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1.0 PROCEDURE

   a. Procedure:
   b. Summary of Method
   c. Definitions
   d. Health and Safety Warnings
   e. Cautions
   f. Interference
   g. Personal Qualifications/Responsibilities
   h. Equipment and Supplies
   i. Procedure (steps and materials need)
   j. Data and Records Mgmt

2.0 QUALITY CONTROL AND QUALITY ASSURANCE SECTION - QC

3.0 REFERENCES
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GUIDANCE FOR PREPARING
STANDARD OPERATING
PROCEDURES (SOPs)

April 2008

Public Works Director............Diane Taniguchi-Dennis, P.E.
Assistant PW Director/Operations Manager ...... Mike Wolski
Assistant PW Director/City Engineer ......Mark Shepard, P.E.
Administrative Services Supervisor...............Angelia Sousa

PUBLIC WORKS – OPERATIONS
FOREWORD

The City of Albany Public Works Department is developing an Agency-wide program of quality assurance for Public Works. The Public Works Department Quality System requires documentation of both management and technical activities. This guidance document, Guidance for Preparing Standard Operating Procedures (SOPs) provides a standard working tool that can be used to document routine quality system management and technical activities.

This document will be one of the Public Works Department Quality System Series documents. These documents describe the Public Works Department policies and procedures for planning, implementing, and assessing the effectiveness of the Quality System. This document is valid for a period of up to five years from the official date of publication. After five years, this document will be reissued without change, revised, or withdrawn from the COA Public Works Agency Quality System Series documents.

Questions regarding this document or other Quality System Series documents should be directed to the Public Works Management Staff at: ?

Copies of COA Public Works Quality System Series documents may be obtained from the Quality Staff directly or by downloading them from the COA Public Works Quality Staff Home Page: www.?
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GUIDANCE FOR PREPARING
STANDARD OPERATING PROCEDURES

1.0 INTRODUCTION

1.1 Overview

A Standard Operating Procedure (SOP) is a set of written instructions that document a routine or repetitive activity followed by an organization. The development and use of SOPs are an integral part of a successful quality system as it provides individuals with the information to perform a job properly, and facilitates consistency in the quality and integrity of a product or end-result. The term “SOP” may not always be appropriate and terms such as protocols, instructions, worksheets, and laboratory operating procedures may also be used. For this document “SOP” will be used.

SOPs describe both technical and fundamental programmatic operational elements of an organization that would be managed under a work plan or a Quality Assurance (QA) Project Plan [COA-PW Requirements for QA Project Plans]. This document is designed to provide guidance in the preparation and use of an SOP within a quality system.

1.2 Purpose

SOPs detail the regularly recurring work processes that are to be conducted or followed within an organization. They document the way activities are to be performed to facilitate consistent conformance to technical and quality system requirements and to support data quality. They may describe, for example, fundamental programmatic actions and technical actions such as analytical processes, and processes for maintaining, calibrating, and using equipment. SOPs are intended to be specific to the organization or facility whose activities are described and assist that organization to maintain their quality control and quality assurance processes and ensure compliance with governmental regulations.

If not written correctly, SOPs are of limited value. In addition, the best written SOPs will fail if they are not followed. Therefore, the use of SOPs needs to be reviewed and re-enforced by management, preferably the direct supervisor. Current copies of the SOPs also need to be readily accessible for reference in the work areas of those individuals actually performing the activity, either in hard copy or electronic format, otherwise SOPs serve little purpose.

1.3 Benefits

The development and use of SOPs minimizes variation and promotes quality through consistent implementation of a process or procedure within the organization, even if there are temporary or permanent personnel changes. SOPs can indicate compliance with organizational
and governmental requirements and can be used as a part of a personnel training program, since they should provide detailed work instructions. It minimizes opportunities for miscommunication and can address safety concerns. When historical data are being evaluated for current use, SOPs can also be valuable for reconstructing project activities when no other references are available. In addition, SOPs are frequently used as checklists by inspectors when auditing procedures. Ultimately, the benefits of a valid SOP are reduced work effort, along with improved comparability, credibility, and legal defensibility.

SOPs are needed even when published methods are being utilized. For example, if an SOP is written for a standard analytical method, the SOP should specify the procedures to be followed in greater detail than appear in the published method. It also should detail how, if at all, the SOP differs from the standard method and any options that this organization follows. Using a correct well-written SOP can minimize such differences.

