personnel in lab sections containing specimens, chemicals/reagents. Lab coats are not to be worn outside the laboratory building, and are PROHIBITED in administrative areas or rest rooms.
  - Gloves must be worn when handling samples/specimens or chemicals/reagents.
  - Safety glasses must be worn when opening or working with samples/specimens or chemicals/reagents.
- Assume that all specimens are potentially infectious. Use universal precautions when handling them.
- Report all accidents, potential hazards, and occurrences to your supervisor immediately, and to the Human Resources Leave Unit and to the Safety Officer. (Refer to "DOH Incident/Accident-Procedures".)
- Mouth pipetting is not permitted under any circumstances. Always use a pipetting aid.
- Use a biosafety cabinet when there is a potential to inhale infectious aerosols or agents.
- Use a fume hoods when working with volatile, noxious or toxic chemicals/reagents. Refer to SDS for guidance on chemicals/reagents.
- No more than one gallon (4 liters) of flammable liquids per 100 square feet may be stored outside of an approved flammable storage cabinet within a laboratory.
- Never proceed with an analysis if you are unsure of its safety.
- Never bypass a safety device on any piece of equipment, for any reason.
- Do not obstruct or block doorways, hallways, emergency equipment, or exits. Storage of records, supplies, equipment, or chemicals in the hallway is prohibited.
- Keep work area as clean and uncluttered as possible. A disorderly work area is both a safety and a fire hazard.
- Clean spills immediately, according to established written protocol.

- Laboratory work surfaces must be decontaminated with a 1:10 solution of household bleach with water following any spill and at the end of work activities when working with clinical or biological specimens. This solution must be prepared daily.
- Do not bend, re-sheath, cut, or remove needles from syringes. Syringes and needles should be discarded in a heavy plastic or metal "sharps container", containing an appropriate antiseptic solution.
- All Hazardous/Radioactive waste for disposal must be placed in closed, labeled containers.

11.3 EYE AND FACE PROTECTION POLICY

ECLS requires that every employee and visitor wear eye and face protective equipment as indicated in this policy. **INDUSTRIAL QUALITY EYE AND FACE PROTECTIVE DEVICES SHALL BE WORN WHEN THE POSSIBILTY EXISTS THAT AN INJURY CAN BE PREVENTED BY SUCH DEVICES.**

The areas at risk and potentially hazardous procedures may include, but not limited to:

- Locations where chemicals are stored or handled.
- Working with hazardous biomedical material, cultures, and specimens.
- Handling explosives and flammables.
- Working with or near systems under vacuum or pressure.
- Areas and activities that present the hazard of flying objects such as glass cutting, preparation of capillary gas chromatographic columns, etc.
- During field operations or visiting a site where eye protection is required by the host institution.
- Pouring a corrosive or irritating liquid.
- Carrying out distillations or liquid-liquid extraction procedures.
- Any task that may result in a splash of a hazardous material.
- Any other area or task where eye/face safety is in question.

Laboratory management, with the assistance of the Employee Health and Safety Program (EHSP), shall identify potentially hazardous areas, procedures, and tasks. It is the responsibility of a program supervisor to assure that all employees under his/her supervision, including those temporarily assigned to the program, wear the required eye/face protection at all times in the areas at risk.

ENTRANCE TO ALL AREAS THAT REQUIRE EYE PROTECTION SHALL BE POSTED WITH A SIGN INDICATING THE EYE PROTECTION REQUIREMENT. In addition, equipment or processes that require an operator to wear eye/face protection shall be posted with appropriate warning signs.

Within PHEL, it is permissible not to wear eye protection in the break and conference rooms, administrative offices, and other rooms and hallways where chemical and biomedical materials are not in use. However, if at any time there is a hazardous operation being carried out in these areas, signs will be posted and all personnel entering the area shall be warned that eye protection and/or other personal protective equipment, if any, is temporarily required.

Industrial quality eye protection devices must comply with the Z87.1 Standard. This standard specifies the following requirements:

- Impact resistance.
- Passage of a flammability test.
- A 3 mm minimum of lens thickness.
- Lens retaining frames.

