MINNESOTA POLLUTION CONTROL AGENCY
520 Lafayette Road North, St. Paul, Minnesota 55155-4194

Toxic Substances Control Act Polychlorinated Biphenyl Inspection Program Quality Assurance Program Plan

March 2018
Revision 6

Section A.1: Approvals

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Section A.2: Table of Contents

Section A.2: Table of Contents (Continued)

Section A.3: Distribution List

The listed individuals will receive copies of the approved QAPP and subsequent revisions, if applicable:

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Section A.4: Program Organization and Responsibility

Under the Toxics Substances Control Act (TSCA), the EPA Administrator has promulgated regulations that govern the labeling, processing, distribution, and disposal of PCBs. The MPCA (as part of an Environmental Performance Partnership Agreement) is allowed to conduct TSCA PCB inspections as a representative of the U.S. EPA. The PCB compliance program may require both field sampling and laboratory analyses. The MPCA will conduct program management and field sampling while Pace Analytical Services Laboratories will conduct analytical work. The most recent MPCA organizational charts appear on this webpage - http://www.pca.state.mn.us/index.php/about-mpca/mpca-overview/agency-structure/mpca-organization.html.

The staff persons responsible for the TSCA program throughout the state are as stated. Sarah Kilgriff, the MPCA PCB Compliance Program Manager, will be responsible for overall management of the PCB compliance program. John Elling, the MPCA PCB Supervisor, will coordinate all daily activities. Joshua Burman is the MPCA TSCA inspector for the southern district. The MPCA TSCA Inspector for the northern district is an open position and will be filled with qualified staff. William Scruton is the MPCA QA Coordinator for the PCB compliance program. The Pace General Manager is Sarah Cherney. The Pace Project Manager is Chris Bremer. The Pace Quality Assurance Manager is Melanie Ollila. The Pace Quality Assurance Manual and Standard Operating Procedure (SOP) specific to the MPCA compliance program are included as Attachment 1 and 2, respectively.

Section A.4.1: The MPCA Program Manager

The MPCA PCB Compliance Program Manager will:

- Provide administrative direction to assigned staff and to the MPCA QA coordinator as needed.
- Serve as primary contact with the EPA and manage the cooperative agreement and budget to assure that goals are met and funds and resources are responsibly allocated.
- Prepare an annual program summary to include samples analyzed, problems encountered regarding QA/QC, and recommended changes in procedures.
- Provide direct supervision and project assignment to assigned staff.
- Provide technical direction for the preparation of work plans and the tasks to be performed.
- Conduct annual performance appraisals of assigned staff specific to their position description relating to the PCB compliance program.

Section A.4.2: MPCA QA Coordinator

The MPCA QA Coordinator will:

- Represent the MPCA with the contractor(s) ensuring adequate exchange of information regarding program responsibilities and effective functioning of the analytical program.
- Coordinate the daily activities associated with the management of the contract with Pace regarding analytical and support services.
- Coordinate analytical needs and projections, analytical data reports from the contractor, and resolution of problems arising from contract provisions with the laboratory and MPCA staff.
- Notify the contractor of updates and changes in analytical techniques or requirements of federal and state regulatory programs.
- Maintain a sample tracking system with the program coordinator to see sample analyses are completed in a timely manner and are completed within recommended holding times.
- Review invoices to ensure proper billing for services provided by the contractor(s).
- Update and distribute the PCB compliance program QAPP when deemed necessary with rule, statue, policy, procedure, technology changes, or when EPA approval expires.
- Provide an overview to the Program Manager of analytical results and quality control data to ensure the laboratory has met program requirements.

Section A.4.3: MPCA PCB Supervisor

The MPCA PCB Supervisor will:

- Provide technical representation at meetings.
- Provide direction for sampling requirements.
- Prepare reports.

Section A.4.4: The Laboratory General Manager

The laboratory General Manager is:

- Responsible for all analytical work.
- Responsible for all staff and facilities.
- Responsible for the QA function (QA Manager reports directly to him/her).

Section A.4.5: The Laboratory Project Manager

The laboratory Project Manager will:

- Coordinates the PCB analytical work performed for MPCA and EPA.
- Discuss with the MPCA Program Manager issues related to the analysis or coordination of the TSCA samples.
- Reviews and releases the PCB data (along with the associated quality assurance data) sent to the MPCA. The following positions are the only approved signatories for Pace's final analytical reports: Senior General Manager, General Manager, Quality Manager, Client Services Manager, Project Manager, and Project Coordinator.

Section A.4.6: The Laboratory Quality Manager

The Quality Manager will:

- Oversee the QA program within the laboratory including data review.
- Reports any deviations from the Pace QAM or SOPs to the MPCA QA Coordinator.
- Conduct internal audits.
- Updates SOPs and the QAM with MPCA as required.

Section A.4.7: The Laboratory Staff

The laboratory staff will:

- Perform all analytical work in accordance with the laboratory's current Standard Operating Procedures and Quality Assurance Manual (see Attachments 1 and 2). The primary analyst is responsible for the initial data reduction and review, verifying the calculations, narrating discrepancies, and reporting the analytical data into the Laboratory Information Management System (LIMS).
- Pre-qualified secondary reviewers are assigned the responsibility for checking 100% of the data packages for the use of the proper methodology and report limits, compliance with quality control criteria, completeness of required deliverables, accuracy of the data quantitation, and verifying the data that was entered into the LIMS.
- Perform assigned work functions that are pertinent to and within each individual's knowledge, experience, and training.

Section A.5: Definition/Background

PCB inspections are conducted to determine if PCB-containing material is regulated under TSCA. PCB inspections are also conducted to determine if a facility's use, handling, storage, and disposal practices comply with the PCB Disposal and Marking Regulations, 40 CFR 761, published May 31, 1979 and as amended. Significant amendments were published in the June 29, 1998 Federal Register (effective August 28, 1998) for the disposal of PCBs. During inspections, samples should be taken from a representative area of every uncontrolled discharge of a known or suspected PCB source unless sampling is physically impossible or unsafe. Sampling is performed whenever suspected PCB material is involved in a potential noncompliance (i.e. a leaking mineral oil transformer of unknown PCB concentration). During oversight of PCB remediation activities, samples are collected at the MPCA's discretion to verify compliance with regulatory cleanup levels, or "Action Levels" which are set in the Data Quality Objective (DQO) process (see Section A.7 and Appendix 2).

Section A.6: Program Description

Section A.6.1: Objective

Polychlorinated Biphenyls (PCBs) are sampled/determined in support of Toxic Substance Control Act (TSCA) inspections for the regulated use, storage, and disposal of PCBs (40 CFR 761). Polychlorinated Biphenyls, as total PCBs, are to be measured in a variety of sample types such as soil, solids, oil, electrical transformer fluid, water, wipes, etc. Total PCBs are to be identified/quantified, either based on the formulation (ex. Aroclors) of PCBs present in the material analyzed, or based on comparison with individual PCB congener standards, whichever is appropriate. Certain sections of current regulations (40 CFR 761) mandate total PCBs are to be tested by Method 8082 when Aroclor formulations are present, after sample preparation of any solid matrix by Methods 3500, 3540, or 3550.

