Franklin Township Municipal Sanitary Authority
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Laboratory Quality Manual

Effective date: June 1, 2010

Revised January 18, 2016

Approving Name: Kevin Kaplan Title: Manager

Approving Signature: _____ Date _____

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Revision History

Original - June 30, 2006
Revised - April 2, 2010
Revised - May 26, 2010
Revised - October 1, 2015
Revised - January 18, 2016

Distribution List:

Kevin Kaplan
Gene Greco
Andrew Dettling

The analyst has read and understands the Quality Manual.

Analyst Name (Print)_____ Initials:_____

Analyst Signature_____ Date:_____

The analyst has read and understands the Quality Manual.

Analyst Name (Print)_____ Initials:_____

Analyst Signature_____ Date:_____

Ethics Policy:

Objective

The objective of this quality manual is to establish a documented quality system that provides for continuous improvement of that quality system to ensure reliable and accurate laboratory test results.

All laboratory personnel who perform analytical testing are familiar with the quality documentation, which is implemented in their work, policies and procedures. The laboratory quality manager provides copies of the quality documentation to the laboratory staff and/or informs the staff of its location. Laboratory staff review the documentation as part of their on-the-job training, which is recorded in their training records. The quality system documentation includes:

Laboratory quality manual;
Work instructions;
Records, forms, and reports.

The supporting documents and procedures are referenced in this quality manual, but are maintained separately from the quality manual.

Safety

The Authority is committed to providing all employees with a safe working environment. Management shall inspect the equipment and techniques used in the analytical testing processes for the purpose of observing its safe or unsafe condition. If management believes conditions found are unsafe, it shall document its findings and correction measures. Corrections of unsafe conditions to be made within a reasonable amount of time. We shall continue to provide and maintain all reasonable precautions to safeguard your health and safety. All of us have an obligation to prevent, correct and eliminate unhealthy and unsafe conditions and practices. Safety rules have been designated to protect you.

Accidents do not just happen. They are caused. Knowing and following the rules and wearing proper safety equipment are ways for you to help us make the Franklin Township Municipal Sanitary Authority a safe place to work.

Safe working conditions are prerequisite to good laboratory practices. Laboratory personnel are instructed in safe working practices and are encouraged to look for hazardous conditions and repair or report them to the quality manager, as well as to recommend and implement accident prevention. The quality manager documents hazardous conditions and the actions taken to eliminate the hazardous condition.

The laboratory maintains a safety manual on file in the laboratory. The safety manual is available to all laboratory staff and management and contains all safety regulations associated with the overall laboratory operations.

Management provides safe-working conditions, complies with safety regulations, and, along with supervisors, ensures that the staff complies with these regulations.

It is the responsibility of all staff to be familiar with and comply with all safety guidelines and requirements. The laboratory staff takes proper precautions in the laboratory as described in the safety manual.

Safety equipment in the laboratory shall consist of, but not limited to:

Eye wash device
Emergency Shower
Safety glasses/goggles
Uniform
Fire extinguisher
Surgical or rubber gloves
Fume hood(s)

Material Safety Data Sheets

Laboratory workers should be aware of all relevant safety information on the chemicals and reagents used in their work place. MSDS provide valuable information with regard to safe handling of chemicals, their storage, hazards, first aid and disposal. MSDS are made available to all employees for reference in case of an emergency.

Theft & Dishonesty

Theft of Authority property or the property of others will not be tolerated. Violators will be subject to immediate dismissal.

Misrepresentation, falsification, withholding of material facts or the altering or falsification of any Authority record, including applications for employment, analytical data, expense reimbursement requests, time cards and other documents, will result in disciplinary action including possible dismissal.

Rules of Conduct

In the administration of discipline, the Authority's objective and concern is to be constructive. Disciplinary actions are taken for the purpose of correcting a deficiency and helping to make a more valuable employee.

Ordinarily, therefore, the Manager will apply corrective discipline if an employee engages in misconduct or fails to meet Authority requirements as to performance or otherwise. However, this depends upon all of the circumstances, and discipline may or may not be imposed, as determined by the Authority in its discretion. When it is imposed, it may consist of one or more warnings or reprimands, oral or written. These guidelines do not change an employee's status as an employment-at-will relationship subject to termination at any time, with or without cause as to exempt employees only. Any corrective discipline applied to the non-exempt employees shall be subject to the terms in the applicable collective bargaining agreement.

Conflicts of Interest

In the modern business world, it is important that you avoid putting yourself in a position where your judgment on behalf of the Authority may be questioned because of gifts from or financial interests in those with whom we do business. It is expected that each employee will serve the Authority's best interests at all times.

Outside Employment

If an employee is considering outside employment the work must not interfere with the employee's normal duties.

Tuition Reimbursement

The Authority encourages further professional development for the mutual benefit of the employee and the Authority, and has established a tuition refund plan for its employees to further this goal. This policy applies to all courses which in the sole discretion of the Authority have a direct bearing on the nature of the work being or expected to be done by the employee in the future and is limited to one course per semester. The Authority does not pay for supplies or books.

All full-time employees are eligible to participate. To apply, the employee must submit a written request to the Manager prior to signing up for the course.

The Authority will not be responsible for any further reimbursement after employment has been terminated.

Licensing

The Authority will pay reasonable license fees and dues for all employees acquiring a Certified Wastewater Treatment Plant Operators License or such other licenses specifically requested by the Authority and also any fees and dues for those desiring to become members of organizations which meet the approval of the Authority.

Continuing Education

Periodically, specialized courses, seminars and technical meetings are available which may be of benefit to one's professional development. Attendance at such courses is also encouraged. Those desiring to take specialized courses or attend seminars or technical meetings must first coordinate their planned activity through the Manager and such activity must be approved by the Board of Directors (if costs are more than $50) or Authority Manager if reimbursement is expected.

Employees involved in any analytical testing will have access to training for those parameters.

Drug-free Workplace Policy

The improper use of narcotics and other controlled substances (illegal drugs) is a significant problem in the workplace and throughout society.

In the workplace, the sale, use and abuse of illegal drugs threatens the safety and morale of all personnel, and threatens the public image of the employee and the employee's company as well.

In response to the Federal "Drug-Free Workplace Act of 1988", we have established the following general policy regarding illegal drugs:

- No person will be considered for hire who is a user or seller of illegal drugs.
- Any employee found to be using, possessing or working while under the influence of illegal drugs on Authority premises at any time (including breaks or meal periods) will be in violation of our drug-free policy which is cause for immediate disciplinary action including dismissal.
- All personnel will agree to abide by the Authority's policy and will agree to notify the Manager of any convictions for drug violations within five days of said convictions.
- Any employee found to be a seller or involved in the sale, solicitation, or dealing of illegal drugs will be immediately dismissed.

Under the terms of the Drug-Free Workplace Act, we are required to give all personnel a copy of the official policy statement concerning the establishment of a drug-free workplace.

Policy

The Authority maintains a formal safety program which includes training and education, as appropriate. A number of programs are in place and available to all personnel as their job

responsibilities dictate. Additional programs and updated information will be made available to affected employees on an ongoing basis. Please check with the Manager for a copy of all pertinent safety programs in place.

Failure to comply with all Authority safety policies as communicated in our safety training programs and manuals may be subject to disciplinary action including dismissal, as appropriate. Applicable safety rules/programs in place include but are not limited to the following:

1. All accidents must be reported immediately to your supervisor or Plant Superintendent.

2. Drinking, possession of intoxicating liquor, drugs or reporting for work while under the influence of alcohol or drugs is prohibited.

