

WQ Manual-001.14
Wisconsin Occupational Health Laboratory (WOHL)
Quality Control / Quality Assurance Manual

The current revision of this SOP is located at O:\SOP\EHD\WOHL\Final\QC>manual\. Please confirm that this printed copy is the latest revision.

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1. Manual Maintenance, Control and Update Procedures:

1.1. Procedure Manual: The official procedures of the laboratory are maintained on the laboratory's computer system in o:\sop\ehd\wohl\. There are directories for final, draft, archived, and retired. The final and archived directories are further divided into directories for each laboratory area. The draft directory is divided into for approval, in progress, and proposed; which are also divided into directories for each laboratory area. The only directory that allows write access is draft. If a change is made to a method, the file is saved in either \draft\in progress\area if it still being worked on or in \draft\proposed\area if it is ready to go to approval. From here the document control officer checks the formatting, revision number, and may look up and add missing information. The document is then moved to the for approval directory and the laboratory director or assistant moves the method to the proper directory and archives the previous version. All of the previous versions are stored so that there is a record of changes. The procedure is fully described in [WOHL GenOp-004](#).

1.1.1 Hand pending of procedures is not allowed in the laboratory.

1.1.2 Procedures can be printed and used but they are only considered current on the day of printing.

1.1.3 Individual sections can print out up to 2 copies of "official" methods. Each section is responsible for ensuring that the copies are updated when a procedure changes.

1.2. Quality Manual: The Quality Assurance/ Quality Control manual is updated whenever necessary by the Quality Control Coordinator following the procedure detailed in [WOHL Gen Op-004](#).

1.3. Manual Review: On a yearly basis, all analysts and support staff must read selected WOHL Gen Op policies [WOHL Gen Op-012](#). Records are stored in the employee-training file. The supervisors must also read the QA/QC manual. All other manuals/ methods/ procedures are reviewed at the time of updating. The last revision date is when the method/ procedure was updated. Every three years a list of all methods that have not been changed in 3 years will be created and the laboratory director will review these methods. After this review, the table of contents of the specific manual will be updated to include a "review date".

2. Organization:

2.1. Laboratory Name: Wisconsin Occupational Health Laboratory (WOHL) a section of the Environmental Health Division of the Wisconsin State Laboratory of Hygiene

2.2. Key Personnel:

2.2.1. Laboratory Director: Terry Burk, CIH

- 2.2.2. Assistant Laboratory Director:** Steve Strebel
- 2.2.3. Quality Assurance Coordinator:** Derek Popp
- 2.2.4. Quality Assurance Coordinator – Environmental Microbiology:** Miel Barman
- 2.2.5. Document Control Officer:** Donna Johnsen
- 2.2.6. Quality Assurance Coordinator NVLAP:** Donna Johnsen
- 2.2.7. Inorganic Supervisor, NELAC and NVLAP Technical Manager :** Lyle Reichmann, CIH
- 2.2.8. Organic Supervisor:** Steve Strebel
- 2.2.9. Metals supervisor, ELLAP Technical Manager:** George Bowman
- 2.2.10. Environmental Microbiology Supervisor, EMLAP Technical Manager:** Christine Powell
- 2.2.11. IHLAP Technical Manager:** Terry Burk, CIH
- 2.2.12. Laboratory Information Management Specialists:** Eric Maly, Dave Schleis

2.3. Organizational Chart: [Appendix II](#)

- 3. QA/ QC Objectives:** To provide our clients with data that is of high precision and accuracy.
- 3.1.** To accomplish the stated objective, a program has been established to monitor the quality of the laboratory results using a system of inter- and intra-laboratory knowns and unknowns, thorough record keeping, routine checking and calibration of instruments, procedure manuals for each section, employee training and routine evaluation of results. Data generated by the laboratory is expected to be within the quality control guidelines. If data fails to meet the guidelines appropriate documentation of why a particular data package did not meet the guidelines, will be included with the report. The above programs focus on detecting and eliminating errors.
 - 3.2.** Another aspect of the stated objective is to identify sources of errors before they occur. To accomplish this goal, the quality control coordinator and the analysts work together to identify and minimize errors. This assures that the program remains interactive. By routinely monitoring the results of quality control samples the quality control group can see trends in the data and take action before an out of control situation develops.