1.4 Writing Styles

SOPs should be written in a concise, step-by-step, easy-to-read format. The information presented should be unambiguous and not overly complicated. The active voice and present verb tense should be used. The term "you" should not be used, but implied. The document should not be wordy, redundant, or overly lengthy. Keep it simple and short. Information should be conveyed clearly and explicitly to remove any doubt as to what is required. Also, use a flow chart to illustrate the process being described. In addition, follow the style guide used by your organization, e.g., font size and margins.
2.0 SOP PROCESS

2.1 SOP Preparation

The organization should have a procedure in place for determining what procedures or processes need to be documented. Those SOPs should then be written by individuals knowledgeable with the activity and the organization's internal structure. These individuals are essentially subject-matter experts who actually perform the work or use the process. A team approach can be followed, especially for multi-tasked processes where the experiences of a number of individuals are critical, which also promotes “buy-in” from potential users of the SOP.

SOPs should be written with sufficient detail so that someone with limited experience with or knowledge of the procedure, but with a basic understanding, can successfully reproduce the procedure when unsupervised. The experience requirement for performing an activity should be noted in the section on personnel qualifications. For example, if a water or wastewater certification or short school course experience or additional training is required that requirement should be indicated.

2.2 SOP Review and Approval

SOPs should be reviewed (that is, validated) by one or more individuals with appropriate training and experience with the process. It is especially helpful if draft SOPs are actually tested by individuals other than the original writer before the SOPs are finalized.

The finalized SOPs should be approved as described in the organization’s Assistant Public Works Director/Operations Manager or the Assistant Public Works Director/City Engineer or its own SOP for preparation of SOPs. Generally the immediate supervisor, such as a Water Distribution Superintendent or the City Assistant Engineer, and the organization’s Public Works Director should review and approve each SOP. Signature approval indicates that an SOP has been both reviewed and approved by management. As per the Government Paperwork Elimination Act of 1998, use of electronic signatures, as well as electronic maintenance and submission, is an acceptable substitution for paper, when practical.

2.3 Frequency of Revisions and Reviews

SOPs need to remain current to be useful. Therefore, whenever procedures are changed, SOPs should be updated and re-approved. If desired, modify only the pertinent section of an SOP and indicate the change date/revision number for that section in the Table of Contents and the document control notation.

SOPs should be also systematically reviewed on a periodic basis, e.g. every 1-2 years, to ensure that the policies and procedures remain current and appropriate, or to determine whether the SOPs are even needed. The review date should be added to each SOP that has been reviewed. If an SOP describes a process that is no longer followed, it should be withdrawn from the current file and archived.

The review process should not be overly cumbersome to encourage timely review. The frequency of review should be indicated by management in the organization’s Executive Management Team.
Plan. That plan should also indicate the individual(s) responsible for ensuring that SOPs are current.

2.4 Checklists

Many activities use checklists to ensure that steps are followed in order. Checklists are also used to document completed actions. Any checklists or forms included as part of an activity should be referenced at the points in the procedure where they are to be used and then attached to the SOP.

In some cases, detailed checklists are prepared specifically for a given activity. In those cases, the SOP should describe, at least generally, how the checklist is to be prepared, or on what it is to be based. Copies of specific checklists should be then maintained in the file with the activity results and/or with the SOP.

Remember that the checklist is not the SOP, but a part of the SOP.

2.5 Document Control

Each organization should develop a numbering system to systematically identify and label their SOPs, and the document control should be described in its Quality Management Plan. Generally, each page of an SOP should have control documentation notation, similar to that illustrated below. A short title and identification (ID) number can serve as a reference designation. The revision number and date are very useful in identifying the SOP in use when reviewing historical data and is critical when the need for evidentiary records is involved and when the activity is being reviewed. When the number of pages is indicated, the user can quickly check if the SOP is complete. Generally this type of document control notation is located in the:

```
Left Hand Corner                Right Hand Corner
SOP #                          SOP Title
Rev. Date                      File address
Bottom of Page                 Page # of #
```

2.6 SOP Document Tracking and Archival

The organization should maintain a master list of all SOPs. This file or database should indicate the SOP number, version number, date of issuance, title, author, status, organizational division, branch, section, and any historical information regarding past versions. The QA Manager (or designee) is generally the individual responsible for maintaining a file listing all current quality-related SOPs used within the organization. If an electronic database is used, automatic “Review SOP” notices can be sent. Note that this list may be used also when audits are being considered or when questions are raised as to practices being followed within the organization.
As noted above in Section 2.3, the Quality Management Plan should indicate the individual(s) responsible for assuring that only the current version is used. That plan should also designate where, and how, outdated versions are to be maintained or archived in a manner to prevent their continued use, as well as to be available for historical data review.