3. Clean up spilled materials promptly and completely.

4. Running is not permitted in any work area.

5. Workers engaging in horseplay, teasing or distraction of fellow workers are subject to disciplinary action.

6. The wearing of hand protection, eye protection, protective clothing and other safety equipment specified by Authority work procedures is mandatory.

7. Know and follow the area work procedures at all times.

8. If in doubt concerning the safe way to perform a job, ask your supervisor before proceeding with the task.

9. Do not remove, displace, damage, destroy or carry off any safety device, safeguard, notice or warning furnished for use at any plant.

10. Do not alter or attempt to repair any article of safety equipment without authorization from your immediate supervisor.

11. Do not use defective equipment; report it to your supervisor immediately.

12. Each employee is responsible for knowing the operation and location of fire extinguishers in his work area.

13. Protective safety goggles or plastic face shields must be worn when there is a danger of flying particles or splattering of any kind.

14. Good housekeeping is the responsibility of each employee. Keep your work area neat and clean at all times.

15. All analytical testing will be performed using EPA approved methods. Deviation from these methods are not allowed unless authorized in writing by management.

16. Quality control and quality assurance must be performed with all analytical methods.

17. Unethical, improper or illegal lab practices may not be used.

18. Laboratory personnel will be trained prior to performing work in the laboratory. Records of this training will be kept.

19. Laboratory personnel will review, understand and follow the latest version of the ethics policy. Following this, a signed copy will be kept on file.

20. Data shall not be mishandled or reported in a way or for any reason. These activities include but are not limited to:

    - Deliberately mislabeling a sample bottle or sample location,
    - Deliberately diluting samples before analysis without recording and accounting for such dilutions in the calculations of final reportable results,
    - Falsifying dates or times on raw data records, logbooks or log sheets,
    - Falsifying results of analysis without the performance of that analysis,
    - Manipulating standard solutions to create the appearance of passing quality control,
    - Taking shortcuts in the analysis,
    - Deliberately recording data not actually obtained by the laboratory to create the appearance of compliance with regulations or a regulatory permit,
    - Knowingly using a method other than the approved method for a particular analysis or not following the said method, and
    - Knowingly performing a procedure incorrectly.

Punishments for violating the laboratory's Code of Ethics will be evaluated by management on a case-by-case basis and administered according to the severity of the violation.

The analyst has read and understands the Ethics Policy.

Analyst Signature_____ Date:_____

Document Control System

Handling and Storage of Samples

The effectiveness of wastewater treatment is demonstrated by, if not determined by, the results of laboratory tests. The value of any laboratory analysis performed on a treatment plant sample depends on the overall quality of the sample on which the test is performed. The sample must be representative of the actual conditions in the plant. Often the error most commonly committed in analytical testing is that of improperly collecting or preserving samples.

The purpose of sampling is to collect a portion of the wastewater which is small enough to be conveniently handled in the laboratory and still be representative of the total waste stream. The sample must be collected in such a manner that nothing is added or lost in the portion taken and no change occurs between the time the sample is collected and the laboratory test is performed. Unless these conditions are net, the laboratory results may be misleading.

Samples for testing are recorded in a laboratory sample log that identifies the sample. Work logs are maintained in the laboratory. The work log is to include: Sample name/location, type of sample (composite or grab), date and time of sampling, test parameters to be performed, and type of preservative/preservation used.

Samples are evaluated by laboratory staff to ensure that standards, equipment, staff, facilities, and procedures necessary to perform testing are available. Procedures for the review of all analytical testing are maintained in the laboratory files.

The laboratory handles, prepares, and stores samples in its custody in a safe manner to protect them from loss, deterioration, damage, and destruction of required chains of evidence. Documentation of the date, time and retention of the test items (samples) are maintained in the laboratory files.

If a sample requires specific environmental conditions for storage, the conditions are maintained, monitored and recorded.

Samples to be held for any reason, including safety, value, to perform check testing, etc., are stored and secured to protect the item's condition.

The laboratory applies sampling procedures for substances, materials or product testing. A sampling plan and procedure are available in the laboratory. The sampling plan is based on appropriate statistical methods, and the process addresses the factors that must be controlled to ensure valid test results.

Three types of samples will be taken:

1) 24 hours composite
2) grab
3) 8 hour composite (when autosampler is inoperable)

These samples will be taken at several different locations at the treatment plant:

1) Influent sample located in the grit chamber
2) Effluent sample located at the outfall.
3) Various locations as needed.

Auto-samplers will be in operation for influent and effluent composite sampling and flow proportional. Sampler temperatures should be kept at 4 degrees Celsius. When composite sampling, a part of a substance or material is taken as a representative sample of the whole to provide for testing.

In the event that an auto-sampler would be out of service, an 8 hour composite sample will be substituted for the 24 hour composite. This 8 hour composite will be manually sampled throughout the period of an 8 hour work shift.

General rules for sampling:

- Sample must be taken from well-mixed areas.
- Samples should be analyzed as soon as possible after collection.
- Unusual particles should not be collected with routine samples.
- No deposits, growths or floating materials which have accumulated at the sampling point or on the side walls should be included.
- Proper collection and storage containers must be used.
- Each sampling point should have its own designated sampling device for collection of the sample.
- The amount of sample collected should be of adequate volume for all testing.

Records are maintained of any deviations, additions or exclusions from the documented sampling procedure and are reported in the test results. The laboratory maintains procedures for recording to include the sampling procedure used, type of sample, the identification of the sampler, initials of person doing the sampling, environmental conditions (if relevant) and the diagrams or other equivalent means to identify the sampling location as necessary, and, if appropriate, the statistics the sampling procedures are based upon.

If required, samples will be preserved according to the specific method for which it is being tested. Preservation may be by refrigeration and/or chemical addition. A list shall be kept in the laboratory citing the method identification and preservation type required. It is recommended that the refrigeration units shall be kept at 4 degrees Celsius, taking care not to allow the samples to freeze.

A list of the regulation sample holding times will be kept in the laboratory and will be adhered to by the analysts. Samples for testing shall not exceed those holding times.

Sample turnaround time shall be a period of 35 days. This period would include the reporting to any official agencies.

Records

The laboratory maintains procedures for the identification, collection, indexing, access, filing, storage, maintenance and disposal of administrative and measurement-related records. All records are readily retrievable and maintained in a suitable environment.

To ensure that the laboratory records are secure and to prevent destruction or tampering, the laboratory records are kept in locked cabinets and access to the files are limited to the laboratory staff. Records include information required by regulation or associated with original test observations, calculations, and reported results. Type evaluation data is recorded in permanent form at the time of test, in bound notebooks, or on standard forms on file. Permanent ink is used to record the actual data, and no erasures or whiteouts are made. Any corrections to data are made by drawing a single line through the entry and initialing the change with a note as to why and date the change was made. The type evaluation test number is included on the data sheets to ensure that the data and calculations are identifiable to the specific job. Type evaluation records contain sufficient detail to permit any necessary repetition of the evaluation and identification of the components of uncertainty. Records of original data include the following:

Test Procedure used;
Description of, and reason for, any deviation from the standard operating procedure (SOP);
Identity of the personnel performing testing;
Identity and description of objects under test;
Identity of equipment or apparatus used;
Identity of standards used and reference to traceability;
Date of test;
Original test data;
Derived data;
and test number if appropriate.

It is the laboratory's policy to ensure that the laboratory's Quality Manual, all SOP's, raw data sheets, temperature logs, instrument calibration logs, logbooks and operator manuals for lab equipment, final data reports, and other documents are properly controlled. Records, including those in computer files, are accessible only to authorized personnel. Computer files are backed-up for protection against loss. The laboratory maintains and retains the above records for a period of no less than 5 years or longer if required by regulations.
In the case that the laboratory terminates operation, the Authority will continue to retain all laboratory records for the period specified above.