3.3. The laboratory is also continually working to improve the overall quality of service. Through customer surveys, and records of customer complaints and compliments we gain insight into what our customers want, where we are deficient, and where we have done well.

4. Quality Control Policies: The laboratory's policies and procedures have been developed in order to achieve the stated objectives.

4.1. The Quality Assurance Coordinator(QAC) is responsible along with the laboratory director for the overall quality system of the laboratory. The QAC ensures that the quality system is compliant with ISO/IEC 17025 (current version), NELAC, NVLAP handbook 150 and the AIHA accreditation policies.

4.2. The QAC holds weekly meetings with management and representative analysts on QA/QC issues.

4.3. The laboratory director approves all of the laboratory methods, policies, and procedures.

4.4. The laboratory director also writes the laboratory QA plan, which is a document that summarizes the quality system for clients of the laboratory.

4.5. Supervisors and technical managers are responsible for the selection of analytical methods, scheduling and monitoring training of the staff, assigning specific authorizations, setting work schedules, and instrument procurement.

4.6. The QAC and the laboratory director also monitor the performance of the quality system through auditing and quality control sample performance.

4.7. The laboratory's general operational policies are written by the QAC, the other coordinators, laboratory director and the rest of the laboratory management team.

4.8. The QAC, the other coordinators, and the laboratory management are responsible for implementing the quality system.

4.9. All laboratory and management personnel are required to follow the WOHL Gen Op policies, specific analytical procedures, accreditation policies (AIHA, NELAC, and NVLAP handbook 150 current version), and ISO/ IEC 17025 (current version).

4.10. Applicable quality control samples shall be analyzed with field samples ([WOHL Gen Op-009](#)).

4.11. WOHL maintains a procedure for accepting contracts with clients ([WOHL Gen Op-023](#)) for analytical work. The procedure discusses pricing and special requests such as method development.

- 4.12. WOHL does not sub-contract analytical analysis ([WOHL Gen Op-008](#)). If subcontracting became necessary the laboratory will notify the client and place samples with appropriately accredited laboratories.
- 4.13. All staff are trained in ethics and confidentiality as it applies to the State Laboratory of Hygiene ([WOHL Gen Op-030](#)).
- 4.14. All staff are trained in how timesheets are filled out. This is confusing due to the nature of how WOHL as an organization is funded ([WOHL Gen Op-031](#)).
- 4.15. **WOHL General Operation Procedures Table of Contents:** [Appendix III](#) , these procedures are briefly described within this document. The general operations procedures are available to all of the staff.

5. Personnel and Training:

- 5.1. **Hiring:** The laboratory is part of the University of Wisconsin and conforms to the requirements of Wisconsin's Civil Service System and the University of Wisconsin's policies for hiring classified staff. These requirements are designed to ensure the laboratory's ability to hire highly qualified personnel. The procedure is fully discussed in the labwide procedure [Labwide GENOP-126](#), Hiring Procedure.
- 5.2. **Training:** The laboratory has extensive training procedures and documentation of training. Each employee undergoes general training about the laboratory explaining what we do, the expectations, and the location of reference materials for methods and safety. Each employee is then trained to perform a specific task following the training plan for that task. When the employee is determined to be proficient, the plan is signed by the trainer. The records of the successful analysis of QC samples and/ or other knowns are used to confirm successful completion of training. In those analytical areas that are defined as being qualitative or semi-quantitative, other types of records are substituted for the records of known sample analysis. All of these documents are stored in the employee's training file. In addition, each employee shall demonstrate proficiency in a particular analytical area at least every six months through the analysis of QC samples or other known samples. Failure to do this will result in having to demonstrate proficiency through the analysis of QC samples or other samples of known value prior to the analysis of field samples. For those areas defined as semi-quantitative or qualitative, other records shall be substituted. The relevant WOHL Gen Op policies for training are [11](#) and [12](#).
- 5.3. **External Training Courses:** All employees are encouraged to request relevant external training courses and seminars.