Section A.6.2: Scope

The objective of the MPCA's Polychlorinated Biphenyl (PCB) compliance program is to reduce the exposure and threat of PCBs to human health and the environment through compliance assistance, compliance incentives, and enforcement. Implement phase down of PCBs in the Lake Superior Basin. Strategies include (1) compliance assistance to promote understanding of environmental regulations; (2) offer incentives that encourage facilities to identify violations; (3) monitor compliance through inspections and investigations; and (4) conduct civil and criminal enforcement actions to correct violations and deter future noncompliance. The MPCA will strive for the performance objectives set forth in the Environmental Performance Partnership Agreement (EnPPA) between the U.S. Environmental Protection Agency (EPA) Region 5 and the MPCA. As part of the overall program, oil, soil, water and wipe samples may be collected and analyzed. To assure the quality of the data, the EPA has required the MPCA to develop a Quality Assurance Program Plan (QAPP). The objective of the QAPP is to define the Quality Assurance and Quality Control (QA/QC) procedures to be followed for the collection, transportation, and analysis of PCB samples to assure precision and accuracy. The Quality Assurance Program Plan is reviewed and approved by Region 5.

Section A.6.3: Purpose/Background

Since 1988, the MPCA has been authorized under a cooperative agreement with the EPA, Region 5, to conduct TSCA PCB inspections in the State of Minnesota as representatives of the U.S. EPA. Inspections are conducted to determine whether a facility's handling, storage, and disposal practices comply with the PCB regulations 40 CFR Part 761. The QAPP supports the scope of the PCB program for sampling and analysis under the cooperative agreement.

Section A.6.4: Inspections

Sections 11(a) and (b) of TSCA provide authority for conducting inspections to monitor compliance. Any facility, in which chemical substances are manufactured, processed, stored, or distributed are subject to inspection under TSCA. Inspections may include review of any item related to compliance with TSCA, including records, files, papers, processes, controls, and facilities. Samples, as well as photographs, may be taken to carry out the inspection. The purpose of an inspection is to ensure compliance with TSCA. The inspection effort may result in the collection of samples to determine whether a release of PCBs has occurred or to determine the level of contamination at a site when a release has already been confirmed. Soil, water, oil, and wipe samples may be collected in order to make such determinations.

Section A.6.4.1: Inspection Targeting

The identification of candidates for PCB inspections within the State of Minnesota varies from year to year based on the number of PCB users, the inspection plan negotiated with U.S. EPA, information received via citizen's complaints, and other salient information. The Neutral Inspection Scheme is employed when possible, with an effort toward conducting inspections among a variety of industry types, including industries identified by the MPCA and/ or by the U.S. EPA as having historical or potential environmental problems, such as scrap-yards and white-goods recyclers. Other industries or locations, which the MPCA considers a priority, include general manufacturing, electrical equipment and utilities, chemical, food and feed, government, commercial buildings, and disposal facilities.

Targeting of inspections is also geographically based, with an effort made to conduct inspections across the northern, southern, and metropolitan areas of the state. Additionally, inspections are conducted in areas thought to be at greater environmental risk from PCBs, including the Lake Superior watershed.

Other considerations for the identification of inspection candidates, and instances of application of sampling events, were the reporting of spills to the MPCA, presence of abandoned electrical and oil-filled equipment, equipment of unknown PCB concentration in general, and improper disposal of PCBs (i.e. burning, dumping, use constituting disposal, etc.).

Section A.6.4.2: Inspection Preparation

The EPA has issued MPCA inspectors TSCA Inspector credentials after having completed all required training, certification, and recertification following EPA Orders 3500.1 and 1440.2, as amended. Preplanning is conducted for all PCB inspections, including a review of MPCA records, confidential business information, the preparation of documents, and the preparation of equipment. Equipment used included both safety and sampling equipment.

Sampling equipment review included a checklist for all necessary equipment, visual observation of the condition of sampling devices and containers, presence of labeling and chain of custody forms, and general review of numbers and types of each.

Section A.6.4.3: Conducting the Inspection

Each PCB inspection is conducted in accordance with the statutory requirements of TSCA and the directives provided via the U.S. EPA's TSCA Inspection Manual (see Section D.3, Reference 5). The inspection process includes the presentation of proper credentials and the inspection is conducted during normal working hours. Formal inspection paperwork is presented to the inspectee, including both the Notice of Inspection and Confidentiality Notice. A Receipt for Samples and Documents is completed and presented to the inspectee whenever samples are collected and/or documents or photographs are taken as part of the inspection process.

Inspections include a review of any potential PCB containing equipment in use or storage at the facility. The inspector, upon learning of the status of PCB or PCB contaminated equipment at the facility, investigates any PCB rules applicable to those items, including use and authorization, marking, storage, and record keeping requirements.

The inspection also includes a review of past disposal activities involving PCB or suspected PCB containing wastes. This includes the review of pertinent records, shipping manifests, testing records, Annual Document Logs, Certificates of Destruction, or any other records that provide information about the fate of such wastes.

Sampling is conducted during an inspection to identify the contents of any unknown equipment, the presence of PCBs in any released material or waste, or to confirm information provided by the facility. Sampling techniques include wipe samples, oil sampling, soil samples, and water samples. Each is utilized as appropriate, per the discretion of the inspector. Generally, wipe samples are used to identify the presence of PCBs in oils released onto the surfaces of equipment or other nonporous surfaces. Oil samples are drawn from equipment suspected of having PCBs present such as electrical and hydraulic equipment or to confirm information provided by the facility. Soil sampling are utilized when releases of oils or other potentially PCB containing wastes to the soil have occurred. In all instances, analytical results of the sampling provide further information to the U.S. EPA to establish the compliance of the facility with PCB rules under TSCA.

Section A.6.4.4: Analytical Samples

The samples are brought under chain of custody procedures to Pace Analytical Services, Inc. (hereafter referred to as Pace). The samples are labeled to allow identification of each sample specific to where on site the sample was taken. The sampler identifies the type of sample and the action level upon the chain of custody. This information allows the laboratory to use proper methods that bracket the action level when analyzing these samples.

The following table gives the general guidance of action levels for sampling at TSCA sites:

Table 1: TSCA PCB Action Levels by Matrix

Sample Type	Common Applicable TSCA PCB Action Levels*
Soils	50, 25, 10, and 1 ppm
Sediments	50 ppm **
Oil (Electrical Fluids)	50 ppm
Oil, Used	2-50 ***, 50 ppm
Water	3 and 0.5 µg/l
Wipes	10 µg/100 cm^2

* - Other PCB Action Levels exist for Oil (Electrical Fluids) (500 ppm), Sediments (100 ppm), and Wipes (100 µg/cm^2), but these are not as frequently used as above Levels.