When selecting appropriate eye protection, consideration should be given to the employee's safety and personal comfort. Selection of an appropriate eye and face protective device is the responsibility of both the employee and supervisor. EHSP should be consulted in all cases where there is uncertainty as to what protection is necessary.

SAFETY GLASSES AND SPECTACLES PROVIDE ONLY A MINIMUM OF EYE PROTECTION WITH REGULAR USE. ADDITIONAL PROTECTION SUCH AS GOGGLES AND FACE SHIELDS SHALL BE REQUIRED WHEN CARRYING OUT MORE HAZARDOUS OPERATIONS.

DOH shall provide eye and face protection devices at no cost to all employees whose work requires such protection. Where appropriate, DOH shall provide prescription spectacles at no cost to the employee upon submission of prescription from their physician. Both glass and plastic lenses are available through EHSP. Plastic lenses are not resistant to some chemicals and get easily scratched. Glass lenses are heavier, but they are chemical resistant and last longer. Based upon the potential for exposure, both the supervisor and the employee should determine which type of prescription lenses is the most appropriate. Plain safety spectacles are available through EHSP for employees awaiting prescription safety glasses.

Other forms of eye protection that may be required for a particular operation include goggles and face shield. Goggles should be worn when there is a potential danger of splashing chemicals, irritating vapors, or flying particles, e. g., working with glassware under vacuum or pressure, or when glass apparatus is used in high temperature operation. Goggles offer no protection to the face and neck, and do not offer protection against chemical splashes. Full-face shields over safety glasses should always be worn when maximum protection to the face and throat is needed.

EXAMPLES OF OPERATIONS REQUIRING MAXIMUM PROTECTION ARE:
- Handling corrosive, irritating materials or those which can absorbed through the skin.
- Conducting a reaction that has a potential for explosion, or working with a vacuum system that may explode.

CONTACT LENSES SHALL NEVER BE WORN WITH A QUARTER OR HALF-MASK RESPIRATOR.

CONTACT LENSES SHALL NOT BE WORN IN THE LABORATORY. Gases and vapors can be concentrated under the lens and cause permanent damage to the eyes. In the event of a chemical splash into the eyes, it is often impossible to remove the contact lens to irrigate the eye because of involuntary spasm of the eyelid. Soft lenses can absorb solvent vapors even through face shields and, as a result, adhere to the eye.

11.4

(a) **IN CASE OF EXPOSURE**

ACCIDENTS INVOLVING EXPOSURE TO HARMFUL MATERIAL REQUIRE PROMPT ATTENTION. THE IMMEDIATE TIME OF 0-15 MINUTES FOLLOWING AN EXPOSURE IS CRITICAL. WASH THE AREA IMMEDIATELY.

- **Eye Contact**: Promptly flush eyes with water for no less than 15 minutes and seek medical attention.
- **Ingestion**: Encourage the victim to drink large amounts of water, call Poison Control, and seek medical attention.
- **Skin Contact**: Promptly flush the affected area with water and remove any contaminated clothing. If symptoms persist after washing, seek medical attention.

(b) **FIRST AID POLICY**

First aid is referred to as that aid given at the first instance following the injury. First aid assistants (Medical Emergency First Responder) are located on every floor. Their names are posted on the Employee Health & Safety bulletin boards. In the event of a MINOR INJURY:

- Contact the nearest Medical Emergency First Responder.
- Contact the supervisor and the Safety Officer to report the injury.
- Complete an Injury/Illness Form, RM-2 Risk MGMT (available at: http://dhss). Submit the form to the Human Resource representative.
- If the person must be taken for additional medical assistance, call The Human Resources Leave Unit (633-0074 or 0022) to schedule a medical appointment.

If an employee is unable to walk, disoriented, in pain, bleeding profusely, etc., these would be considered a serious injury:

- Call 911 for ambulance assistance.
- Contact the nearest Medical Emergency First Responder.
- Call the call The Human Resources Leave Unit (633-0074 or 0022).
- Contact the supervisor to report the injury.

Never move an accident victim unless they are in danger of further injury. Seriously injured employees will be taken to the nearest hospital for treatment. A volunteer should collect the injured employee's belongings and meet the emergency vehicle/employee at the hospital.
Note: The First Responder or other individual helping the injured employee should not follow behind or try to keep up with the ambulance.