- 5.4. Authorizations:** The laboratory will maintain a list of who is authorized by laboratory management to perform the critical functions within the laboratory.
- 5.5.** Employees will be free from undue management pressure to report results or perform tasks.

6. Sampling Materials and Procedures:

- 6.1.** The laboratory supplies most sampling media and containers at no extra charge. For some media there is a nominal charge as listed in the sampling guide.
- 6.2.** The laboratory accepts sampling media from other sources, but for some assays, this will necessitate that qualifications be made to the sample results.
- 6.3.** Field blanks should be submitted with each set of samples. Blanks are required for the proper analysis of some analytes. The specific analytes needing blanks are identified in the specific methods.
- 6.4.** The laboratory follows all shipping requirements listed in 49 CFR. Return shipping instructions are included with all media that is classified as hazardous to ship.
- 6.5.** Bulk and air samples are not to be shipped together. If this occurs, the data shall be qualified by stating that contamination could have occurred. Environmental Microbiological bulk and air samples can be shipped together.

7. Chain of Custody:

- 7.1.** The laboratory is located in a secure facility. All visitors must sign in and out and employees are allowed card access. A divisional SOP ([EHD Gen Op-011](#)) covers the building security procedures in detail. After samples are logged in, they are transferred to the appropriate analytical group and a secondary login is performed. At this point, the samples are stored until analysis. The flow of samples and paperwork through the laboratory is as follows:
 - 7.1.1.** Packages are opened one at a time in the receiving area.
 - 7.1.2.** Samples are placed with paperwork and checked for general completeness.
 - 7.1.3.** A Sample(s) Issue Form (green sheet) ([WOHL Gen Op-013](#)) is added to the study.
 - 7.1.4.** Media is inventoried
 - 7.1.5.** Any unusual condition of samples, such as broken tubes, bulks shipped with air samples, leaking, etc... is noted on the green sheet.

- 7.1.6. Samples and paperwork are moved to the login desk.
- 7.1.7. The order of sample login is as follows:
 - 7.1.7.1. Rush and priority samples are logged in first.
 - 7.1.7.2. Samples for total weight
 - 7.1.7.3. Special requests
 - 7.1.7.4. Samples shipped cold
 - 7.1.7.5. All remaining samples
- 7.1.8. At login, a sequential lab number is placed on each sample and stamped on the sampling sheet that accompanied the samples.
- 7.1.9. If samples are listed but not received, the client is notified by telephone. The results of this conversation are documented on the green sheet.
- 7.1.10. Coding notations describing section assignment, analytes requested, and billing numbers are made on the sampling sheets.
- 7.1.11. If the chain of custody has been signed by the client, it is signed and dated by the person logging in the samples.
- 7.1.12. All relevant sampling information is entered into the computer database.
- 7.1.13. Groups of samples and paperwork are transported to a central pick up area. At the end of the day samples are either transported directly to the analytical sections if staff is available to take them or stored in the shipping and receiving refrigerator/ freezer until the next day.
- 7.1.14. The analyst, who is analyzing the samples, keeps the paperwork until the report is written.
- 7.1.15. The report and paperwork are returned to the office for mailing.
- 7.1.16. The chain of custody form is copied and stored with the data. The original is mailed with the report to the client.
- 7.2. Information on sample handling within each section is in [WOHL Gen Op-013](#). The SOP details conditions when samples are rejected for analysis. It also states when the clients are called to clarify expectations.

8. Reagents and Standards:

- 8.1. The laboratory will use appropriate, fresh reagents and chemicals, certified when necessary. Primary standards and reagents will be labeled with a received date, the

initials of the analyst inspecting the new chemical and an expiration date. The expiration dates are set at 3 years from date of receipt unless otherwise specified by the manufacturer. At the expiration date the standard or reagent can be re-evaluated and assigned a new expiration date of three years from the date of re-evaluation ([WOHL Gen Op-020](#)).