** - TSCA regulates sediments if >50 ppm PCBs; however, other non-TSCA regulations or water quality criteria/standards may apply to sediment concentrations <50 ppm PCBs.

***- Used oil has TSCA regulated uses if PCBs are present in excess of a regulatory reporting limit of 2 ppm, but less than 50 ppm. A TSCA Action Level of 50 ppm PCBs exists for used oil, as well as a regulated concentration range of 2-50 ppm PCBs. PCBs should be measured down to 2 ppm (or less) in used oil.

NOTE: PCBs will be reported on a dry weight basis whenever applicable.

The actual action limit to be used is dependent on the risk associated with the sample. For example, if a soil sample is analyzed for PCBs in a residential area where children could be exposed to the soil, a lower action limit is used versus an industrial setting. The TSCA inspector in compliance with federal and state regulations determines the action level. The suspected level of PCBs (when known) will be written on the COC. The action level is also written on the Chain of Custody (COC) to allow the laboratory to have this level within the calibration curve of the gas chromatograph.

There are instances when TSCA does regulate materials at any detectable PCB concentration. These are:

- Dilution of regulated PCBs
- Imported PCBs or PCB items
- Waste oil used as a sealant, coating, dust control, road oil, rust preventative, or pesticide/herbicide carrier

In these cases, laboratory trace methods for analysis of PCBs will be used (see Pace Analytical Services Standard Operating Procedure for analysis of PCBs contained in Attachment 2).

When samples arrive at the laboratory that are multiphase (and the phase cannot be mixed or are immiscible), then the laboratory samples and analyzes each phase separately. The laboratory also reports each of these phases separately on the analytical report for evaluation by the TSCA Inspector. Whenever possible, the TSCA Inspector identifies on the chain of custody form the samples that are multiphase and/or whenever a sample requires the reporting of analytical results on a dry weight basis.

Section A.6.5: Laboratory and Analytical Development Activities

The MPCA has contracted with Pace Analytical Services for TSCA work. Should these services change, the MPCA will provide the U.S. EPA, Region 5, for review and comment, a modified QAPP indicating proposed changes and including any updated operating procedures. Pace Analytical Services Laboratory Quality Assurance Manual and PCB SOP are attached (Attachment 1 and 2 respectively).

The wide variety of field situations makes specifying exact numbers and types of samples that may be collected impossible. Sampling efforts have traditionally been dependent on the types of PCB-related cases that have been encountered.

Section A.6.6: Intended Data Usage

The data is used to determine:

- Whether a facility has incorporated proper handling, record-keeping, and disposal procedures within its operations;
- Whether a release has in fact occurred at a site;
- The extent and magnitude of contamination at a site;
- The quality of data generated by responsible parties (through the use of split sampling);
- Appropriate disposal of contaminated soils during site remediation activities; and
- The potential and/or immediate public health risks associated with a site or facility.

Section A.6.7: Annual Report

The MPCA prepares an annual report at the end of each federal fiscal year. The annual report will include a QA/QC evaluation of the laboratory data generated for the program and a progress report comparing current conditions to the goals established in the EnPPA.

The annual report will be distributed to the appropriate MPCA staff and to the U.S. EPA Region 5 Project Manager.

Section A.7: Quality Assurance Objectives and Criteria

Section A.7.1: Overview

The Data Quality Objectives (DQOs) for TSCA work is determined by the site requirements. For example, the required limits of a matrix (for example water, see Section A.6.4.4) and site requirements (such as residential) will determine the reporting limit needed from the laboratory. This directly influences Step 3 of the DQO process by determining the limit needed. The MPCA inspectors determine the needed number of samples, the reporting limits, the level of quality from the laboratory (rush vs. standard vs. legal), the sampling locations, and the reporting requirements.

Quality assurance objectives are developed for field sampling, chain of custody, laboratory analysis and reporting (see detailed procedures in Section B.2 and B.3). Meeting these objectives will provide the MPCA with defensible information to be used:

- To identify pollutant sources;
- To determine the quality of data generated by responsible parties through the use of split samples;
- For enforcement actions; and
- For litigation if necessary.

The MPCA is responsible for field sampling and chain of custody until the laboratory accepts samples. Specific procedures to be used for sampling, quality control, audits, preventive maintenance and corrective actions are described in other sections of this document. The purpose of this section is to define quality assurance goals for precision, accuracy and completeness. Establishing these goals allows the State to judge the adequacy of the results and whether corrective actions are necessary.

The quality assurance objectives to be met for both field operations and laboratory activities are discussed below. (A more specific discussion of quality control checks to be followed by Pace are included in Attachment 1.)

Laboratory reports include the date of sampling, the date of analysis, the signed Chain of Custody form, a narrative of the analysis that notes items that are outside the laboratory QC limits, and the analytical results for the collected sample. In addition to the analytical results, the reports include the percent recoveries (% R) of surrogates and the percent recoveries (% R) and relative percent differences (RPD) of laboratory control sample/laboratory control sample duplicates and matrix spike/matrix spike duplicates. An example of the Chain of Custody form is included in Attachment 3.

Section A.7.2: Blanks

A trip blank is typically utilized with the collection of samples to be analyzed for volatile hydrocarbons to determine whether contaminants are introduced into samples due to improper handling techniques or contaminants have permeated the cap of the sample vial during shipment. Volatile samples will not be collected for this program and therefore trip blanks will not be utilized for quality assurance purposes.

The samplers use field blanks as a QC check while sampling. The field blank is an empty, capped container for each sample type collected in the sampling event. The empty container is transported to the site but is not uncapped. For surface samples, a piece of swabbing material is treated with solvent and placed in the vial or bottle. The results from the field blanks should verify that the field sampling and laboratory procedures are free of contamination and do not contribute to the PCB analysis.

The laboratory uses method blanks to verify the extraction procedures, glassware, and instrument conditions have background below the laboratory reporting limits. The method blanks are reported with MPCA samples to allow the project manager to determine that laboratory contamination or analytical error could cause a false positive. The laboratory performs method blanks at a rate of one for each analytical batch of twenty samples (5%) or less to ensure a contaminant-free environment.

Section A.7.3: Duplicate Samples

As is the case for field blanks, duplicate samples are collected as necessary to protect the integrity of the sampling investigation. Duplicates are collected by alternately filling two separate sample containers from the same source for each set of parameters. Duplicate sample analyses provide a check on sampling and analytical reproducibility, or precision. For soil matrices, one duplicate is generated for each ten samples collected. The laboratory runs matrix spike and matrix spike duplicates (MS/MSD) to gain a measure of reproducibility. MPCA has a relative percent difference (RPD) goal for duplicates of 50% for soils and 30% for water.