Electronic storage and retrieval mechanisms are usually easier to access than a hard-copy document format. For the user, electronic access can be limited to a read-only format, thereby protecting against unauthorized changes made to the document.
3.0 SOP GENERAL FORMAT

SOPs should be organized to ensure ease and efficiency in use and to be specific to the organization which develops it. There is no one “correct” format; and internal formatting will vary with each organization and with the type of SOP being written. Where possible break the information into a series of logical steps to avoid a long list. The level of detail provided in the SOP may differ based on, e.g., whether the process is critical, the frequency of that procedure being followed, the number of people who will use the SOP, and where training is not routinely available. A generalized format is discussed next.

3.1 Title Page

The first page or cover page of each SOP should contain the following information: a title that clearly identifies the activity or procedure, an SOP identification (ID) number, date of issue and/or revision, the name of the applicable agency, division, and/or branch to which this SOP applies, and the signatures and signature dates of those individuals who prepared and approved the SOP. Electronic signatures are acceptable for SOPs maintained on a computerized database.

3.2 Table of Contents

A Table of Contents may be needed for quick reference, especially if the SOP is long, for locating information and to denote changes or revisions made only to certain sections of an SOP.

3.3 Text

Well-written SOPs should first briefly describe the purpose of the work or process, including any regulatory information or standards that are appropriate to the SOP process, and the scope to indicate what is covered. Define any specialized or unusual terms either in a separate definition section or in the appropriate discussion section. Denote what sequential procedures should be followed, divided into significant sections; e.g., possible interferences, equipment needed, personnel qualifications, and safety considerations (preferably listed in bold to capture the attention of the user). Finally, describe next all appropriate QA and quality control (QC) activities for that procedure, and list any cited or significant references.

As noted above, SOPs should be clearly worded so as to be readily understandable by a person knowledgeable with the general concept of the procedure, and the procedures should be written in a format that clearly describes the steps in order. Use of diagrams and flow charts help to break up long sections of text and to briefly summarize a series of steps for the reader.

Attach any appropriate information, e.g., an SOP may reference other SOPs. In such a case, the following should be included:

1. Cite the other SOP and attach a copy, or reference where it may be easily located.
2. If the referenced SOP is not to be followed exactly, the required modification should be specified in the SOP at the section where the other SOP is cited.
More information on text is contained in Section 4.1 for Technical SOPs and Section 4.2 for Administrative SOPs.
4.0 TYPES OF SOPs

SOPs may be written for any repetitive technical activity, as well as for any administrative or functional programmatic procedure, that is being followed within an organization. General guidance for preparing both technical and administrative SOPs follows and examples of each are located in the Appendix.

4.1 Guidelines for Technical SOP Text

Technical SOPs can be written for a wide variety of activities. Examples are SOPs instructing the user how to perform a specific analytical method to be followed in the laboratory or field (such as field testing of water or wastewater), or how to collect a sample in order to preserve the sample integrity and representativeness (such as collection of samples for future analysis of volatile organic compounds or trace metals), or how to conduct an inspection on a job site. Technical SOPs are also needed to cover activities such as data processing and evaluation (including verification and validation), modeling, risk assessment, and auditing of equipment operation.

Citing published methods in SOPs is not always acceptable, because cited published methods may not contain pertinent information for conducting the procedure-in-house. Technical SOPs need to include the specific steps aimed at initiating, coordinating, and recording and/or reporting the results of the activity, and should be tailored only to that activity. Technical SOPs should fit within the framework presented here, but this format can be modified, reduced, or expanded as required. Examples of technical SOPs are located in the Appendices A, B, and C.

Side note that each program’s first SOP should be about how that program fills out SOP’s.

In general, technical SOPs will consist of five elements: Title page, Table of Contents, Procedures, Quality Assurance/Quality Control, and References:

Title Page - See Section 3.1.

Table of Contents - See Section 3.2.