- 8.2. All weights for solution preparation will be taken using calibrated balances.
- 8.3. All volumes for solution preparation will be taken with class B or better glassware. All volumes transferred with mechanical pipettes will use pipettes that are operating within specifications. All syringes that are used will be of high quality.
- 8.4. All information on standard and reagent preparation will be recorded in the analyst's notebook or in a standard log as appropriate. Standards must follow the criteria described in the [Traceability](#) section of this manual.

9. Calibration and Maintenance:

- 9.1. **Calibration:** All instruments are calibrated at appropriate frequencies. The calibration encompasses the range of the analysis as defined in the specific method. The calibration of instruments is verified prior to the start of a new analytical run through the analysis of calibration curves, check standards, or quality control samples as defined by the analytical method. Calibration records are either stored in a logbook, computer log, or with the analytical data.
 - 9.1.1. Each day of use the method performance is verified at the reporting limit through the analysis of a standard prepared at or below the analyte's (except for environmental lead) reporting limit. Acceptance criteria shall be stated in the analytical procedures. For environmental lead accuracy at the reporting limit is verified by analyzing matrix spiked samples. The environmental lead samples must be within $\pm 20\%$ of the known values to be considered acceptable.
 - 9.1.2. The performance of analytical balances is verified each day of use through the weighing of calibrated weights. If the balance is equipped with an internal calibration procedure, it may also be run. Each month the balances are checked against a NIST traceable weight set ([WOHL Gen Op-001](#)).
 - 9.1.3. The NIST traceable set of weights is calibrated annually. This weight set is then used to calibrate the weights that are used each day of use to verify balance performance ([WOHL Gen Op-024](#)).
 - 9.1.4. The performance of analytical pipettes is verified quarterly using the Artel PCS[®] or through the weighing of water on a balance ([WOHL Gen Op-021](#)).

- 9.1.5. The performance of dispensers where the volume is critical to the performance of the analytical method are verified ([WOHL Gen Op-033](#))
 - 9.1.6. Refrigerator and freezer temperatures are monitored each working day. Each quarter the temperature will be checked with a NIST traceable thermometer.
 - 9.1.7. Incubator temperatures are monitored each day of use and verified with a NIST traceable thermometer quarterly.
 - 9.1.8. Thermometers that are used in assays where temperature is a critical component of the assay will be checked once a year against a NIST traceable thermometer ([WOHL Gen Op-025](#)).
 - 9.1.9. Light microscopes are checked each day of use and serviced annually.
- 9.2. **Maintenance:** All instruments have maintenance logs. All maintenance events are recorded in these logbooks. The maintenance records are inspected as part of routine auditing by QC group ([WOHL Gen Op-002](#)).
- 10. Analytical Methods:** The laboratory selects methods appropriate for the analysis requested. Generally, the laboratory selects OSHA, NIOSH, or EPA methods. WOHL has and does analyze samples using other or internally developed/ modified methods. Regardless of the source of the method the laboratory verifies that it can achieve an acceptable level of performance using the method before client samples are analyzed ([WOHL Gen Op-016](#)). Analytical methods are written according to the guidance provided in [WOHL Gen Op-019](#). This policy helps to maintain consistency in the laboratory methods.
- 11. Data Reduction, Validation, and Reporting:** Each analytical section will develop procedures to address how each function is performed. These procedures shall include the following ([WOHL Gen Op-010](#)):
- 11.1. Data Reduction:**
 - 11.1.1. Relevant calculations are listed in the analytical methods.
 - 11.1.2. Most laboratory data is reduced using a combination of validated excel spreadsheets and the validated programs of LIMS ([WOHL Gen Op-003](#)).
 - 11.1.3. Data from most of the instruments is transferred to the computer system. From there the results are calculated either directly using the instrument software or the relevant numbers are transferred to a validated EXCEL spreadsheets for calculation.

11.1.4. Data from the excel spreadsheets is then exported to the LIMS for report generation.

11.1.5. For total weight samples, an Access database is used to store the final data and export results to LIMS.

11.2. Validation:

11.2.1. The report and all of the supporting data is reviewed by the analyst and validated in LIMS.

11.2.2. The analyst review also ensures that the proper number of significant figures is used in the LIMS generated report ([WOHL Gen Op-037](#)).