Section A.7.4: Spike Samples

Spiked samples will not be collected in the field but MPCA does submit adequate volumes of samples to ensure the laboratory has enough sample to allow for spike and spike duplicate analyses. MPCA policy allows a maximum recovery of 150% and a minimum recovery of 30%. The laboratory uses MS/MSD recoveries to measure accuracy in the PCB analysis. Laboratory-generated limits for spike recoveries are used in validation of data (when required). Staff sampling for PCBs indicate on the COC which samples are collected for spike and spike duplicate samples. MPCA policy requires a 10% rate of spikes for environmental samples.

Section A.7.5: Laboratory Activities

The quality assurance objectives for accuracy, precision, completeness, representativeness, reporting limits, and comparability to be met by the laboratory are described in Section 11.0 of the Pace Quality Assurance Manual (QAM) in Attachment 1.

Section A.7.6: Definitions of Precision, Accuracy, Representativeness, Comparability, and Completeness

Section A.7.6.1: Precision

Where possible, laboratory precision is measured through the collection and analysis of duplicate samples. Duplicates are collected at the rate of one duplicate per ten environmental samples collected. The result for the duplicate sample is compared to the result of the known sample. The relative percent difference (RPD) between the known sample result and the duplicate sample result is calculated according to the following formula:

$$RPD = \frac{(\text{Sample Conc.} - \text{Duplicate Conc.})*200}{(\text{Sample Conc.} + \text{Duplicate Conc.})}$$

Precision can also be determined between the results of a matrix spike (MS)/matrix spike duplicate (MSD) pair or between a laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) pair. RPD results should be < 25% for water samples and < 50% for soils samples for the data to be acceptable.

Section A.7.6.2: Accuracy

The accuracy of the measurement is gauged through the analyses of surrogate spikes, matrix spike (MS)/matrix spike duplicate (MSD), and/or laboratory control sample (LCS)/laboratory control sample duplicate (LCSD). Surrogate compounds are spike into every sample prior to extraction and analysis. Where possible, MS and MSD samples are collected at the rate of one set per 20 environmental samples. If an MS/MSD pair cannot be analyzed, an LCS/LCSD pair may be used to measure accuracy. The percent recovery is determined by comparing the spiked sample concentration to the environmental (unspiked) sample concentration. The formula for determining percent recovery is as follows:

$$\%R = \frac{(\text{Spiked Sample Conc.} - \text{Environmental Sample Conc.})*100}{(\text{Spiked Concentration Added})}$$

Acceptable data falls between 30% and 150% recovery.

Section A.7.6.3: Representativeness

Representativeness of the data set is the measure that expresses the degree to which the data accurately represents the population as a whole. This issue is addressed through the sampling design. The EPA has provided guidance on choosing a sampling design (EPA QA/G-5S) in order to collect the appropriate amount of defensible data.

Section A.7.6.4: Comparability

Comparability is the degree of confidence that one data set can be compared to another data set and whether the data sets can be combined and used for decision-making purposes. The level of comparability between data sets is determined by reviewing sample collection and handling procedures, sample preparation and analytical procedures, holding times, and quality assurance protocols. When a large difference in one of the methods or procedures exists, the comparability of the data is considered low. If all of the procedures were followed, data from the same site is considered comparable.

Section A.7.6.5: Completeness

Completeness is measured by determining the ratio of valid sample results compared to the total number of results reported for a specific matrix. During data verification, the data completeness is determined by the following equation:

$$\% \text{ Complete} = \frac{(\#\text{ of Valid Results}) * 100}{(\#\text{ of Results Reported})}$$

A completeness of 90% must be obtained in order for a laboratory report to be considered acceptable. Laboratory reports that are not at least 90% complete are rejected. If the laboratory is at fault, they will be responsible for securing the re-collection and re-analysis of samples.

Section A.8: Specialized Training/Certifications

Section A.8.1: Field

Field personnel who will be working with potentially hazardous substances have 40-hour OSHA training and yearly 8-hour refresher training. Copies of this training are maintained in the MPCA QA Coordinator's Office. Inspectors have also participated in training provide by the U.S. EPA for conducting PCB inspections. Upon U.S. EPA approval, the inspectors receive the credential for conducting PCB inspections. The inspectors are also trained in specific sample collection and chain of custody procedures (see Sections B.2 and B.3). Copies of SOPs are also sent out in the field with the inspectors,

Section A.8.2: Laboratory

Laboratory personnel have been trained in proper analytical techniques. They also receive annual refresher training on such items as laboratory safety, right to know, and emergency procedures. The documentation of this training is maintained in the laboratory's QA Office.

The Minnesota Department of Health provides certification of environmental laboratories. The laboratory must maintain certification for PCB analysis in water, oil, and solid and chemical materials during the length of the project. The current certificate for the laboratory appears in Attachment 4.

Section A.9: Record Keeping

The MPCA retains sampling records from PCB inspections and investigations within the files constructed and maintained specific to each case. Sampling records include all information related to the sampling event, including date, site location, maps or diagrams of sample sites, chain of custody paperwork, and analytical results. Files for each PCB inspection are kept for five years in active files, and then are archived. In both instances, the files are retrievable.

The laboratory SOP for records retention indicates that all data documentation, records, protocols, and final reports are stored either on-site at the laboratory or off-site in secure storage. The records are retained for a period of not less than five years.

Section B: Data Generation and Acquisition

Section B.1: Sampling Design

The data derived from the analysis of samples acquired during site inspections is used as the basis for appropriate remedial action and subsequent enforcement actions. The objective of sampling is to obtain data, which will assist MPCA investigative personnel in the identification and confirmation of the release of PCB's into the environment. This information is forwarded to the U.S. EPA to further enforcement proceedings that may result from a facilities noncompliance with PCB regulations.

Section B.2: Sampling Procedures

Prior to sampling collection, field personnel coordinate with the laboratory to assure that appropriate equipment and supplies are available to meet the sampling need. Sampling techniques employed by the MPCA are appropriate for wipe, oil, water, and soil samples.

The inspector utilizes wipe samples when oils are observed on nonporous surfaces of oil-containing equipment or those surfaces that may have been exposed to PCB oils for any reason. The wipe sample is collected with a hexane solvent applied to an area of 10 X 10 cm as identified by a template of that size. A gauze pad that has been thoroughly wetted with hexane is wiped within the boundaries of the template in a horizontal, vertical, and diagonal manner so that the entire surface within the template has been wiped. The gauze is placed in a 125-mL glass jar and then tightly sealed with a Teflon cap. A label is applied to the jar that clearly identifies the sample. The label provides a specific description of the sample site. The jar is then sealed with chain of custody tape.

When the inspector suspects PCBs are present, he/she collects oil samples from containers such as drums, tanks, or tanker trucks. Additionally, equipment suspected of containing PCBs is also sampled (observing safety at all times). Oils are collected via drum pipettes and placed in 2-oz glass containers with Teflon screw caps. The containers are labeled to identify the contents and the origin of the samples. All sample containers are sealed with chain of custody tape.