11.5 CHEMICAL FUME HOOD POLICY

Laboratory fume hoods are important safety devices. They provide the employee and the general laboratory area protection from exposure to chemical fumes that might be injurious to health and safety. However, the hood must be used properly to provide maximum protection. The following guidelines will be adhered to when using the chemical fume hood:

- The average face velocity of the chemical fume hood should be maintained between 80-120 L.F.M. for maximum efficiency.
- Do not clutter the hood area with unnecessary equipment. Do not use the hood as a ventilated storage cabinet.
- If an apparatus must be housed in a hood, it should be equipped with legs that will allow air to flow beneath it. Any apparatus, such as an oven, large hot plate, or water bath that does not have legs should be placed up on blocks. Prior to performing work, the user should be satisfied that the hood is in proper working order.
- Keep all work at least 8 inches inside the hood face but not against the back wall of the hood.
- The worker should keep their face out of the hood, i. e., outside of the plane of the sash.
- The sash should always be closed as much as practical to work with, but never more than 18 inches high.
- A hood should be thoroughly checked following installation. Maintenance activities should be carried out at least once a year.

11.6 GLASSWARE POLICY

To minimize or eliminate the frequency of injuries from broken glassware, the following is the ECLS glassware policy:

- Glass will be chemically attacked by hydrofluoric acid, hot phosphoric acid, and strong alkalis so glassware is never used to contain or process these materials.

- Do not use broken, chipped, cracked, or badly scratched glassware since it is prone to breakage. Instead, see that it is properly disposed of by placing it in "Broken Glass" containers.
- Never pick up broken glass with bare hands. Instead: use gloves; sweep up with hand broom and dustpan; fine glass particles may be picked up with a wet paper towel; place broken glass in "Broken Glass" containers; and do not mix broken glassware with other trash.
- Always wear safety glasses and gloves while cutting or breaking glass tubing.
- Use tongs or zetex gloves to remove all glassware from heat. Hot glass can cause severe burns.
- When clamping glassware, do not permit glass to metal contact or use excessive force to tighten.
- Do not attempt to catch falling glassware.
- Laboratory glassware is never to be used for holding food or drink for human consumption. It may contain toxic chemicals or biological residues.
- Carry long tubing or burets in an upright position, close to the body.
- Never carry glassware and/or samples on the stairwells. Always use the elevators.

11.7 FIRE PREVENTION POLICY

FLAMMABLE CHEMICALS are handled as follows:

- If the area has only one exit, flammable materials should never be stored near or adjacent to the exit. Such material should be stored at the end of the room farthest from the exit. Room exits should always be kept clear of obstructions.
- Handle all solvents in an exhaust hood, using the smallest amount practical.
- Store flammable liquids in a flammable liquid storage cabinet or in flammable materials storage (FMS) refrigerator.
- Always keep the supply of solvents in a laboratory to a minimum. No more than one gallon (or 4 liters) of flammable liquids per 100 square feet may be stored outside of an approved flammable storage cabinet within a laboratory.
- Extinguish all flames in the area when using flammables. Always be aware of nearby electrical equipment such as hot plates and ovens.
- No flammable are to be stored in refrigerators that are not rated "flammable materials storage" or "explosion proof".

Smoking is banned in all NJ State buildings. Smoking is permitted only in designated areas outside of each building.

REACTIVE CHEMICALS are handled as follows:

- Understand possible dangers before using and be aware of special storage requirements. See Safety Data Sheets (SDS) or Hazardous Substance Fact Sheets (HSFS) available in the service corridors or the RTK Central File.
- Keep the supply in the laboratory at a minimum, ordering the smallest amount practical to work with.
- When using these chemicals, co-workers in the area are to be notified when the work is started and completed. If no else is in the area in which you are working, your immediate supervisor is to be notified when work is started and completed.
- Segregate chemicals that are capable of explosive reaction with each other.
- It is your responsibility to know the properties of the chemicals you work with. If in doubt, always refer to SDS and HSFS and your supervisor.