11.2.3. The laboratory has a system of peer review in place where another qualified analyst or supervisor reviews the data and report. Reviewing your own work is not allowed. If an analyst reviews the report they validate the study as a second reviewer in LIMS. If the supervisor reviews the report the data is reviewed as the final reviewer and is ready for reporting. ([WOHL Gen Op-010](#))

11.2.4. The final data review is done by the supervisor or designee.

11.3. Reporting:

11.3.1. The supervisor or designee after their final review prints the report.

11.3.2. The final report consists of the analytical results, a cover sheet explaining the analysis, and a quality control report.

11.3.3. All reports are mailed, and/or faxed and/or e-mailed if available to the clients.

11.3.4. Clients can request to receive reports by one or all of the methods listed above.

12. Quality Control/ Quality Assurance Procedures:

12.1. Quality Control:

12.1.1. Intra-laboratory Programs: The intra-laboratory programs consist of several elements that, when taken together, assure that the data produced by the laboratory is of good quality. The programs that are in place include but are not limited to preparing check samples, checking instrument calibration, ensuring traceability of the data generated, and randomly checking instruments including mechanical pipettes.

12.1.1.1. Quality Control Samples IH: Quality control samples are prepared in pairs or two controls and a blank. The analytes are requested by the analyst or supervisor with the exception of blind samples, which are chosen by the quality control coordinator.

The check sample program works in two parts. The first consists of preparing spiked samples (see specific QC sample preparation methods WQ###) and analyzing as part of a daily QC. The QC samples are there to detect problems in the analysis system from preparation to final calculation. They are either the same as a requested substance or a substance(s) that can be quantified using the same analytical method as the requested substance. Upon completion of an analysis, the chemist logs onto the computer ([WS003](#)) and gives their initials, date, and values as prompted. The analyst may receive various messages if errors are detected or sample results are unacceptable. An acceptable set of values generates a correct message. A correct report must be attached to the field samples to be reported out as evidence of a satisfactory run. If the results are unacceptable the field samples maybe reported out with comments detailing the problems with the QC samples. For QC samples with several substances, the printout will list all the substances and identify the ones in error. This feature saves the analyst time and allows them to concentrate on the substance that is out of control. For substances that are being studied for use as control samples, a statement will accompany the field samples for that particular analyte explaining what was done and what the results of those test samples were. This statement will be signed by the analyst and the quality control coordinator. The program is described in greater detail in [WQ Op-015](#).

12.1.1.2. Blind Samples: The second consists of sending blind samples through for analysis. The blind samples are intended to detect sample-handling errors and to determine if control and proficiency samples are being handled more carefully than “regular” samples. The results of both parts are subjected to the statistical limits ([WOHL Gen Op-017](#)) for the substance or substances in question.

12.1.1.3. QC Limits for IH: The control limits ([WOHL Gen Op-017](#)) are calculated based on a statistical evaluation of historic data. The initial limits for new substances are established at 100 ± 10 , 20 and 30 percent. When forty samples have been analyzed statistical limits are calculated. The data is evaluated to look for outliers. Outliers are deleted from the data set using the rules of

assignable cause and huge error. The rule of assignable cause is looking for a reason why the data is an outlier; these are documented in the comment section of the QC database. The rule of huge error is a statistical method for eliminating “bad” data points. The equation is: $|x_q - \text{Mean (without } x_q)|/S$. Where x_q is questionable value and S is the standard deviation without x_q . If this ratio is greater than four the value can be eliminated. The mean and standard deviation are then calculated. The limits are then set up as being 1 ± 1 , 2 and 3 standard deviations. One is used instead of the calculated mean in order not to introduce any positive or negative bias into the limits and resulting sample data. The mean is used to make judgments about the performance of the method. The limits are evaluated yearly using data acquired over the past year. The standard deviations are compared and if found to be not significantly different no changes will be made to the limits. If the standard deviation differs, the limits will be recalculated.