1. Procedures - The following are topics that may be appropriate for inclusion in technical SOPs. Not all will apply to every procedure or work process being detailed.

   a. Procedure: (describing the purpose of the process or procedure and any organization or regulatory requirements, as well as any limits to the use of the procedure),

   b. Summary of Method (briefly summarizing the procedure),

   c. Definitions (identifying any acronyms, abbreviations, or specialized terms used),
d. Health & Safety Warnings (indicating operations that could result in personal injury or loss of life and explaining what will happen if the procedure is not followed or is followed incorrectly; listed here and at the critical steps in the procedure),

e. Cautions (indicating activities that could result in equipment damage, degradation of sample, or possible invalidation of results; listed here and at the critical steps in the procedure),

f. Interferences (describing any component of the process that may interfere with the accuracy of the final product),

g. Personnel Qualifications/Responsibilities (denoting the minimal experience the user should have to complete the task satisfactorily, and citing any applicable requirements, like certification or “inherently governmental function”),

h. Equipment and Supplies (listing and specifying, where necessary, equipment, materials, reagents, chemical standards, and biological specimens),

i. Procedure (identifying all pertinent steps, in order, and the materials needed to accomplish the procedure such as:

- Instrument or Method Calibration and Standardization
- Sample Collection
- Sample Handling and Preservation
- Sample Preparation and Analysis (such as extraction, digestion, analysis, identification, and counting procedures)
- Troubleshooting
- Data Acquisition, Calculations & Data Reduction Requirements (such as listing any mathematical steps to be followed)
- Computer Hardware & Software (used to store field sampling records, manipulate analytical results, and/or report data), and

j. Data and Records Management (e.g., identifying any calculations to be performed, forms to be used, reports to be written, and data and record storage information).

2. Quality Control and Quality Assurance Section - QC activities are designed to allow self-verification of the quality and consistency of the work. Describe the preparation of appropriate QC procedures (self-checks, such as calibrations, recounting, reidentification) and QC material (such as blanks - reinstate, trip, field, or method; replicates; splits; spikes; and performance evaluation samples) that are required to demonstrate successful performance of the method. Specific criteria for each should be included. Describe the frequency of required calibration and QC checks and discuss the rationale for decisions. Describe the limits/criteria for QC data/results and actions required when QC data exceed
QC limits or appears in the warning zone. Describe the procedures for reporting QC data and results.

3. Reference Section - Documents or procedures that interface with the SOP should be fully referenced (including version), such as related SOPs, published literature, or methods manuals. Citations cannot substitute for the description of the method being followed in the organization. Attach any that are not readily available.

4.2 Guidelines for Administrative or Fundamental Programmatic SOP Text

As with the technical SOPs, these SOPs can be written for a wide variety of activities, e.g., reviewing documentation such as contracts, QA Project Plans and Quality Management Plans; inspecting (auditing) the work of others; determining organizational training needs; developing information on records maintenance; validating data packages; or describing office correspondence procedures. Administrative SOPs need to include a number of specific steps aimed at initiating the activity, coordinating the activity, and recording and/or reporting the results of the activity, tailored to that activity. For example, audit or assessment SOPs should specify the authority for the assessment, how auditees are to be selected, what will be done with the results, and who is responsible for corrective action. Administrative SOPs should fit within the framework presented here, but this format can be modified, reduced, or expanded. An example of administrative SOPs can be found in Appendix C.

In general, administrative/programmatic SOPs will consist of five elements: Title page, Table of Contents, Purpose, Procedures, Quality Assurance/Quality Control, and References.

Title Page - See Section 3.1.

Table of Contents - See Section 3.2.

1. Procedures - The following are topics that may be appropriate for inclusion in administrative SOPs:

   a. Purpose – (identifying the intended use of the process)
   
   b. Applicability/Scope (identifying when the procedure is to be followed),
   
   c. Summary of Procedure,
   
   d. Definitions (defining any words, phrases, or acronyms having special meaning or application),
   
   e. Personal Qualifications/Responsibilities (identifying any special qualifications users should have such as certification or training experience and/or any individual or positions having responsibility for the activity being described),
   
   f. Procedure,
g. Criteria, checklists, or other standards that are to be applied during the procedure such as citing this document as guidance for reviewing SOPs), and

h. Records Management (specifically, e.g., as forms to be used and locations of files).

2. Quality Control and Quality Assurance Section - Describe any control steps and provisions for review or oversight prior to acceptance of the product or deliverable. This can include test plans such as verification and validation plans for software or running a “spell-check” program on the finished document.