Upon transfer of ownership of the Authority to the Municipality of Murrysville, the laboratory records will continue to remain at the treatment plant unless otherwise decided by the Municipality.

Standard and Reagent Logbooks (See Appendices O & P)

For standard and reagent preparation logbooks, the laboratory maintains records of reagents and standards prepared for each method performed.

Each standard and reagent logbook must contain at least the following information:

Identification of the compound
concentration of the final solution, dilution or reagent prepared
Date the solution was prepare
Expiration and/or last used date
Initials of the individual preparing the solution.

The standard and reagent bottles are to be marked with an expiration date.

Sample Collection Logbooks (See Appendix H)

Sample collection logbooks will contain the minimum information:

Date and time the sample was taken,
identification of sample: grab/composite, influent/effluent,
type of preservation used, if any,
initial of person collecting sample,
testing parameters.

Instrument Calibration Logs (See Appendices L)

Instrument calibration logs will contain the minimum information:

Date and time of calibration
Analysts initials
Method identification
Results of calibration (calibration curve)

Quality Control Charts (See Appendices K, R & S)

Control charts will be kept in data and graph form for the following at a minimum:

Laboratory control samples
Matrix spikes
Duplicates

Quality System, Document Control, Internal Audits and Management Reviews

The laboratory has established and maintains a quality system that supports the tests conducted by the laboratory. The quality system is described in this quality manual, the appendices, and applicable sections of the references named herein. These documents are readily available to all laboratory staff and serve as the basis for evaluating the integrity of the measurements and associated reports. The laboratory conducts internal audits of the laboratory quality system on behalf of management to ensure that the laboratory's policies and procedures as set forth in this quality manual are being followed.

Management periodically reviews the quality system, including review of internal audit results.

Quality System

The basic elements of the quality system include:

- the quality manual,
- work instructions (maintained in the laboratory),
- standard and reagent preparation logbooks,
- Records, forms, reports: and
- Equipment instruction manuals (maintained in the laboratory).

To ensure proper operation of the quality system, there are:

- Qualified personnel for each measurement,
- Management reviews and supervision,
- Appropriately maintained and calibrated working standards, equipment, and associated apparatus.
- Environmentally-controlled facilities, where appropriate, and/or proper accounting of relevant environmental factors; and
- Appropriate sampling procedures, where necessary.

All elements of the quality system are considered when developing test methods and procedures, training and qualification of personnel and in the selection and calibration of equipment.

Quality System Documentation

<u>Internal Document Control</u>

General

A detailed list of controlled documents with revision dates, retention periods, and locations are

kept. The procedures for document control include:

- Information on documents,
- designation of responsibility,
- assurance that authorized editions of appropriate documents are available at all locations that are essential to the proper functioning of the laboratory,
  periodic review and, as necessary, revision of the documents to ensure suitability and compliance with applicable requirements,
- removal of invalid or obsolete documents,
- access and changes to hard and electronic document, and
- marking obsolete documents used for legal purposes.
- Records lists: the records maintained by the laboratory, the location of the records, and the retention time. Handwritten documents are clearly marked, initialed, and dated.

All documents are reviewed and approved for use management prior to issuing the document to personnel in the laboratory. A control document distribution list is maintained in the laboratory, including the current revision status and distribution of the document.

Document changes are reviewed and approved following the same procedures for the original review process. The altered and/or new text is identified in the document. Handwritten changes to hard copy documents are clearly marked, initialed and dated by laboratory staff authorized to make changes to the documents. Some laboratory documents are maintained on the computer and changes are made electronically. Changes in electronic documents are tracked by the word processing system and are accepted by authorized laboratory staff.

Authority

Only management has the designated authority to modify or update the quality manual and Standard Operating Procedures. The quality manual and SOP's are annually reviewed and updated as needed. Management is responsible for final approval of all changes made to the quality manual, SOP's and the revised documents takes effect when signed and dated by management.

This quality manual is available to all laboratory staff and management. Management is responsible for providing the documented quality system to staff and ensuring that all staff familiarize themselves and comply with the policies and procedures established in the manual and associated documentation. Management notifies staff of the most current and approved version of the quality manual through memorandums.

Controlled Copies of the Quality Manual

Controlled copies of this quality manual are issued to the manager, assistant manager, plant superintendent, and are made available to all laboratory personnel. All controlled copies are marked as controlled and are numbered and updated by the quality manager whenever changes are made. Recipients of controlled copies are issued the revised quality manual. It is the responsibility of management to ensure that the most current quality manual is issued and followed by all laboratory staff. A list of the names, control numbers, and location of all controlled copies is maintained in the laboratory files.

Uncontrolled Copies of the Quality Manual

Uncontrolled copies of the quality manual are marked "uncontrolled", issued upon request, and are not updated.

Internal Audits and Management Reviews

Internal Audits (See Appendix G)

The internal audit program addresses all elements of the quality system, including testing. A review of the quality system in accordance with Chapter 252 of the Title 25 of the PA Code is conducted and a checklist is completed. Internal audit reports are maintained in the laboratory. The internal audits include an audit of the laboratory:

Equipment
Standards
Staff (training needs)
Facilities
Quality documentation
Management action items
Test results
Statistical control data
SOP's
Analytical Methods

Management annually conducts an internal audit to review the laboratory's quality system and testing activities to ensure its continuing suitability and effectiveness and to introduce necessary changes or improvements. Internal audits are conducted yearly to verify that operations continue to comply with the quality system. Management investigates any deficiencies found during the internal audit to determine appropriate actions.

Management Reviews

Management conducts annual reviews of the quality system.

Laboratory staff participate in the review meetings. The management review includes:

- Identification of problems that arise as a result of any discovered errors and/or discrepant results from the analysis of the laboratory test data.
- Evidence from internal audits and statistical control data and/or charts, where appropriate;
- Evidence from proficiency tests, round robins, and/or interlaboratory collaborative experiments;
- Review of policies and procedures;
- Reports of managerial and laboratory personnel;
- Preventive and corrective actions;
- Assessments by external bodies; and
- Changes in volume and type of work, staff needs, facility and equipment needs.

Authorization Review

A quality manager reviews and if needed, updates the laboratory annually and may consist of:

General laboratory information;
Equipment and standard information;
Internal audit information;
Management reviews
Scope or laboratory activities;
Staff assignments and training records; and
Updated quality manual

All internal audit and review findings, and any corrective actions that arise from them, are documented by management, and maintained in the laboratory files.

Personnel & Qualifications

Members of the laboratory staff are selected for employment based on their professional qualifications, including education and relevant experience. The basic qualifications for

laboratory staff include:

- knowledge of the laboratory or analytical testing;
- experience in analytical testing.
- High school diploma or GED

Staffing is sufficient to maintain the timely processing of the workload, laboratory internal monitoring, quality control, traceability activities, and training. Additional laboratory personnel is acquired as the need arises and is trained in an on-the-job training program that ensures that personnel understand the analytical procedures. Management and/or senior staff train staff on how to conduct the analytical procedures according to documented test procedures. Training is verified by management, who ensures that staff is qualified to perform device testing.

Laboratory Staff Evaluations

Laboratory staff evaluations are performed by management. Personnel who are in the process of training are supervised until their on-the-job training is completed.

Adequately trained staff is a key factor in good type evaluations. The type evaluation laboratory personnel have the necessary background or training for the analytical testing they are performing to ensure comprehension of the laboratory tests and operations. Qualification and training are documented and maintained for laboratory personnel (See Appendices D & F).