The above limits are then used to determine if the sample results are acceptable and in which area the results lie. The computer generates a different report for each standard deviation range. The exceptions to the above are the weight section which doesn't have recovery limits- and environmental lead under ELLAP where maximum limits are stated in the accreditation policies. These limits must be used if calculated limits are found to be greater than the default values.

12.1.1.4. Range Limits for IH: Range limits are calculated using the differences between the two control samples and calculating the mean difference, standard deviation, and control limits. The plotting of the range data is a measure of precision. The range data of the QC samples is summarized as part of the monthly QC report. The range limits are only calculated after there has been 40 QC samples (20 sample pairs) analyzed for a particular substance. The acceptance limits are then calculated by taking the absolute difference between each pair of samples. Then calculating the mean of the differences. The control limits are then $0 + 2.512 (\text{mean})$ {upper warning limit} and $0 + 3.267 (\text{mean})$ {upper control limit}. The lower control limit is zero. Initial limits are defined as 0, 0.25, and 0.33. These limits assume an average difference of 0.1 or 10% and are used until sufficient data exists to calculate true performance limits as above.

12.1.1.5. Analysis of all Control Data except Bulk Asbestos: The quality control group uses a Microsoft Access database front

end to access the Oracle QC database. Extensive analysis of the data can be done through access or the data can be exported to Excel or SAS for further analysis. SAS software has extensive data analysis tools, which allow many data relationships to be explored.

12.1.1.6. Uncertainty of Measurements except Bulk Asbestos and TEM Asbestos in Water, and Environmental Microbiology:

To get an accurate determination of uncertainty all of the errors that have a potential to impact the sample result need to be considered and taken into account. Rather than estimating all of these errors and adding them together the laboratory uses data from its internal QC program to estimate the uncertainty. The QC samples are prepared in a way to be very similar to if not identical to field samples. This ensures that the same errors that would be associated with field samples during analysis are taken into account. Using 2 standard deviations of the quality control performance limits (same as the warning limits), 95% confidence interval, gives a good approximation of this error. For substances where there are not QC samples or where insufficient data exists to determine QC limits the uncertainty is defined as $\pm 20\%$ of the value determined.

12.1.1.7. Uncertainty of Measurements Bulk Asbestos: To get the overall laboratory uncertainty an average of the between analyst replicate analysis errors is taken and multiplied by 2. However at 1% asbestos the uncertainty is $\pm 50\%$ (0.5 – 1.5% Asbestos).

12.1.1.8. Uncertainty of Measurements TEM Asbestos in Water: The uncertainty for Asbestos in Water is calculated on a per sample basis. The uncertainty is only calculated if the sample is positive. The uncertainty is calculate based on the poisson distribution for 95% confidence.

$$95\% \text{ confidence} = (\text{average count of all fields}) + d^2/2 \pm d((\text{average count of all fields})+d^2/4)^{1/2}$$

$d = 1.96$; the 95% probability with infinite degrees of freedom

12.1.1.9. Uncertainty of Measurement for Environmental Microbiology: The uncertainty for Environmental Microbiology is calculated based on the duplicate and replicate read data for viable bacteria and mold cultures and for total spore counts. A RPD value is calculated for every duplicate and replicate sample read. These values are recorded and the standard deviation is calculated on an annual basis. Two times

this variation of the RPD values represents the uncertainty of measurement.

12.1.1.10. Total Weight QC Samples: Quality control in the weight group consists of daily balance calibration, reweighing samples and QC samples. Approximately 10% of samples are reweighed and the two weights recorded. Quality control samples are blank filters, which have been assigned a QC number. These are analyzed one per day and go through the same preparation as the samples. The initial and final weights are recorded and compared.

12.1.1.11. Airborne Asbestos QC Samples: The asbestos section consists of two groups, fiber counting and bulk identification. The fiber counting group utilizes the old proficiency analytical testing (PAT) samples. The first day of counting for the week a new pair of samples is prepared (filter cut and mounted) and counted. Each succeeding day, old QC slides are renumbered and counted. These samples are then subjected to the same computer program as the above. The analysts also count two coefficients of variation (CV) slides. The CV slides are used to determine each analyst's and the laboratory's coefficient of variation. Ten percent of all samples counted are selected at random, and recounted. The difference of the square roots of the recount values must not exceed $2.77(CV)(\text{Mean of the square roots of the recounted values})$, in order for the results to be reported out.