TOXIC AND CORROSIVE CHEMICALS are handled as follows:

- Understand the possible dangers before using, and be aware of special storage requirements. See SDS or HSFS.
- Keep the supply in the laboratory to a minimum, ordering the smallest amount practical to work with.
- Always store in the proper container.

- Follow all rules pertaining to good laboratory housekeeping; labeling, handling, and disposal (see PHEAL Laboratory Waste Disposal Guidelines).
- Use only in hooded or well-ventilated areas. Keep sealed when not in-use.
- Use appropriate protective equipment. Always refer to your supervisor for the proper equipment.

ELECTRICAL EQUIPMENT

- Do not use electrical equipment if power cords are frayed or control switches are not in good working order. Label "DO NOT USE" and see that arrangements are made through your supervisor for disconnection, repair, and/or replacement.
- Do not use electrical equipment, such as hot plates, around flammable liquids.
- Never try to bypass any safety device on a piece of equipment.
- In any emergency involving electrical equipment, including fire: Shut off power immediately; alert those in your immediate area; follow the PHEAL Emergency Response Plan; and fire extinguishers shall be used only by those who have been trained, and for small fires only.

LABORATORY HOUSEKEEPING

- Each employee is responsible for keeping his or her area neat and orderly. A disorderly work area is both a fire and a safety hazard.
- Laboratory benches should not be used as storage areas but should be cleared upon completion of each analysis.
- Aisles and hallways must never be blocked for any reason. Furniture and equipment in laboratory work areas shall be arranged so that means of access to any exit may be reached easily from any point.
- Laboratory apparatus should be assembled in a stable, orderly manner.
- Safety equipment such as fire extinguishers, eyewashes, and showers are to be kept clean and their access should never be blocked.
- All spills and leakages should be cleaned up immediately. Refer to Spill Policy.
- Keep all cabinet doors and drawers closed.

TRAINING AND EDUCATION

Emergency Response training and education will be presented to all new employees by, the PHEL Safety Officer, and the Emergency Evacuation Coordinator. The training includes:

- Review of Fire Prevention Program and Special Policies.
- Explaining the use of the Emergency shower and the Stop, Drop, and Roll technique.
- Review of Emergency Evacuation Plan.

11.8 COMPRESSED GAS CYLINDER POLICY

STORAGE is handled as follows:

- When cylinders are delivered, they are to be separated and secured immediately in the cylinder cages on the loading dock.
- Chains must be refastened once the tank has been placed into or removed from a slot.
- Do not store full and empty cylinders together. Serious "suck-back" can occur when an empty cylinder is attached to a pressurized system.
- All cylinders should be stored and attached to a firm support with a chain or strap in place to prevent them from falling over. If not in use, their valves should be closed completely and the original shipping cap should be in-place.
- Always leave positive pressure in a gas cylinder. Label it "MT" (empty).
- Store empty cylinders in the designated locations in the gas cages.

TRANSPORTATION is handled as follows:

- Safety glasses are required whenever and wherever cylinders are handled.

- Before using or removing cylinders, read all label information and data sheets concerning the gas.
- Never drop gas cylinders or permit them to strike each other.
- Cylinders should be handled carefully and properly. They are never to be dragged, rolled or slid but moved on a hand truck designed for moving gas cylinders. Always be sure that the cylinder is secured to the truck.
- Never move a used gas cylinder until the valve is closed, the line is bled, the regulator is removed, the shipping cap is on, and the cylinder is labeled "MT".
- Cryogenic gases are extremely cold. Liquid nitrogen is stored at -320 degrees F and will cause burns and frostbite. Therefore, these tanks should only be transported by two or more workers wearing safety glasses, insulated gloves and a lab coat.

USAGE is handled as follows:

- Never lubricate, modify, or tamper with a safety valve or its safety devices.
- No part of a gas cylinder should be subject to a temperature higher than 125 degrees F. A flame should never be permitted to come in contact with any part of a gas cylinder.
- Know the contents of the gas cylinder before making any connections. The properties of a compressed gas that represent hazards should be well known to the user before the gas is put into use.
- Use compressed gases in a well-ventilated area. Toxic, flammable, and corrosive gases should be handled in a hood. Only small cylinders of toxic gases should be used.
- Always use a reducing valve or a pre-set pressure control.
- Tools and gas wrenches should always be readily available to shut off or adjust cylinders and regulators.
- Never hammer or tighten a compressed gas line while it is under pressure. The extra stress may cause the line to rupture.
- Copper tubing is not to be used for acetylene.