All laboratory personnel will perform an Initial Demonstration of Capability (IDC) and an Annual Continued Demonstration of Capability (DOC) for any analytical testing that they are involved in. The will also analyze 4 consecutive laboratory control samples and annual blind performance samples with acceptable levels of precision and accuracy.

Initial demonstrations of capability shall be performed each time there is a change in instrument type, analytical method, or personnel.

The Laboratory Technician will managed, analyzed and report proficiency test study samples in the same manner as real environmental sample and utilized the same procedures, equipment, facilities, number or replicates and methods for routine analysis of the analyte.

Personnel Records

Personnel records for all laboratory personnel will be kept by management will include the following:

A list of the dates of employment;
An example of the employee's signature and initials;
A list of persons authorized to approve or release data;
Initial and continuing demonstrations of capability;
Documentation of training;
Signed statements that indicate the employee has read, understood and is using the latest version of the QM and SOP's;
Employees education history.

Proficiency Testing

The Laboratory Technician will managed, analyzed and report proficiency test study samples in the same manner as real environmental sample and utilized the same procedures, equipment, facilities, number or replicates and methods for routine analysis of the analyte.

Initial Demonstration of Capability

Four aliquots will be prepared and analyzed for the initial demonstration of capability. Mean recovery and the standard deviation of the mean recovery will be calculated, compared for precision and accuracy, then filed.

Laboratory Facilities and Environment

The laboratory facilities are maintained to support good laboratory practices and accurate type evaluation test results. Equipment and other items that are no longer used for testing are discarded or removed from the laboratory and/or placed into storage to prevent clutter in the laboratory. Portable equipment and materials used for testing are returned to the appropriate location(s) after use.

The laboratory facilities, test areas, energy sources, lighting, heating, and ventilation facilitate proper type evaluation testing. The laboratory ensures that dust, electromagnetic interference, humidity, line voltage, temperature, and vibration levels (i.e., vibration sources due to surrounding equipment or improper support tables and temperature changes) do not affect the test and are appropriate for the device under test. The laboratory staff observes the device under test to determine if any conditions of the facility affect the test.
Environmental conditions maintained by the laboratory are appropriate for the type evaluation testing. The environment in the laboratory where testing is performed does not invalidate results nor adversely affect the test results (See Appendix C). The laboratory environmental conditions are monitored and recorded if required by the test procedures or if they influence the quality of the results. Management will stop testing if the environmental conditions jeopardize the test results. The laboratory staff ensures that the facilities are adequate for testing by:

- verifying that air conditioning, lighting, heating, and ventilation do not adversely affect the environmental conditions or device being tested ,

- maintaining good housekeeping practices to promote a clean, uncluttered laboratory according to procedures.

- having sufficient space to minimize the risk of injury to staff and/or damage to standards or equipment due to activities around test setup.

- maintaining a convenient and efficient work environment with effective separation of incompatible activities, and

- controlling access to and use of areas affecting the quality of tests.

- training needs and providing training and qualifying laboratory personnel are maintained in the laboratory.

Environmental Records

Laboratory device testing

The laboratory environmental conditions are maintained and documented to ensure that they are conducive to the various type evaluations. Corrective actions are taken when the environmental conditions affect the quality of test (See Appendix C).

Field device testing

Typically field tests are not performed when the environmental conditions are such that they may adversely affect the test results, and these conditions are documented on the data sheets.

Management utilizes staff resources to meet policy goals:

Implements and applies the appropriate analytical procedures;

Provides ongoing training to ensure proficiency in type evaluation testing;

Develops work plan schedules and requires that the staff follow the procedures in day-to-day operations; and

Assigns and authorizes staff to perform tasks based on personnel training and verified competence. Records of authorizations are maintained in the laboratory files.

Standards, Equipment, and Associated Apparatus

Laboratory standards, equipment, and associated apparatus are maintained suitable for the correct performance of tests and are maintained in accordance with the laboratory procedures, equipment maintenance and operational manuals, and this quality manual. The equipment, standards and associated apparatus are protected from dirt, dust, corrosion, and other causes of deterioration. Management investigates any equipment or standards that are suspected in contributing to out-of-control conditions. Records of corrective actions for discrepancies are maintained in the laboratory (See Appendix E). Procedures for safe handling, transport, storage, use and planned maintenance of test equipment to ensure proper functioning are maintained in the laboratory.

Maintenance and calibration records for equipment and standards include the following as appropriate:

Item name and manufacturer; model, serial, and other identification numbers;

Date and condition of receipt, date placed in service, and current location;

History of calibration, maintenance, malfunction, modification, and repair;

Date and identification of person repairing the equipment;

Calibration status, recertification date and maintenance plan, where appropriate;

Identification of any software affecting the calibration and quality assurance of the program;

Copy of manufacturer's instructions, where available;

Verification that equipment complies with specifications.

Operation and Maintenance

Equipment and Associated Apparatus

Laboratory equipment is properly maintained in accordance with procedures for calibration, verification, and maintenance. These procedures are located in the laboratory files.

The equipment is maintained so that it operates according to the manufacturer’s specifications for device evaluations. The following activities are conducted to ensure that the equipment operates according to manufacturers specifications:

- maintenance and service of the equipment by trained technicians,

- operation by laboratory staff that have been trained,
- protection from factors that may affect the operation, such as drafts, dirt, dust, and extreme temperatures, and
- when not operating correctly, one or more of the following will be done:
  labeling the equipment with an out-of-service tag,
  removing the equipment from service, and/or
  whenever possible storing it in a laboratory storage area, returning it to service only when its satisfactory performance has been verified.

The laboratory examines any previous tests that might have been affected by the equipment that was taken out of service.

Operation manuals and instructions for proper maintenance of equipment are available and located in the laboratory files.

Newly installed equipment and software programs are tested to verify that they perform satisfactorily before they are placed into service. Documentation of this verification is maintained in the laboratory.

Equipment is used only when it is in a safe and reliable condition and by personnel who have been appropriately trained and are qualified. Safe and reliable conditions include:

- Stable support for equipment,
- Use of electrical outlets in accordance with equipment specifications, and
- loading equipment in accordance with equipment specifications.

All equipment having an affect on the test is calibrated and is labelled, coded or otherwise identified to indicate the status of calibration, including date calibrated and recalibration due date.

The laboratory uses and maintains procedures for the intermediate checks of equipment calibration status when needed.

The laboratory follows procedures to ensure that correction factors that arise from the calibration of equipment are correctly updated.

Under no circumstances shall any instrumentation be manipulated in an unethical, inappropriate, or illegal way.

Standards (Measurement Traceability and Calibration)

To maintain integrity of the standards, all maintenance operations are performed according to documented procedures. The laboratory standards are:

a. selected for use according to the level of precision, accuracy, and uncertainty required;
b. limited in access and use to trained and laboratory staff only; and
c. handled and safely stored according to good laboratory practices.

Measurement Traceability and Calibration

Standards and measuring and test equipment significantly affecting the integrity of the measurements conducted by the laboratory are monitored for stability as part of the measurement control program. Standards and equipment are calibrated and/or verified before use to ensure the recall or removal from service of any equipment or standards that are unreliable or that have exceeded the calibration interval. The laboratory maintains procedures for storage and use of reference standards, materials and equipment.

Measurement Traceability

The laboratory has a program of calibration and verification of measuring and test equipment that has an affect on the test results. The program is designed to ensure that the tests are valid and that the measurements made by the laboratory are traceable to national standards of measurement.