12.1.1.12. Bulk Asbestos QC Samples: Bulk asbestos follows the QC guidelines for NVLAP accreditation. This includes the analysis of replicate and duplicate samples, and calibration of the dispersion oils. At least 10% of the field samples will be re-analyzed as QC samples. Samples are selected as detailed in [WQ Op-012](#). Samples will be repeated by the same analyst to establish precision and samples will be analyzed by a different analyst to establish accuracy and precision of the laboratory. The laboratory is monitored for contamination monthly. The details of the program are in [WQ Op-012](#).

12.1.1.13. Bulk Asbestos QC Limits: The QC limits are established following the guidance of NISTIR 5951 guide for quality control on the qualitative and quantitative analysis of bulk asbestos samples. The limits are based on performance within the categories of asbestos in the samples (<1%, 1-10%, >10% asbestos). The limits are $\pm 2 * 0.741 * \text{Inter quartile range (IQR)}$

([WQ Op-011](#)). The limits are evaluated by QC personnel on a yearly basis.

12.1.1.14. Gas Sample QC: A single QC sample is analyzed due to the labor involved in analyzing the samples a single sample was determined to be sufficient. The results of this analysis are entered into our computer system. Duplicate injections are performed and they are entered as a pair of samples.

12.1.1.15. ELLAP Requirements: The group performs quarterly wipe tests for lead and pipette calibration. The QC group issues notices to accomplish these two tasks during the first week of each of the following months: January, April, July, and October. The results are stored by the QC group, with copies kept in the laboratory area. The metals group also performs replicate analysis and spikes on 5% of lead samples for each matrix (soil, paint, and wipe) type for accuracy and precision. The results are stored in an access database. Plots are generated and compared to the ELLAP stated default limits. Method blanks are analyzed, at a 5% rate of the total samples analyzed at each matrix, in order to determine if contamination exists.

12.1.1.16. Environmental Microbiology QC Samples: A minimum of 5 percent duplicate and 5 percent replicate analysis is performed for samples from all quantitative and semi-quantitative methods performed (culturable fungi/ bacteria, spore traps, tapes and Legionella) in order to monitor precision within the laboratory. Also, a QC spore trap sample is analyzed on a rotating basis from a slide collection on each day that an analyst reads spore trap samples. This analysis evaluates the accuracy of the analyst. The above QC samples are scored on total counts, counts per type of the top three organisms (overall status), identification (organism match) and relative abundance per spore type (rank order) found. In addition, on a monthly basis identifications are done utilizing pure cultures grown on plates and of spores deposited on slides. A detailed description of the QC program is found in [WQ Op-014](#).

12.1.1.17. Environmental Microbiology QC Limits: The default limits for viable cultures and spore trap replicate and duplicate analysis were established at ± 40 , 80, and 120% relative percent difference (RPD). QC limits (1SD) for replicate and duplicate reads are calculated annually and set such that $\pm 2SD$ is a warning level and $\pm 3SD$ is the level at which a read fails. The calculated QC limits are stored in the Einstein database. For fungal identification and tape samples the standard deviation is

zero. Results must be exact. Details for this procedure are found in [WQ Op-016](#). For the Daily Spore Count QC slides, the QC limits for the count data are calculated following the procedure in [WQ Op-016](#). The limits for Daily QC slides are 100% $\pm 2SD$ for a warning and 100% $\pm 3SD$ for a failure. For the relative abundance (rank order), samples have to match of 3 out of the top 5 spore types where greater than 7 spores were counted. ([WQ Op-016](#)). Organism match compares organisms with counts above 4. For viable cultures, all organisms must match exactly. Overall status looks at the percent recovery or the RPD of the top three organisms and if they are graded according to the QC limits.