3. Reference Section - Cite all references noted in the body of the SOP. A copy of any cited references not readily available should be attached to the SOP.
5.0 EXAMPLE SOPS

Example SOPS can be found in Appendices A-E. These examples are not purported to be perfect or complete in content, nor is their use endorsed or recommended. They are provided merely to illustrate application of SOP format to technical and administrative subjects. They should not be cited or followed as actual procedure specification or guidance. Attachments cited by the individual examples are not included.
6.0 REFERENCES


# Revision and Creation of Standard Operating Procedures (SOP’s)

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<td>Purpose:</td>
<td>Establish a consistent policy and procedure for revision and creation of the NPDES Laboratory standard operating procedures. Development and revision of the laboratory procedures will be performed by the Laboratory Technicians &amp; Laboratory Supervisor. The EMS Team including the EMS Coordinator may be asked to review procedures or provide input.</td>
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<td>Revision date / By:</td>
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**Emergency Contact:** Laboratory Supervisor, EMS Team

**Reference:**
- Manual of Good Practice – Main Laboratory Library
- Albany WWTP DEQ Permit – Main Laboratory Files

**Equipment Needed:** Computer, printer, paper, SOP’s
Procedure:

1. The need for revision and creation of the laboratory procedures will be determined by staff that routinely uses the procedures, including primarily the Laboratory Technicians. Input may also be received on the laboratory procedures from Wastewater Treatment Plant Operations or Maintenance staff, or the Environmental Services staff. Possible triggers to revise or create procedures include:
   a. Change in Federal or State regulations.
   b. Change in Standard Methods procedures.
   c. Follow up on a nonconformance found in an internal audit, a third party audit or a laboratory audit.
   d. Need to improve a procedure that is not meeting the needs of the laboratory. This could be from new equipment or a change in existing equipment.

2. To ensure that the laboratory procedures are kept up to date, periodic reviews will be performed at least annually, and will be completed prior to May 1.

3. The Laboratory Technicians will draft changes to the laboratory procedure.

4. The draft revised or created procedure will be routed to the Laboratory Supervisor for review. The Laboratory Supervisor will determine if review is needed by other staff involved in the wastewater or biosolids value chain.

5. If the revised or created procedure has the potential to affect another work group, including Wastewater Treatment Plant Operations or Maintenance staff, or the Environmental Services staff, a copy of the revised or created procedure will be routed to the affected work group.

6. Comments, edits, and/or recommendations from the above sources will be reviewed by the author(s) of the procedure and the Laboratory Supervisor, and further changes will be made to the procedure as appropriate. The Laboratory Supervisor will have final approval of the procedure.

7. The revised document will be forwarded to the Administrative staff for form review and incorporation into the appropriate program’s Procedures Manual.

8. If the revised or created procedure has ripple effects on other procedures or EMS elements, these documents must be reviewed and changed as needed.
9. The SOPs will be summarized in the SOP Control List that can be found in the front of the SOP notebook. The Control List should list the SOP title, SOP number, and current revision date.

10. The effective date for each procedure is the date the procedure was revised. This date must be listed as the Revision Date in the header of the SOP and as the date in the SOP Control List.

11. To avoid confusion regarding location of current versions of the laboratory procedures, the following storage locations are defined. Once the approval procedure is complete, current revised SOPs are limited to the following locations:

   **Laboratory SOPs:**
   - Hard copy (1) Laboratory Library
   - Electronic copy (1) G:\SEWER\WWTP\LAB\LabProcedures

   Hard copies of superseded procedures will be filed in archive files, clearly labeled and retained for duration consistent with EMS Element 12, Table 12-1.

   **Training:**

   Training regarding any revised SOP will include review of the SOP and testing of the revised procedure, including use of any equipment specified in the procedure. Safety issues and any equipment needed for safety must be considered. Training must be conducted consistent with the Biosolids EMS Element #8.
Determination of pH

**SOP Number:** LAB-007

**Version Number:** 3

**Scope:** Covers the testing procedure for pH in wastewater samples. Plant operations, lab testing, DMR reporting.

**Purpose:**

- Plant operations, lab testing, DMR reporting.

**Responsibility:** Laboratory Technician

**Frequency:** As needed

**Effective Date:** Last Revision Date – Supersedes all previous versions

**Revision date / By:** June, 2007 / SW

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**Emergency Contact:** Laboratory Group, Laboratory Supervisor

**Reference:** Standard Methods 20th edition

**Equipment Needed:**

- Beckman PHI 40 pH Meter; Beckman STAR pH electrode; Beckman Electrode Filling & Storage Solution 1M KCL #598943; certified pH 4, pH 7 and pH 10 buffers, 100ml plastic beakers; 400ml glass beaker, stir bar, wash bottle with laboratory DI water.
1.0 SAMPLING AND STORAGE

1.1 Samples for DMR reporting. Samples can be taken in 100ml plastic or glass bottles. Grab samples of effluent are taken and analyzed within 15 minutes of sampling. No storage required.