11.9 GUIDELINES FOR HANDLING AND TESTING BIOHAZARDOUS MATERIALS

The following practices shall be followed when handling or testing any "biological specimen":

- Assume that all specimens are potentially infectious.
- All specimens received broken shall not be examined.
- Gloves should be worn to avoid skin contact with all body fluids, work surfaces, materials, and other objects exposed to biological agents. After use, gloves must be discarded in biohazard disposal bags.
- Disposable gowns and masks should be worn in designated areas and should be placed in biohazard disposal bags before you leave the laboratory.
- All personnel should wash their hands following completion of laboratory activities, after removal of protective clothing, before leaving the laboratory and before eating or smoking.
- Laboratory work surfaces should be decontaminated with a 1:10 solution of household bleach with water following any spill and at the end of work activities. This solution should be prepared daily.
- Do not bend, resheath, cut, or remove needles from syringes. Syringes and needles should be placed in a heavy plastic or metal discard pan containing an appropriate antiseptic solution. Discard pans should be located as close as practical to the area in which the syringes are used. Autoclaved needles and syringes should be double boxed and taped securely for disposal.
- Mechanical or electronic pipetting devices should be used for the manipulation of all liquids in the laboratory. Mouth pipetting is prohibited.
- All procedures and manipulations of potentially infectious material should be performed carefully to minimize the creation of droplets and aerosols. These procedures include centrifuging, blending, and vigorous mixing.
- When the potential for aerosoling, splashing, or spillage of biohazardous material is present, all manipulations should be done under a Class I or II biological safety cabinets. Centrifuge safety caps should be utilized.
- Specimens are not to be transported via stairwells under any circumstances.
- All contaminated materials will be decontaminated by autoclaving before disposal or reprocessing.

- **NOTE: BIOLOGICAL SPECIMENS CAN BE, BUT ARE NOT LIMITED TO, THE FOLLOWING: FISH TISSUE, BIRD TISSUE, HUMAN SECRETIONS, EXCRETIONS, AND BLOOD.**

References:

- US Department of Health and Human Services. US Public Health Service. Acquired Immunodeficiency Syndrome (AIDS). Precautions for Clinical Laboratory Staff: 1982, 5;31:577-80.
- US Department of Health and Human Services, Public Health Service. CDC Biosafety in Microbiological and Biomedical Laboratories, 5th Edition, 2009.

11.10 GUIDELINES FOR REPORTING SAFETY AND HEALTH CONCERNS

- Employees should report any safety or health concerns to their immediate supervisor.
- Supervisors should take whatever action is necessary to correct or resolve the problem within the Program, Service Area, or Division and also inform the Safety Officer.
- When it is not feasible to resolve the problem within the Division, staff should forward their concerns through their respective Director to the EHSP Chief.
- Dependent upon the nature and level of the complaints and concerns, the coordinator will take appropriate action as soon as possible.
- If at any time an employee feels that their concerns are not being addressed within a reasonable time frame, they are encouraged to contact the EHSP Chief at (609)633-0361.
- All calls will be confidential. Identification will be required if a direct response is requested.

11.11 WASTE CHEMICAL REMOVAL POLICY

- Disposal of hazardous chemicals into the sewer system or trash collectors is prohibited.
- All hazardous outdated and waste chemicals must be removed from laboratories and properly disposed through the Laboratory Safety Office (LSO).

Containers:

- Must be labeled with the appropriate **label obtained from the LSO.**
- Must be compatible with chemicals they contain.
- Must be leak proof and have tightly closed lids.
- Must be kept closed, except when in the process of being filled.

Accumulation and Storage:

- **Liquid wastes** are to be **collected in one-gallon (or 4-liter) containers**, and stored in an appropriate hazardous waste cabinet in the laboratory.
- Each **cabinet** for storing chemical waste must be **labeled** with the words "HAZARDOUS WASTE".
- Quantities of chemical waste accumulated in the laboratory, at any time, **shall not exceed five (5) gallons** of liquid or ten **(10) pounds** of solids.