Calibration of Standards

Working standards are calibrated on a periodic basis, are monitored, and are under the custody of trained laboratory personnel. Records of the calibrations are maintained in the laboratory (See Appendix L).

Standards are recalibrated if there is damage to the standards or any significant change is observed in the monitoring program.

Verification of Standards

Standards are continuously monitored to ensure the integrity of the test.

Measurement assurance procedures and standard and reference material monitoring results are maintained in the laboratory files (See Appendices K, R & S).

Range of Quantitation and Detection Limit Studies

The laboratory will keep quantitation and detection limit studies for each analyte reported. These studies will be kept on file in the laboratory.

Validation Studies

Validation studies will be performed on a method before reporting any sample results determined by that method.

The validation procedure includes, but not limited to:

Method Detection Limits
Initial Calibration Verification
Continuing Calibration Verification

Calibration of Measuring and Test Equipment (M&TE)

A calibration interval is established for the equipment and the equipment is labeled, marked, or otherwise identified to indicate its calibration status.

Procedures for setting and changing M&TE calibration intervals are maintained in the laboratory files.

Calibration of equipment is conducted at a frequency to ensure that the equipment remains in tolerance during its use in the laboratory. Frequency of calibration is based on a review of calibration, maintenance, and repair history. Management conducts reviews and the records of the review are maintained with the internal audit records in the laboratory files (See Appendix L).

NIST Thermometer

The laboratory must keep a calibrated certificate demonstrating traceability to NIST standards. The thermometer must be recalibrated yearly.

Working Thermometers

Working thermometer will be labeled and documentation will be kept on the date of calibrations and correction factors from calibration. This documentation may be designated on the temperature log along with the identity of the thermometer. It should be common practice of the analyst to note the date of calibrations on both the thermometer and in the thermometer calibration notebook

Working thermometers will be calibrated against the NIST thermometer yearly and records of the calibrations will be kept. These records will list the date of calibration, the identification of the NIST reference thermometer and the working thermometer temperature reading, any correction factor, and the initials of the person doing the calibration.

PH meters

Daily calibration/verification and documentation of the pH meter, or before each use, whichever is less frequent, shall be performed.

The calibration records must list the date of standardization, the calibration buffers used, and the initials of the person performing the standardization.

Reference Weights

The laboratory will keep a calibration certificate demonstrating traceability to NIST standards and the weights must be ASTM type 1, 2 or 3 (Class S or S-1). Reference weights will be re-certified every 5 years and documented.

Analytical and Pan Balances

Analytical and Pan Balances will be verified daily, or before each use, whichever is less frequent. Records of verification will be maintained, which will list the balance identification, the date of verification, the reference weights used, any correction factor, and the initials of the person doing the calibration verification.

Annual service and calibration by an outside source will be performed and documented in the laboratory. The service date will be written on the balance.

Refrigeration Equipment

Temperatures of all laboratory refrigeration equipment will be recorded daily.
Temperature logs will list the refrigeration equipment identification, the date, any temperature correction, and the initials of the person reading the thermometer (See Appendix Q).

Samples and standards shall be store in separate refrigerators.

Spectrophotometer

Calibration must be performed each day of use. Calibration must be done according to the test method.

Conductivity Meter

Conductivity meters will be calibrated daily, or before each use, whichever is less frequent, and records of the calibration will be retained.

Dissolved Oxygen Meter

DO meters will be calibrated before each use. Weekly, a zero calibration will be performed. Membranes will be changed as needed.

Autoclave

Autoclave batch logs will contain information on the date, items autoclaved, time started, time stopped, high temperature, pressure, results and analyst.

Performance and functional properties shall be checked prior to use and documented in the instrument log. This would also include a monthly sterility check on a full load capacity.

The use of a biological indicator will be used with each use of the autoclave to demonstrate that the microbial organisms are killed.

The mechanical timing device will be verified quarterly. The timing check record will list the autoclave identification, date, the mechanical timing device time, the actual time, the correction factor, and the initials of the analyst.

Corrective action will be taken and documented if the autoclave cycle fails to meet any requirement.

Maintenance records will be kept which shall include the date, time, service performed and initials.

Glassware

Glassware (except Class A) such as BOD bottles and graduated sample containers will be checked for accuracy of the volumes for each lot number of bottle or once per year, whichever is more frequent. A record of this accuracy check will include the apparatus identification, the lot number of bottles tested and/or date, the volume of liquid dispensed, the accuracy of the volume expressed as % accuracy, and the initials of the analyst.

Incubators, Water Baths and Heating Blocks

Temperature logs will be kept twice per day, separated by at least 4 hours, every day in use.

The temperature log will list the equipment identification, the date, the time, the corrected temperature, and the initials of the person reading the thermometer (See Appendix Q).

Measurement of Uncertainty

The laboratory performs testing and evaluation of measuring devices. Tests are performed on

each device to determine detection limits. The laboratory identifies all components of the test uncertainty that might affect the integrity of the test results, makes a reasonable estimation, and ensures that the form of reporting the results does not give a wrong impression of the uncertainty.

Test Methods and Procedures

The administrative and test procedures are maintained in the laboratory files. The procedures are available to the laboratory staff and are followed to ensure the integrity of the test results, and that the administrative and test procedures are conducted uniformly in the laboratory. Equipment manuals, operating instructions, reference data, specifications, and tolerance tables relevant to the laboratory are maintained in an up-to-date file in the laboratory and are readily available.

The selected test procedures are appropriate for the device under test, and the latest edition of the procedure is used to test the device. When documented or published procedures are unavailable, or when deviations from documented procedures occur, procedures for a specific test are developed, validated, and agreed to by the laboratory and the type evaluation body. The extent of the validation meets the needs of the application. The results of the validation are maintained in the laboratory and include the validation procedures used and a statement that the method is fit for its intended use. Before a new test is conducted, the laboratory reviews the test procedure to ensure that the test can be performed adequately. If the test procedure is revised, the review is repeated. The test report states the procedure used to perform the test. Records regarding departures from documented policies and procedures or from standard specifications are initiated by management and are maintained in the laboratory files. Procedures for departure from documented policies and procedures are maintained in the laboratory.

Testing Procedures

The laboratory follows the procedures according to EPA rules and regulations.
The laboratory identifies all the components of the uncertainty that might affect the integrity of the test results in accordance with EPA regulations. The device under test must meet the tolerances and specifications of Codes of Federal Register 40. Evaluations of weighing and measuring devices are conducted by using standards to verify the accuracy of the device and other tests are performed to ensure that the device meets the required specifications. Laboratory staff are trained before they may conduct the test. Test methods and reporting instructions are followed when conducting the test.

Administrative Procedures

The administrative procedures ensure that the overall operations of the laboratory promote the quality and integrity of the test results and test items.

Management maintains the procedures for the purchase, receipt and storage of consumable materials used for the technical operations of the laboratory.

Departures from Documented Policies and Procedures

There may be occasions where it becomes necessary to deviate from the document policies and procedures, the laboratory's QM, the laboratory's SOP's, or the referenced method. When a deviations is necessary, prior approval from management is required. All deviations and courses of action will be recorded, initialed, and dated.

When management is not available for prior approval, the analyst may use their best judgement in determining the best course of action. Any action is to be recorded, initialed and dated.

Reporting & Control of Data/Detection of Departures from Procedures

Laboratory personnel analyze and record the sample data. Management approves and reports the data to the appropriate agencies. (See DMR, Appendix T).