Soil samples are collected during instances where oil-contaminated soils are encountered, particularly when the source of the oil is thought to be from electrical or hydraulic equipment. This sample type is the most commonly applied sampling technique employed by the MPCA PCB staff. Samples of soil are collected and placed in 250-mL glass jars, which are closed with Teflon screw caps. The jars are labeled and sealed with chain of custody tape.

When instances where large areas of oil stained soils are encountered, the inspector draws a composite sample to best represent the presence of PCBs within that area of contamination. When separate and distinct areas of soil contamination are observed, separate samples are drawn from each area. The inspector makes an effort to identify all potential sources of contamination and apply sampling efforts as appropriate. The different matrices of samples collected follow the criteria as listed in the table below. Staff makes every effort to deliver the samples to the laboratory as soon as possible using state contracted courier service if the site of collection is beyond reasonable driving distance to the laboratory, though maximum holding times are recognized below. More information about handling of samples is discussed in Section B.3 of this plan.

Table 2: Containers, Preservation Techniques and Holding Times

Matrix	Container	Preservation	Holding Times
Oil	Teflon Cap, 2-oz. Glass	Cool, ≤6° C	See Note 1
Soil	Teflon Cap, 250-mL, Glass	Cool, ≤6° C	See Note 1
Water	Teflon Cap, 1-Liter, Glass	Cool, ≤6° C	See Note 2
Wipes	Teflon Cap, 125-mL, Glass	Cool, ≤6° C	See Note 1

Note 1: Maximum of 14 days from collection to extraction and 40 days from extraction to analysis.

Note 2: Maximum of 7 days from collection to extraction and 40 days from extraction to analysis.

The current numbering system consists of four sequences. The first sequence is "PCB". The next sequence denotes the year, month, and date. The third sequence identifies the site based on the following sequential numbering system. The sequence starts with "MN", adds either a "O", "T", "R", "S", or "D", and then nine digits. The forth sequence identifies the order in which a sample was collected at the site. *(Example: The fourth sample collected on March 01, 2011 at site ID 123456789 would be numbered as 'PCB-110301-MNS123456789-004.')*

Samples are to be retained at the laboratory for evidentiary purposes until the case is closed. Sampling equipment that was used in the field to collect the samples will also be retained by the laboratory. After the case is closed, the samples and sampling equipment will be disposed of by the laboratory.

Section B.3: Sample Custody

Section B.3.1: Overview

Due to the evidentiary nature of samples collected during enforcement investigations, sample possession must be traceable from the time samples are collected until they are disposed of. To maintain and document sample possession, chain of custody (COC) procedures are followed.

Section B.3.2: Field Custody Procedures

Trained field personnel collect the samples (see Section B.1). The field personnel either have the samples in their possession, in their view, in a secured area that only they have access to, or turn custody over to another individual who has signed the chain of custody (COC) form (See Attachment 3). The COC is the record of all individuals who come in contact with the samples. A copy of the chain of custody is maintained at all times to ensure the samples can be used in for enforcement. A COC has the following information present:

a. Date and time of sampling,
b. Name of sampler,
c. Identification number of the samples,
d. Analytical methods requested,
e. Information to the hazard of the sample,
f. Project name,
g. Signature of the sampler, and
f. MPCA contact name and phone number.

Sample custody is maintained when shipping samples by the chain of custody form being signed by the sampler, the samples sealed with the COC, and the samples cooled on ice (or preserved as required). The COC is double zip-locked and taped to the inside lid of the cooler (with the sampler keeping a copy of the COC). The cooler is custody taped on two corners and shipped. The sampler and the laboratory keep a copy of the bill of lading as proof of custody in shipment. Records of custody are maintained by the MPCA within the site files.

Section B.3.3: Laboratory Custody

Laboratory custody procedures are found in Section 7.0 of the Pace QAM (Attachment 1). The laboratory signs the COC when the samples are received. The laboratory verifies the COC is correctly filled out and all samples are accounted for (and not broken). Any problems that occur upon receipt of the samples will cause the sample clerk at the laboratory to immediately contact the MPCA QA Coordinator. The MPCA will decide if the samples are to be run depending on the problem. The laboratory logs in the samples into the laboratory LIMS system. The system assigns a unique number to each sample. The LIMS system generates a Sample Receipt Form (SRF) that is distributed to the client and the supervisors in the laboratory that are in charge of the specific sections that will be performing the required analyses. The login numbers are then used to track the sample at the laboratory. The laboratory stores the samples in a secure refrigerated area that maintains the samples at 4° +/- 2° C. The sample holding area is secure from unauthorized personal having access to the samples. The samples are removed by the analyst for extraction/digestion, the extraction/digestion performed, and any remaining sample placed back in the refrigerator. The laboratory disposes of the samples, except in case of very hazardous samples, which are returned to the site or lab-packed for disposal at an appropriate facility.

Section B.4: Analytical Methods

Four types of extraction methods are employed for the analysis of PCBs. Waters are extracted by a liquid-liquid extraction utilizing methods SW3510 or SW3520. Soils and sediments are extracted by utilizing EPA method SW3540 or SW3550 depending on the type of solid matrix. Oil samples are analyzed by method based on EPA-600/4-81-045. This method is not truly an extraction, but rather of a dilution method with clean-up steps included. The wipe sample method is based upon method 8701M70. This method is an extraction of the wipe with a solvent mix, concentration, cleanup and analysis. Most sample extracts will require clean up to remove sulfur or other non-target interferences. SW3660 is designed to remove sulfur from the extract while SW3665 uses sulfuric acid/permanganate to destroy other non-target interferents. All extracts are analyzed by a gas chromatograph with an electron capture detector (or with a mass spectrometer if the detected concentration is high enough) utilizing Methods SW8082 or SW8270. The SOP for PCB analysis covers these methods and is found in Attachment 2. Compound identification based on a single-column analysis should be confirmed on a second-column or by some other qualitative technique (gas chromatography/mass spectrometry (GC/MS) may be used for this confirmation).

Section B.5: Quality Control

Field and laboratory QC checks are identified in Table 3. The frequency of analysis and the control limits are also listed. If the results do not meet the QC acceptance criteria, corrective actions are defined.

Table 3: Quality Control Elements

QC Type	Soil	Water	Wipe	Oil
Blanks				
Field Blanks		X	X	
Method Blanks	X	X	X	X
Spikes				
Matrix Spike	X	X		X
Matrix Spike Duplicate	X	X		X
Laboratory Control Sample	X	X	X	X
Surrogates	X	X	X	X
Calibration Checks	X	X	X	X
Duplicates				
Field Duplicates	X	X	X	X
Laboratory Duplicates	X	X	X	X

Section B.5.1: QC Type

Section B.5.1.1: Field Blanks

Field blanks are collected to show any bias that is related to collection equipment or transport of samples from the field to the laboratory. One field blank is collected for each day's set of water or wipe samples. If there is contamination in the field blank but not in the samples, no action is required. Any positive PCB result that is associated with a positive PCB result detected in a field blank is evaluated. If the environmental sample result is less than X5 the concentration detected in the field blank, the report level is raised to the PCB concentration found in the sample. If the environmental sample result is greater than X5 the concentration found in the field blank, no qualification is necessary. However, an explanation of the rational should be provided in the narrative accompanying the report.