Disposal:

- **Laboratories which regularly generate chemical waste:**
  - At **2:00 PM,** on **Wednesdays,** and beginning on the fourth floor, Central Services (CS) staff will be checking with these laboratories.
  - If you have **full bottles** of chemicals to dispose of, **you** (not CS staff) are to place the chemicals on the **chemical waste cart** (provided by CS staff).
- **Laboratories which are not regular generators** of chemical waste are to contact the LSO for hazardous waste labels and instructions on disposal.
- **In case of an emergency**, if you need waste disposed of; it must be taken to the Hazardous Waste Storage Room (L192) for storage, at the appointed time. Appointments can be made by contacting the LSO.

Within 180 days from the accumulation start date, all hazardous waste will be shipped to an off-site facility, for final disposal.
NOTE: The chemical waste removal company cannot accept unidentified chemicals.

11.12 CHEMICAL STORAGE POLICY

- Reagents straight from the manufacturer must have the date received written clearly on the label.
- Incompatible chemicals shall be segregated in storage to prevent accidental contact with other chemicals.

  CORROSIVE CHEMICALS are: stored in a cool, dry well-ventilated area away from sunlight; stored with acids segregated from bases (hydrofluoric acid); stored segregated from toxic materials, organics, and flammables.

  REACTIVE CHEMICALS are: stored in a cool, dry area protected from shock, elevated temperatures or rapid temperature changes (aluminum alkalis); store segregated from corrosives, fire, and/or heat sources.

  OXIDIZING CHEMICALS are: stored in a cool, well-ventilated area out of direct sunlight (potassium chromate); segregated from organics, flammables, corrosives, toxicants, heat and/or strong sunlight.

  WATER SENSITIVE CHEMICALS are: not stored where automatic sprinkler or shower is installed; segregated from other reactive chemicals; stored in a room that has no water service and that is cool and water resistant; segregated from moist air, water and water solutions, aqueous acids and bases, flammables, and reactive chemicals.

11.13 SPILL POLICY

Spills of samples, acids, bases, solvents, and other substances found in the laboratory are to be handled in the following manner:

- Alert the immediate supervisor and workers in the area of any type of spill.
- Attempt to prevent further spillage and contamination. The worker must be wearing safety glasses, gloves, and a lab coat.
- If the spill can not be contained and constitutes a life-threatening situation, evacuate the affected laboratory area.
- To contain liquid spills use copious amounts of paper towels, spill pillows, or absorbent to encircle the substance.
- For solid spills, block off the area and see that no one walks through it or spreads it.
- To clean up liquid spills, use large amounts of towels or absorbent. For solvents, place towels in a hood and allow them to dry. For other liquids, use appropriate absorbent and place it in a suitable container (determined by the nature of the substance) for proper disposal.
- To clean up a solid material, sweep it up and place it in a suitable container for proper disposal.

11.14 REFERENCES

SAFETY DATA SHEETS (SDS) are available from the chemical manufacturer and suppliers. They provide comprehensive information about individual chemicals and reagents. Information contained in the sheets includes:

- Identification information such as chemical formula, CAS number, chemical name, and synonyms, etc.
- Labeling information.
- Physical data.
- Fire and explosion hazard data.
- Health hazard data.
- Reactivity data.
- Spill and disposal procedures.
- Recommended protective equipment.
- Storage and handling precautions.
- Transportation information.
- SDS are located in the service corridors and also in the RTK Central File (outside the Safety Office, A356).

HAZARD SUBSTANCE FACT SHEETS (HSFS) are published by the NJ DHSS Right to Know Program and contain information similar to that provided by the MSDS. However, these are not available for all chemicals. The HSFS file for ECLS is maintained by the Laboratory Safety Officer, in the RTK Central File.

A copy of the "CHEMICAL HYGIENE PLAN which includes the EMPLOYEE GUIDE TO WORKING SAFELY WITH HAZARDOUS MATERIALS" is available in the RTK Central File, and is also accessible at the department's intranet website. Employees are encouraged to review this material as often as possible. These documents are updated annually by the Laboratory Safety Officer and the PHEAL Safety Committee.