As a minimum, laboratory staff review data, calculations, and test results to ensure the integrity of the type evaluation. Checks or quality control procedures include interlaboratory or proficiency testing and replicate tests or retesting, as appropriate for the device under test. The analyst will run QA/QC with tests and check the results with the true values. QA/QC that falls outside the allowable ranges will be checked to identify any problems. QA/QC will be kept for all reported testing. Out-of-control QA/QC is reported to management for discussion and corrective actions (See Appendix K, R & S). Out of control results are to be flagged on the bench sheet.

If samples deviate from the method specifications or regulatory requirements, those samples will be reported with a qualifying statement that describes why it did not conform to the standard protocol.

Records are maintained regarding feedback and corrective action whenever testing discrepancies are detected. Whenever possible the samples should be re-prepared and re-analyzed. Management will be notified about any problems. Corrective action(s) will be discussed with management, documented and implemented. Corrective action(s) should be taken as soon as possible. The data may be reported with a data qualifier.

The analytical tests are required to have the following QA/QC performed, if applicable:

Blank
Initial Calibration Verification (ICV)
Laboratory Control Sample (LCS)
Duplicate
Matrix Spike
Duplicate Matrix Spike
Continuing Calibration Verification (CCV)

This QA/QC will be each time the method is performed or every 20 samples, whichever is more frequent.

Spike concentrations should be added to low concentration samples sufficient to double that concentration: and an amount be added to intermediate concentration samples sufficient to bring the final concentration in the sample to 50-75% of the upper limit of the standard curve. If past experience does not allow the estimate of the approximate concentration of the sample, the spike should be a mid-range amount. If this results in a spike amount not in line with the rules of thumb (for low or intermediate concentration samples mentioned above_, then either spike with less (so that the spike is closer in concentration to the sample) or first dilute the sample. Sample dilution should be kept to a minimum.

When unacceptable spike results are obtained, the analyst should check the calculations. If calculation errors were not at fault, repeat the spike analysis. If the rerun does not generate acceptable results, the cause for the difficulty must be determined, corrected and documented.

The concentration of the spiked sample must be within the concentration range of the calibration curve.

There are a number of parameter that are difficult to spike because of the nature of the analysis being performed. These include:

Fecal Coliform
Acidity
Alkalinity
Chlorine
Dissolved Oxygen
pH
Residue (including: total, filterable, non-filterable, settleable, and volatile)
Temperature
Turbidity

Control Limits

The Laboratory Control Samples the Authority uses are purchased from an outside source, such as ERA. Control limits for laboratory control samples are set by the manufacturer and are stated in the documentation that comes with it.

Two sets of control limits (acceptance limits) for calibration verification and spikes are calculated for each analytical test performed in the laboratory. Acceptance limits are determined on a statistical basis using the previous QA/QC results obtained. These limits are the Warning Limits and the Acceptance Limits. Acceptance Limits are set at ±3 times the standard deviation and the Warning Limits are set at ±2 times the standard deviation. Outside these limits the data

is considered "unacceptable". The analyst is to flag the data, check for errors and take corrective action.

Results that are more than ±2 times the standard deviation but less that ±3 times are acceptable but the analyst should check for error.

Duplicate analyses are considered acceptable if the fall within the acceptance limits. Acceptance limits are determined on a statistical basis using the previous duplicate results obtained. In general, there are two types of control limits: Warning and Acceptance Limits. Unlike control limits for accuracy, there are only upper limits. These limits are related to the average ‖R‖ value from duplicate analyses.

The average ‖R‖ value is calculated by taking the absolute (non-negative) value of the difference between the sample concentration and the duplicate concentration. Values beyond 3.27 times the average ‖R‖ value are considered "Not Acceptable". ‖R‖ values from a duplicate analysis more than 2.5 times the average ‖R‖ value, but less than 3.27 times the average ‖R‖ value are within the Warning Limits. Such results are acceptable but the analyst should look for problems and take corrective actions.

When unacceptable duplicate results are obtained, the analyst should check the calculations. If calculation errors were not at fault, repeat the duplicate analysis. If the rerun does not generate acceptable results, the cause for the difficulty must be determined, corrected and documented.

Blanks, either matrix or reagent, are to determine and measure contamination and interferences. The results of blanks should be compared with the sample analyzed per analysis to determine whether the source of any analyte present is due to sample or laboratory contamination, interferences, the sample matrix, or the actual analyte in the samples. Blanks should be below the method detection limit where possible. Blank results are evaluated and corrected where possible. If blank results are consistently above the method detection level (MDL) established, the MDL should be re-established. High blank results may also indicate contamination either from the solvent, laboratory equipment or laboratory environment.

Standard Operating Procedures (SOP's)

The laboratory will be supplied with the Standard Operating Procedures for the analytical methods being used which will include the following:

Identification of the method,
Effective date,
Scope of work,
Equipment and supplies,
Reagents and standards,
Quality Control,

Calibration and standardization,
Analytical procedure
Calculations
Corrective actions or contingencies for handling out-of-control or unacceptable quality control data,
Reporting of results.

Handling and Storage of Test Items

Samples for test are recorded in a laboratory work log and assigned an identity to that sample that uniquely identifies the sample during its stay in the laboratory. Work logs are documented and stored in the laboratory. Documentation is to include the description of sample(s) received for testing, type of testing and date of receipt (See Appendix H).

Samples collected or received shall have an adaquate amount of sample volume for all testing. This shall also include volume of sample for any QA/QC to be performed.

Samples must be collected and stored in the proper containers, and if required, with the proper preservative.

Samples are evaluated by laboratory staff to ensure that standards, equipment, staff, facilities, and procedures necessary to perform testing are available. Procedures for the review of all incoming work are maintained in the laboratory files.

Prior to testing incoming items, the laboratory documents any significant abnormalities including:

Departures from required standard conditions and necessary preparations;

Doubt as to the test items suitability for testing; and

Irregularities of samples.

The laboratory handles, prepares, and stores test items in its custody in a safe manner to protect them from loss, deterioration, damage, and destruction.

If a test item requires specific environmental conditions for storage, the conditions are maintained, monitored and recorded.

Test items to be held for any reason, including safety, value, to perform check testing, etc., are stored and secured to protect the item's condition.

Upon completion of testing, the test items will be retained no longer than necessary and disposed

of in a proper manner.

Site Security

The laboratory is located at the treatment plant. Management is responsible for security directly related to the laboratory and designates the specific duties of on-site security to the laboratory staff. Security of the laboratory premises includes the following:

Locking laboratory doors in specific areas when not in use;

Securing all doors and perimeter at the close of the day;

Notifying building security of disturbances and suspicious activity as appropriate;

Securing entrances to the laboratory when disturbance during testing affects the integrity of the type evaluation; and

Securing all areas where standards and equipment are stored or maintained.

Access

Laboratory building keys are given to management and union personnel.

Cleaning is performed by union personnel during normal working hours.

Outside Support Services and Supplies

The laboratory uses services and supplies of adequate quality where the specifications of outside services and supplies are relevant to the integrity of tests. The laboratory maintains procedures for the purchase, storage, and evaluation of supplies and services.
The purchasing orders contain data that describe the services and supplies ordered; they are reviewed and approved before release. Management completes the purchasing order, which includes the following information:

description of the service or supply,
service provider or supplier name address,
cost of the service or supply in know, and
date of request.

Management reviews the purchase order and approves the order before it is released.

Where assurance of the quality of outside support services or supplies is unavailable, the laboratory uses these items only after they have been inspected or otherwise verified for adequate quality. The suppliers of critical supplies and services that affect the quality of testing are evaluated. The laboratory personnel, upon receipt of the service or supply, examines the supply or quality of the service and records the findings on the packing slip if supplied. If the services or supplies are not of adequate quality, it is documented. The records of inspections, and verification of suppliers and services and actions are maintained in the treatment plant (See Appendix J). Supplies will be marked with date received and the initials of the person who received them.