Section B.5.1.2: Method Blanks

One method blank is extracted and analyzed with each batch of up to 20 samples to demonstrate that there are no interferences from the glassware, reagents, and analytical system. PCB's should not be present in the method blank at ½ the report level concentration. If any method blank shows PCB contamination above ½ the report level, a solvent blank should be injected to demonstrate that there was no carry-over from standards or samples. If there was carry-over, clean the analytical system and re-inject the method blank. If the method blank contamination cannot be attributed to carry-over, the samples that were associated with the blank should be re-extracted and re-analyzed.

Section B.5.1.3: Matrix Spike/Matrix Spike Duplicates (MS/MSDs)

Matrix spike/matrix spike duplicate (MS/MSD) pairs are used to determine if there are any effects related to the sample matrix. One pair should be spiked, extracted, and analyzed per batch of up to 20 samples. The % recoveries of the MS/MSD pairs are used to measure accuracy of the analysis while the relative percent difference is used to measure precision. The % recoveries should be 30-150% and RPD should be ≤ 30% for water matrix while it should be ≤50% for all other matrices.

Section B.5.1.4: Laboratory Control Sample (LCS)

A laboratory control sample (LCS) is an aliquot of clean matrix and of the same weight or volume as the environmental samples. One LCS is prepared with each batch of up to 20 samples. The LCS is spiked with the same target analytes and at the same concentration as the MS. The % recoveries of the LCS are used to show that the analysis is in control if there is a matrix effect associated with the analysis of the sample matrix in the MS/MSD. The % recoveries should be 30-150% for all matrices.

Section B.5.1.5: Surrogate Analytes

Surrogate analytes are added to all blanks, samples, matrix spikes, and laboratory control samples to monitor method performance. Decachlorobiphenyl and tetrachloro-m-xylene are the compounds chosen for this purpose. The % recoveries of the surrogates should be 30-150% for all matrices.

Section B.5.1.6: Field or Laboratory Duplicates

Field and laboratory duplicates are used to measure precision. One pair should be extracted and analyzed per ten samples or less. The RPD should be ≤ 30% for a water matrix while it should be ≤50% for all other matrices.

Section B.5.1.7: Out-of-Control Situations

When the out-of-control situations listed in Sections B.5.1.3 through B.5.1.6 occur, the failing analysis should be re-injected into the analytical system. If the re-analysis meets QC criteria, report the second analysis. If the re-injection still does not meet criteria, the affected samples should be re-extracted and re-analyzed.

If the results of the re-analysis of the MS/MSD pair still fail to meet criteria and the result of the LCS is acceptable, then the problem is related to matrix and the QC batch requirements are considered to have been met. Report the results of the batch and qualify the result of the environmental sample chosen for QC purposes as estimated.

If the results for the LCS fail again, instrument maintenance is required. After the maintenance has been completed, another initial calibration must be performed.

Section B.6: Instrument/Equipment Testing, Inspection, and Maintenance

Section B.6.1: Field Equipment

Delays in project schedules, poor output in performance, and erroneous results in investigative operations can result from improperly maintained equipment. Therefore, preventative maintenance of field equipment is performed routinely before each sampling event. More extensive maintenance may be performed based on hours of use and manufacturer recommendations. Spare parts for all field equipment as well as back up instruments are kept in the MPCA Field Operations Center (FOC). The FOC performs preventative maintenance on a routine schedule on all field equipment for the MPCA. The TSCA inspectors and samplers are anticipated to need little field instruments. Standardized field sampling equipment (bailers, scoops, bowls, push probes, etc.) will be maintained by the FOC.

Section B.6.2: Laboratory Equipment

The protocols for testing, inspection, and maintenance of laboratory equipment are addressed in Pace's Quality Assurance Manual. Additionally, the laboratory's standard operating procedures (SOPs) present the specific protocols to be followed as part of the analysis for PCBs. The preventative maintenance program employed by the laboratory is described in Section 13.0 the Pace QAM (Attachment 1). In general, the preventative maintenance is performed on a scheduled basis on all instruments in the laboratory. The preventive maintenance performed is documented in the instrument maintenance logbooks kept at the instrument. Irregularities noted during operations are traced through the maintenance logbook to allow efficient corrective action to solve problems. Analysts are trained in preventive maintenance of their assigned instruments. The laboratory utilizes in-house service technicians in the event of instrument failures. Contracts are maintained on the computer hardware and software. Backup instrumentation is generally available if a specific Gas Chromatograph/Electron Capture Detector (GC/ECD) system becomes unavailable.

Section B.7: Instrument/Equipment Calibration and Frequency

Section B.7.1: Overview

This section discusses calibration procedures for field and laboratory instruments to be used for the PCB Compliance Program. All laboratory equipment used for analytical determinations is subject to periodic inspection and calibration. Frequency of calibration is based on the type of equipment, inherent stability, manufacturer recommendations, and intended use.

Section B.7.2: Field Procedures

No field equipment requiring calibration is planned for use with the TSCA program.

Section B.7.3 Laboratory Procedures

The calibration procedures followed by the laboratory are outlined in Sections 8.0 and 9.3 of the Laboratory QAM (Attachment 1) and in the PCB SOP (Attachment 2). The basic procedure for PCB analysis is the use of a gas chromatograph calibrated with five points for PCB congeners 1016 and 1260. All other congeners (1221, 1232, 1242, 1248, 1254, 1260, 1262, and 1268) are calibrated by single point calibrations. If a concentration is found for a PCB other than 1016 or 1260, a multipoint curve will be run for the Aroclor group suspected of having a positive concentration. The calibration is from 0.1 mg/L to 10 mg/L in the vial. The limits for TSCA are 10 mg/kg to 50 mg/kg. The required TSCA limits will be achieved by adjusting the initial amount of sample extracted to allow for the required action limit to be within the calibration range of the analytical system. The five point curves are verified ever ten samples with a calibration verification check standard, and, after initial calibration, with an external-source calibration standard. All calibration standards must have a percent difference (%D) of <15%. The initial curve must have a coefficient of >0.99 or a %RSD of <20%.

Section B.8: Inspection/Acceptance of Supplies and Consumables

An MPCA staff person inspects all supplies and consumables for integrity and suitability for use. Any supply or consumable judged to be of inferior quality or not suitable for the intended use is rejected. Sample containers are pre-certified as clean by the laboratory.