1.2 Samples for other testing. Refer to the specific SOP for which you are being required to check the pH.

2.0 SAFETY

2.1 General Laboratory Safety. All laboratory testing should be carried out while wearing eye protection, lab coat or apron, and gloves. Technician should know the location and use of the eye wash, safety shower and chemical spill clean up materials. Technician should be familiar with appropriate MSDS’s.

3.0 REAGENTS & STANDARDS

3.1 General Reagents. VWR pH 4.00, buffer solution red; VWR pH 7.00 buffer solution yellow; VWR pH 10.00 buffer solution blue, or equivalent NIST traceable buffer solutions.

4.0 CALIBRATION/STANDARDIZATION

4.1 Fill one each 100ml plastic beakers half to three quarters full with the pH 4 and pH 10 buffers. Add a small stir bar to each. Use a fresh aliquot of buffer daily.

4.2 Remove electrode from the storage solution, rinse with DI water and blot dry with a tissue. Remove rubber plug from electrode filling hole.

4.3 Place the electrode into the beaker containing the pH 4 buffer. This is Std 1. Provide moderate stirring by turning the stir plate between 2 and 3.

4.4 Press the AUTO button to place the meter in auto mode. The word AUTO should light up on the display.

4.5 Press the calibrate button. The meter should flash ‘4.0 STD 1’ while equilibrating. The meter will ping when done.

4.6 Record the pH value and temperature.
4.7 Repeat steps 4.2 – 4.6 for the pH 10 buffer solution. This is STD 2.

4.8 Meter is now calibrated.

5.0 PROCEDURE

5.1 Calibrate the meter as per section 4.0.

5.2 Check meter calibration by using the pH 7.00 buffer. Fill a 100ml plastic beaker half to three quarters full with the pH 7 buffer. Add a stir bar to the sample and place beaker on the stir plate. Provide moderate stirring.

5.3 Rinse pH probe with DI water and place in the pH 7 buffer solution.

5.4 If necessary, press the AUTO button to place the meter in auto mode. The word AUTO should light up on the display.

5.5 Press the pH button. The meter should flash ‘AUTO’ while equilibrating. The meter will ping when done.

5.6 Record the reading on lab bench sheet if necessary. A value of 6.90 – 7.10 indicates the meter’s calibration is acceptable.

5.7 Fill a 100ml beaker with 60 – 80ml of sample. Add a stir bar to the sample and place beaker on the stir plate. Provide moderate stirring.

5.8 Remove pH probe from buffer solution, rinse with DI water and blot dry. Immerse the probe in the sample.
5.9 Press the pH button. The meter should flash ‘AUTO’ while equilibrating. The meter will ping when done.

5.10 Record pH value and temperature on the appropriate bench sheet. Continue with next sample rinsing electrode between each sample.

5.11 After the last sample, rinse electrode with DI water, place electrode in storage solution and replace rubber plug over inner solution filling hole.

6.0 MAINTENANCE

6.1 Replenish inner electrode solution as necessary. Do not just top off solution. Empty, rinse and completely refill when electrode body is less than half full.

6.2 Store pH electrode in electrode filling and storage solution in between uses.

6.3 pH meter is inspected annually against manufacturer’s specifications.

7.0 QUALITY ASSURANCE/QUALITY CONTROL

7.1 Dispense fresh aliquot of buffer daily. Use only buffer solutions that are within their stated shelf life.

7.2 Buffer pH 10 reading must be within +/- 0.1 SU when calibrating. Buffer pH 7.0 check must be within +/- 0.1 SU.

7.3 Check the meter temperature probe annually with an NIST traceable thermometer.

8.0 CORRECTIVE ACTION

8.1 Calibration fails or buffers outside +/- 1 SU limits: Repeat calibration with fresh aliquot of buffer.

8.2 Replace electrode inner body solution. Recalibrate.
8.3 Consult manufacturer’s manual to clean electrode, recalibrate.

8.4 Replace electrode.

9.0 CALCULATIONS None.

10.0 WASTE MANAGEMENT

10.1 Reagent disposal. Buffers are not hazardous and can be disposed down the sink.

10.2 Sample disposal. Industrial samples or any other sample with a pH <2.0 or > 12.5 are hazardous and need special disposal arranged. Contact Laboratory Technician or Environmental Services.

11.0 REFERENCES


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