Preventive Action / Complaints and Corrective Action

Preventive Action

The laboratory participates in annual laboratory meetings. Discussion at these meetings includes the interpretation of type evaluation test procedures. The information from these meetings is documented and used to improve the quality of test in the laboratory. The laboratory obtains information from laboratory meetings and internal reviews and uses this information to examine its technical and quality system to identify needed improvements and potential sources of nonconformance. If preventive action is required, action plans are developed, implemented, and monitored. Procedures for preventive action are maintained in the laboratory.

The laboratory promptly investigates complaints, adverse findings during audits, or any other circumstance that raises doubts concerning the laboratory's competence or compliance with required procedures. The laboratory determines the root cause, identifies potential corrective actions, and follows a corrective action procedure to resolve the adverse situation promptly and, where necessary, conducts a retest.

Management examines all documents and records associated with complaints, and investigates adverse audit findings and other circumstances. If deficiencies are discovered during these reviews, they are documented. After review of the deficiencies with the laboratory staff and management, corrective actions are documented for each deficiency appropriate to the magnitude and risk of that deficiency and likely to eliminate or prevent recurrence. Deadlines are set for each corrective action. Management monitors the corrective action to ensure that it is effective.

Records of deficiencies and corrective actions are maintained in the laboratory (See Appendix I).

Prevention and Detection of Improper, Unethical or Illegal Actions

Quality control samples will be ran with the analytical tests in order to ensure the integrity of the procedure. The true values will not be made known to the analyst until the testing has been completed. Occasionally, management may include a blind sample to the analyst for testing.

Each analyst must successfully perform at least one proficiency test per calendar year, as specified in PA Title 25 Chapter 252, for each test performed by that analyst. This samples are analyzed by the same personnel, using the same standards and reagents, prepared and analyzed as if they were routine samples. Only management will know the true values of these samples and will compare these true values with the results submitted by the laboratory analyst. After review by management, the analyst will be informed on the accuracy of their results.

Post-analysis Data Review

Raw data and sample information are transcribed by the analyst from the original bench sheets on to a Discharge Monitoring Report where it is then transferred over to management for final review and approval. The analyst checks the calculations for errors. A copy of the Discharge Monitoring Report and the bench sheets are filed in the laboratory (See Appendix T).

When transcription errors, calculation errors or other errors are detected in the data, the cause is investigated and the corrective action documented. Suspect data is reported with a qualifier.

Definitions

The following words and terms, when used, have the following meanings, unless the context clearly indicates otherwise:

Acceptance criteria—Specified limits placed on a measurement, quality control sample or process

Accreditation—A determination by the Department that an environmental laboratory is capable of performing one or more classes of testing or analysis of environmental samples in accordance with the act and this chapter.

Accrediting authority—A territorial, state or Federal agency having responsibility and accountability for environmental laboratory accreditation and which grants accreditation.

Analysis day—A continuous 24-hour period during which testing or analysis of environmental samples is performed.

Analyst—An individual who performs the analytical methods and associated techniques and who is responsible for applying the required laboratory practices and quality controls to meet the required level of quality.

Analyte—The component, compound, element or isotope to be identified or quantified using a test or analysis.

Batch—Environmental samples that are prepared or analyzed together using the same procedures, personnel, lots of reagents and standards.

Batch, analytical—A batch composed of prepared environmental samples that are analyzed together as a group. An analytical batch may contain samples originating from various environmental matrices and can exceed 20 samples.

Batch, preparation—A batch composed of 1 to 20 environmental samples of the same matrix with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours.

Blank—A sample of similar matrix to the samples being tested, being free of the analytes of interest, usually being distilled water. The blank is used to detect the presence of contamination in the analytical environment. Analysis of the blank must indicate that no target analyte(s) or interferences are present at concentrations above the reporting limit for the method or that impact the analytical results for sample analysis.

Calibration verification standard—A standard used to confirm the validity of a previously performed initial calibration of a measurement process.

Certificate of accreditation—A document issued by the Department certifying that an environmental laboratory has met standards for accreditation.

Composite Sample—A collection of individual samples obtained at set intervals of a period of time.

Deficiency—A deviation from acceptable procedures or practices.

Detection limit—The lowest concentration or amount of the target analyte that can be identified, measured and reported with confidence that the analyte concentration is not zero.

Duplicate—Two sample aliquots taken from the same sample, from the same container in the laboratory and analyzed as separate samples with an identical procedure.

Effluent—The output or discharge from a water treatment process

Environmental laboratory—A facility engaged in the testing or analysis of environmental samples.

Environmental sample—A solid, liquid, gas or other specimen taken for the purpose of testing or analysis as required by an environmental statute.

Facility—the Franklin Township Municipal Sanitary Authority treatment plant.

Field of accreditation—A combination of matrix; method or technology, or both; and analyte or analyte group for which an environmental laboratory may be accredited.

Grab Sample—A single sample of wastewater (as defined by the NPDES permit)

Holding time—The maximum elapsed time from sample collection to initiation of testing or analysis.

Influent—Wastewater or other liquid flowing into the treatment process or treatment plant.

Initial calibration—Determination by measurement or comparison with a standard of known concentration the correct value or response of each scale reading on a meter, instrument or other device. Comparison of a measurement standard or instrument with another standard or instrument to report or eliminate by adjustment any variation in the accuracy of the item being compared.
Initial demonstration of capability—A procedure to establish the ability of an analyst, technical staff member or work cell to generate data of acceptable accuracy and precision.

Laboratory control sample (LCS)—A sample of a controlled matrix known to be free of the analyte of interest, to which a known and verified concentration of analyte has been added and that is taken through all preparation and analytical steps in the method.

Laboratory notebook—A chronological record of observations, results of testing or analysis, equipment maintenance or calibration or other environmental laboratory data. A laboratory notebook may be maintained in an electronic format.

Supervisor—A technical supervisor of an environmental laboratory who supervises laboratory procedures and reporting of analytical data.

Linear range—The range of concentrations over which the instrument response is directly proportional to the analyte concentration.

Management—
(i) The individuals responsible for the overall operation, all personnel and the environmental laboratory.
(ii) The term includes the manager, assistant manager and plant superintendent.

Matrix or *matrices*—The media of an environmental sample that includes drinking water, nonpotable water, and solid and chemical materials.

Matrix spike—A sample prepared by adding a known mass of target analyte to a specified amount of environmental sample and that is taken through all preparation and analytical steps in the method.

Method—The scientific technique used to perform testing or analysis on an environmental sample.

Method blank—A sample of a known matrix, similar to the associated samples, and known to be free of the analyte of interest and that is taken through all preparation and analytical steps in the method.

NIST—The National Institute of Standards and Technology of the United States Department of Commerce's Technology Administration.

Negative culture control—An organism selected to demonstrate that the medium does not support the growth of nontarget organisms or does not demonstrate the typical positive reaction of the target organisms.

Nonpotable water—
(i) Any aqueous sample excluded from the definition of drinking water matrix.
(ii) The term includes wastewater, ambient water, surface water, groundwater, effluents, water treatment chemicals and toxicity characteristic leaching procedure or other extracts.

Positive culture control—An organism selected to demonstrate that the medium can support the growth of the target organisms and that the medium produces the specified or expected reaction to the target organism.

Preservative—A chemical or reagent added to a sample to prevent or slow decomposition or degradation of the analyte to be tested. Refrigeration can be considered a type of preservation.