All chemicals and solvents used in the laboratory are inspected to verify that they are of the appropriate grade for their intended use. All consumables found to be contaminated are removed from use. The laboratory has a tracking system that incorporates the date of receipt, the date the container is opened, and the assigned expiration date of the chemical or standard. The procedures are documented in the laboratory Quality Assurance Manual (see Attachment 1).

Section B.9: Non-direct Measurements

Historical data may be used to initiate an investigation. However, all decisions as to whether a site is compliant with the policy outlined in 40 CFR 761 are based on samples collected during an inspection.

Section B.10: Data Management

Section B.10.1: Data Recording

Data and information collected in the field will be recorded in dedicated notebooks and forms. Data recording procedures to be followed by the laboratory are discussed in Pace's Quality Assurance Manual.

Section B.10.2: Data transformation

Data and field information is transformed in various MPCA offices. Procedures for data transformation by the laboratory are discussed in Pace's Quality Assurance Manual. Data are input into various computer programs for storage. The programs utilized include Microsoft Excel® and Microsoft Word®,

Section B.10.3: Data Transmittal

Data and field information are delivered to the MPCA using raw data notebooks and forms. Analytical data are submitted to the MPCA as final analytical reports. These reports have been reviewed and approved by the laboratory's technical, QA/QC, and project management staff. Data are then entered into a database by MPCA staff. An annual report of TSCA activities is prepared at the end of each federal fiscal year.

Section B.10.4: Data Rejection

Analytical data that does not meet the established QA/QC criteria defined in this QAPP is rejected. Field data is evaluated by the MPCA Supervisor to ensure that it is compliant with the QAPP. Data collected that is judged to be out of compliance are qualified, rejected, and re-collected if possible.

Section B.10.5: Data Tracking

MPCA staff contact the analytical laboratory on a regular basis regarding the status of sample analysis.

Section B.10.6: Data Storage and Retention

For MPCA, data storage and retention is dictated by Minnesota statute and department policy. Official laboratory records are managed using an inventory of records with a schedule establishing retention periods and disposal requirements.

Section C: Assessment and Oversight

Section C.1: Response Actions

Section C.1.1: Internal Assessment Review

An Internal Assessment Review ensures that management controls are in place and that they are carried out by the organization in order to plan, implement, and assess the results of the project.

Section C.1.2: Technical Systems Audit

The Technical Systems Audit (TSA) is a thorough audit of the field sample collection activity. This audit reviews equipment, personnel, training, field documentation (photographs, daily field logs, and checklists), and chain-of-custody records to ensure compliance to the QAPP. The results of the TSA (and any identified corrective actions) are summarized in a report to management.

Section C.1.3: Laboratory Audits

Section C.1.3.1: Internal Audits

The laboratory QA staff conducts internal audits of all departments involved with the handling/analysis of the PCB samples. These internal audits take place on an annual basis. These audits review the quality policies and implementation of the policies at the laboratory. The reports of these audits are sent to the laboratory manager and quality assurance officer for review and improvement in operations. The audit concentrates on the specific SOPs in each section, quality assurance practices, sample handling, documentation, and follow-up on prior audits. These audits are used by the laboratory to identify any problem in their operations before there is an effect to the data. All audits are documented and kept in the QA office. If problems occur or corrective action is initiated, the QAC from MPCA is contracted immediately for assistance in corrective actions. Copies of the internal audit findings (along with any required corrective actions) are submitted to the MPCA's QA Coordinator. As a result of the internal audits, the MPCA may audit at its discretion.

Section C.1.3.2: External Audits

External audits of the laboratory are performed by a Third-Party Auditor or by the Environmental Laboratory Accreditation Program of the Minnesota Department of Health. Copies of the findings of these external audits (and any identified corrective action) are submitted to the MPCA's QA Coordinator. As a result of these external audits, the MPCA may audit at its discretion.

Section C.1.3.3: Performance Evaluation (PE) Studies

The laboratory analyzes Performance Evaluation Samples (PE Samples) which are blind samples prepared by external companies and shipped directly to the laboratory. The samples are logged in and analyzed as standard samples with the results being reported back to the independent company for scoring. The laboratory receives these scores and reports them to regulatory authorities (or states requiring PE samples for certification). Satisfactory performance must be maintained over the effective time of the QAPP. Copies of the results of the PE studies must be supplied to the MPCA's QA Coordinator.

Section C.2: Corrective Action/Reports to Management

For each analytical activity employed in this program, the laboratory regularly tracks the overall quality assurance issues. When a quality control sample or QA issue is found to be out of control, Corrective Actions (CA) are implemented. Corrective action includes re-analysis of samples, re-sampling, flagging of data, or rejection of the data. MPCA is informed of any major CA that is performed on any TSCA sample.

Section C.2.1: MPCA Corrective Actions

The individual identifying a potential issue first documents the problem in the field notebook. The project manager who has final sign-off authority on any problem or issue tracks the problem. The project manager tracks all CA. The PM is responsible for identifying the problem, verifying proper documentation is written and implementing the correct action. The project manager will place final documentation into the site record. Any major CA involving the laboratory is tracked by the both the laboratory QAO and the MPCA project manager. The MPCA project manager has final sign-off authority on issues dealing with TSCA samples.

Section C.2.2: Laboratory Corrective Actions

The laboratory has as a corrective actions system that is described in Section 15 of the Pace QAM (Attachment 1). Generally, an individual involved in the analysis of the samples or review of the data discovers the problem. The problem is identified and documented using a Corrective Action Report (CAR). The documentation is important to allow tracking of the problem and ensure a proper solution is implemented. A CAR requires the initials of the person initiating the memo and the department manager or supervisor with also sign off on the memo. The manager or supervisor then passes the CAR to the project manager or the laboratory QAO for review and follow-up. A copy of the CAR is filed in the Laboratory QA Office when completed. The original CAR is archived with the client project folder.

Section C.2.3: Laboratory Reports

The laboratory sends a complete report to the MPCA that includes the following information:

a. A narrative discussing overall issues with the data (e.g. calibration, holding times, internal QC, etc.),
b. The extraction date,
c. Sampling date,
d. Analysis date,
e. Alphabetical list of compounds,
f. Reporting limits,
g. Method of analysis and extraction,
h. Signature of a laboratory officer,
i. The chain of custody,
j. Results of spike,
k. Spike duplicates,
l. Results of surrogate samples,
m. Blanks, and
n. The concentrations found of each analyte.

The laboratory report is given a final review by the laboratory project manager, then signed, and sent to the MPCA. Specific procedures used by Pace are found in Section 7.3 of the Pace QAM.

Section C.2.4: Reports to Management

An annual report summarizes the program's sampling and analytical activities for the previous year, the findings of the audits, any required corrective actions, the results of PE studies, any data quality problems (along with purposed solutions), any major changes in personnel, and an overall evaluation of the laboratory's quality assurance program. The report is sent to all individuals identified in Section A.4.

Section D: Data Validation and Usability

Section D.1: Data, Reduction, Verification, and Validation

Section D.1.1: Data Reduction

In general, instrument response for the quantitative analytical procedures described in the PCB SOPs, is converted to concentrations or absolute amounts of analyte by use of a multipoint calibration curve that relates instrument response to the quantity of the analyte introduced to the instrument. The analyst reduces the raw data produced by the instrument using equations found in the PCB SOP (Attachment 2). Technical expertise of the analyst is needed for evaluation of the data, reviews of the report produced from the raw data, and verification that the QC checks are within required limits (e.g. spikes, surrogates, blanks, duplicate spikes, etc.). The raw data and final report are submitted for verification.

Section D.1.2: Data Verification/Methods

The pre-qualified secondary reviewer verifies 100% of the raw data against the report and against the QC criteria defined in the QAPP (to verify that the data interpretation made by the chemist is correct and to ensure that the data are free from calculation and transcription errors and comply with the required QC criteria). The specific procedures to be followed by the laboratory are described in Section 7.0 of the Pace QAM (see Attachment 1) and in the ***Data Reduction, Validation and Reporting in the Environmental Laboratory*** SOP (see Attachment 6). The flags used on the data will be consistent with those used by EPA for CLP data (J, R, U, B, etc.). The laboratory stores all raw data in their archives for five years. Raw data is available to MPCA staff as needed.

The MPCA TSCA staff does a data review when the analytical report is received. MPCA staff review data to verify all QC is acceptable, the project requirements are met (holding times and reporting limits), and that all required information is present in the report. The MPCA project manager reviews the data to ensure that all quality control requirements are met. The project manager also review the field duplicates, calculate the RPD, and compare the data to past data from the site to verify consistency. When all the data points have been reviewed, the project manager compares the data that is acceptable to the data that was planned for the site and verifies that the 80% completion rate goal has been met. Any problems with the data or laboratory issues are immediately brought to the attention of the MPCA QAC who contacts the laboratory to assess the problems and find a solution. If the problem is particularly severe, a data audit or full laboratory audit may be conducted.

Section D.1.3: Data Validation/Methods

At least 10% of the data are validated by the MPCA QA Coordinator from the raw data. The validation process is consistent with the *National Functional Guidelines for Organic Data Review*. If any data problems are identified, more data packages are validated. If data does not meet the QAPP requirements and are judged unusable, the analyses are not paid for and the samples are re-collected.

Section D.2: Reconciliation with User Requirements

Data quality objectives have been met when a complete report (with all data qualifiers) has been provided to the U.S. EPA. The report includes any data issues identified by the laboratory or the MPCA. The report points out any limitations on the use of the data to decision makers,

Section D.3: References

1. 40 CFR 750, Code of Federal Regulations, "Procedures for Rulemaking under Section 6 of the Toxic Substances Control Act."

2. 40 CFR 761, Code of Federal Regulations, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions."

3. CIO 2105.0, *Policy and Program Requirements for the Mandatory Agency-wide Quality System May 2000, approved October 20, 2008,* U.S. Environmental Protection Agency, Washington, DC.

4. Project Description and Action Level Guidance for TSCA PCB Inspections, Final September 1999, Toxics Program Section, Region V, U.S. Environmental Protection Agency.

5. U.S. Environmental Protection Agency, August 2004. *PCB Inspection Manual*, EPA/305/X-04/003, Office of Compliance.

6. U.S. Environmental Protection Agency, 2001. *EPA Requirements for Quality Assurance Project Plans (QA/R-5)*, EPA/240/B-01/003, Reissue Notice May 2006, Office of Environmental Information.

7. U.S. Environmental Protection Agency, 2002. *Guidance on Choosing a Sampling Design for Environmental Data Collection (QA/G-5S)*, EPA/240/R-02/005.

8. Environmental Performance Partnership Agreement, October 1, 2012 – September 30, 2016, FFY 2013 – 2016, Minnesota Pollution Control Agency, Region 5, U. S. Environmental Protection Agency.

Appendix 1

Table of Acronyms

CA	Corrective Action
CAR	Corrective Action Report
COC	Chain of Custody
CFR	Code of Federal Register
CLP	Contract Laboratory Program
%D	Percent Difference
DQO	Data Quality Objectives
EPA	Environmental Protection Agency
EnPPA	Environmental Performance Partnership Agreement
FOC	Field Operations Center
GC/ECD	Gas Chromatograph/Electron Capture Detector
LIMS	Laboratory Information Management System
MPCA	Minnesota Pollution Control Agency
MS/MSD	Matrix Spike/Matrix Spike Duplicate
PCB	Polychlorinated Biphenyls
PE	Performance Evaluation (sample)
PM	Project Manager
PPM	Part Per Million
QAC	Quality Assurance Coordinator
QAO	Quality Assurance Officer
QAM	Quality Assurance Manual
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RSD	Relative Standard Deviation
RPD	Relative Percent Difference
SOP	Standard Operating Procedure
SRF	Sample Receipt Form
SW	Solid Waster
TSCA	Toxic Substance Control Act

Appendix 2

DATA QUALITY OBJECTIVES STEPS FOR A TRANSFORMER EXPLOSION IN A ROOM OF A BUILDING

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7
STATE THE PROBLEM	IDENTIFY THE DECISIONS	IDENTIFY INPUTS TO THE DECISIONS	DEFINE STUDY BOUNDARIES	DEVELOP DECISION RULES	SPECIFY LIMITS ON DECISION ERRORS	OPTIMIZE SAMPLING DESIGN
Data is needed on an explosion of a transformer that contained potentially contained PCB oil. Identify who is needed on the team (e.g. project manager, chemist, sampling crew) Identify timeline. (In this case sampling and analysis would be rush. Does the oil in the transformer contain PCBs above the TSCA levels?	Identify that the decision is to find out if the oil in the transformer is above the required limits. "Does the oil in the transformer exceed the TSCA level of 50ppm?"	Identify if information available to assist in answering decision problem. For example, find the records on capacitor Look at regulation to find specified tasks for sampling and levels required (e.g. 50ppm for oils). Identify laboratory abilities to meet holding times needed and required quality assurance.	Define the area (assuming the oil is spread around a room after the transformer explosion). Determine affected media (tiles on ceiling, flooring, walls, and anything in a room with the transformer).	If the concentration of the oil is > 50ppm then clean up of the affected areas is necessary. If the concentration is less than 50ppm then TSCA clean up is no necessary.	A statistically valid number of samples will be taken to ensure that the oil is contaminated or not and to delineate the effects of the areas containing the oil from the transformer explosion. Laboratory rush methods will be used for the analytical but full quality assurance will be prepared to ensure the data is valid for the decisions being made. Total samples will be taken of the oil and wipe samples of affected areas.	A judgmental design is used that samples "hot spots" in such a way to ensure a statically valid number of samples is taken that satisfactoril y covers the area affected by the transformer oil and ensures the oil within the transformer is not > 50ppm PCBs.