Proficiency test study—A sample or group of samples, the composition of which is unknown to the environmental laboratory and the analyst.

Promulgated method—A protocol for testing or analysis of a specific analyte that is approved for use by a State or Federal regulation.

Quality Assurance—A definitive plan for laboratory operation that specifies the measures using data from internal and external quality control measures.

Quality Assurance Program—Written policies and procedures that outline how the laboratory intends to produce data of known and acceptable quality.

Quality control—A set of measures within a sample analysis method to assure that the process is in control.

Quality Manager—The Manager, Assistant Manager, or Plant Superintendent.

Quality manual—A document stating, or making reference to, the policies, objectives, principles, responsibilities, accountability, implementation plans, methods, operating procedures or other documents of an environmental laboratory for ensuring the quality of its testing and analysis.

Quantitation limit—The minimum concentration or activity of the component, compound, element or isotope that can be reported with a specified degree of confidence. Typically it is the concentration that produces a signal ten standard deviations above the reagent water blank signal.

Range of quantitation—The concentration range between which an environmental laboratory reports results quantitatively which is defined by a low concentration standard and a high concentration standard.

Reagent water—Water with no detectable concentration of the component, compound, element or isotope to be analyzed and that is free of substances that interfere with the method. Reagent water may be prepared by distillation, ion exchange, adsorption, reverse osmosis or a combination thereof.

Representative Sample—A portion of water identical in content to that in the larger body of water being sampled.

Solution—A liquid mixture of dissolved substances.

Standard Solution—A solution in which the exact concentration of a chemical or compound in known.

Sample duplicate—Replicate aliquots of the same sample taken through the entire analytical procedure.

Solid waste—Any waste, including, but not limited to, municipal, residual or hazardous wastes, including solid, liquid, semisolid or contained gaseous materials as that term is defined in the Solid Waste Management Act.

Spike—A known and verified mass or activity of the target analyte of interest added to reagent water or environmental sample to determine recovery efficiency or for other quality control purposes.

Standard Operating Procedures (SOP's)—A written document that provides detailed instructions for the performance of all aspects of test, analysis, operation or action.

Supervisor—management personnel who supervises laboratory procedures and reporting of analytical data.

Technical staff—Employees of an environmental laboratory that perform any portion of testing or analysis of environmental samples, including the analysts of the environmental laboratory.

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 a specified procedure.

Wastewater—A substance that contains the waste products or excrement or other discharge from the bodies of human beings or animals and noxious or deleterious substances being harmful or inimical to the public health, or to animal or aquatic life, or to the use of water for domestic water supply or for recreation, or which constitutes pollution under The Clean Streams Law.

Wastewater facility—A facility that operates a system designed to collect, convey or treat wastewater and from which effluent is discharged into waters of this Commonwealth. The Franklin Township Municipal Sanitary Authority.

Work area—The areas in an environmental laboratory necessary for testing and analysis and related activities. These areas include sample receipt area, sample storage area, chemical and waste storage area, data handling area and analytical areas.

Work cell—A defined group of analysts that together perform testing or analysis of environmental samples.

Equipment List

The laboratory maintains the following pieces of equipment:

Barnstead still - AS6210
Spectronic 20D+ - 333183
Barnstead EasyPure LF - 07381
YSI Model 59 DO Meter - 926041239
Fisher Low Temperature Incubator - FFU20F9CW2
Napco Model 8000 Autoclave
Millipore Incubator 458
Fisher Micromaster Microscope Model E
Millipore Microscope - 750289
Thermolyne Type 1500 Furnace - F152M
Livror Electronic Moisture Balance - 42464
Denver Moisture Balance
Fast Vacuum Pump 0211 Series
Fisher pH meter Model 25
Dynac Centifuge - 0101
Sargent-Welch Distilling Unit S-63410
Blue M Laboratory Oven Model OV-12A
Fisher Isotemp Incubator Model 525D
Fisher Isotemp Incubator Model110
Marcel Model No. 61 Refrigeration Unit
Precision Water Bath Model 2860

Maintenance logs will be kept for the above equipment.
Whenever the equipment can not be repaired, it should be replaced, if needed.

Appendix A

Organization Chart

Manager

Assistant Manager

Superintendent

Laboratory Analyst

Fill-in Laboratory Analyst

Appendix B

Laboratory Environmental Conditions

Month_____ Year_____

Date	Time	Laboratory Temp. °C	Humidity	Other Laboratory Environmental Conditions	Initials

Form No. LEC rev. 06/06

Appendix C

Personnel Training and Competency

Name of Staff:_____

Title or Position_____

Training Provider Subject/Topics	Training Dates	Continuing Education Units or Hours	Completed Yes/No	Staff Initials	Date Approved

Comments:

Form PTC rev. 06/06

Appendix D

Instrument and Equipment Maintenance Log

Date	Instrument or Equipment	Manufacturer	Model/ Serial No.	Maintenance or Repair Performed	Initials

Form IEML rev. 06/06

Appendix E

Proficiency Test Results

Date	Analyst	Method/ Parameter	True Value	Range	Reported Result	Pass/ Fail	Corrective Actions

Form PTR rev. 06/06

Appendix F

Audit Log

Date	Audit Description	Auditor	Audit Findings	Corrective Actions

Form ADTL rev. 06/06

Sample Log

Form SL 09/10

Date	Influent Grab Sample Time & Volume	Effluent Grab Sample Time & Volume	Influent Composite Volume	Effluent Composite Volume	Fecal	NH3N	TSS	CBOD	pH	Res Cl2		Initials

Appendix H

Complaint/Corrective Actions

Form CCA 04/10

Date	Subject of Complaint/ Discrepancy	Response Date	Reviewed By	Actions Taken/ Results

Appendix I

Supply Log

Form SUPL Rev. 06/10

Date Received	Item	Manufacture	Lot #	Date Opened	Expiration Date	Date Exhausted	Initials

Appendix J

Duplicate Analysis Chart

Form DAC 04/10

Method:_____

Date	Original Result	Duplicate Result	Difference	Analyst

Appendix K

Instrument Calibration Log

Form ICL rev. 04/10

Instrument ID:_____ Method:_____

Date:_____ Analyst:_____

Standard Concentration	Absorbance	Calculated Concentration	mV Reading	Notes

Appendix L

Distillation Log

Form DL 04/10

Method: 4500-NH3 B

Date	Sample ID	Initial Volume (mls)	Final Volume (mls)	Analyst

Appendix M

Autoclave Log

Form AL 04/10

Date	Time Started	Time Ended	Items	Temp/ Pressure	Run Time	Analyst

Appendix N

Reagent Log

Form RL 03/10

Date Made	Reagent	Concentration	Expiration Date	Date Last Used or Discarded	Analyst

Appendix O

Standards Log

Form SL 09/10

Date Made	Standard	Concentration	Volume	Expiration Date	Date Last Used	Analyst

Appendix P

Dilution Water & Stock Buffer pH Log

Form DWSB 03/10

Date	Dilution Water or Stock Buffer	Original pH	pH adjustment needed? Y/N	Final pH (if adjusted)	Initials

Appendix Q

pH Verification of Media

Form VM 03/10

Date	Manufacture	Item	Lot #	pH	Initials

Equipment Temperature Log

Month:_____ Year:_____

Date	BOD Incubator Temp.	Drying Oven Temp.	Fecal Incubator Temp.	Sample Refrigerator Temp.	MTF Incubator Temp.	Water Bath Temp.	Effluent Sampler Temp.	Influent Sampler Temp.	Standards Refrigerator Temp.
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
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25									
26									
27									
28									
29									
30									
31									

61