12.1.1.18. Traceability:

12.1.1.18.1. The laboratory has a procedure for issuing laboratory notebooks and logbooks ([WOHL Gen Op-028](#)). These books are issued by the QA/QC personnel and logged into an access database. When the books are no longer needed they are archived and the final disposition is recorded in the database.

12.1.1.18.2. When standards are prepared in the laboratory, information about the source material is maintained. This enables analytical standards to be traced to the original source material. The laboratory policy is stated in Policy for Labeling and Documentation of Chemicals, Reagents and Solutions, [WOHL Gen Op-020](#).

12.1.1.18.3. The laboratory backs up the network drive on the computer system nightly.

12.1.1.18.4. The laboratory archives electronic data to CD ([WOHL Gen Op-007](#)).

12.1.1.19. Calibration: The laboratory maintains calibration records for all instruments and support equipment. These records are periodically reviewed by the QA/QC personnel, [WOHL Gen Op-009](#), [WQ Op-017](#).

12.1.2. Inter-laboratory Programs: The laboratory is involved in several inter-laboratory programs. The laboratory has participated in the AIHA PAT program since round seven and has always maintained a satisfactory level of performance. These samples are handled as normal samples. Our login

procedure is followed. For samples where multiple analysts can do the requested analysis, each section supervisor will randomly select an analyst to analyze the samples. In areas where the samples are stable the laboratory wants all of the analysts to perform the analysis. These samples are in the areas of microbiology and asbestos. Each section supervisor will have pre-selected the analyst whose results the laboratory will be reporting. Each section supervisor is responsible for overseeing that the samples are analyzed. The supervisor, when reviewing the data, should check to see that the samples were analyzed using the proper methods. The round robin samples are reported as normal, the PT sample reporting is handled by the QC group. When the results are returned with the laboratory ranking, they are discussed with each section supervisor and the analysts involved. The quality control coordinator retains all results; the section supervisors may or may not retain copies. All raw data is retained by the quality control group. A listing of section specific programs follows.

12.1.2.1. Asbestos:

- 12.1.2.1.1.** PAT program: The PAT program is for airborne asbestos fiber counting and bulk asbestos. Samples are sent out four times per year.
- 12.1.2.1.2.** Wisconsin Airborne Asbestos program: A round robin program initiated by the laboratory. It consists of sending prepared slides out to several laboratories and comparing analyses. Slides are either old PAT samples or "real world" samples, usually four slides are sent out.
- 12.1.2.1.3.** Salt Lake City Laboratory round robin: A round robin exchange initiated by the Salt Lake City laboratory consisting of four samples. There are 2 rounds per year.
- 12.1.2.1.4.** Bulk National Voluntary Laboratory Accreditation Program (NVLAP) program: Bulk asbestos samples are sent to the laboratory twice a year. The analysis of these samples is required for NVLAP accreditation.
- 12.1.2.1.5.** State of New York TEM asbestos in water. The program consists of two rounds per year and supports the laboratory's NELAC accreditation.

12.1.2.2. Inorganic Chemistry:

12.1.2.2.1. PAT program: The PAT program sends out samples four times per year. The samples usually contain three metals and also included are silica samples for x-ray diffraction analysis.

12.1.2.2.2. Salt Lake City Laboratory Quality Control Exchange program: The program is initiated by the Salt Lake City OSHA laboratory and usually contains samples for an inorganic analysis. Samples are sent out four times per year. The results are then compared with the Salt Lake City laboratory results.

12.1.2.2.3. Environmental Lead Proficiency Analytical Testing Program (ELPAT): This program is for environmental lead samples, which are lead based paint, lead in soil, and wipe samples for lead. Participation in this program is required for Environmental Lead Laboratory Accreditation Program (ELLAP) accreditation.

12.1.2.2.4. AIHA Beryllium PAT: This is a quarterly program for beryllium on filters organized by AIHA with the filters being prepared by Oak Ridge National Laboratory.

12.1.2.3. Organic Chemistry:

12.1.2.3.1. PAT program: The PAT program sends out samples four times per year. The samples usually contain three solvents. The laboratory receives four blanks along with the samples. The blanks are used to calculate desorption efficiencies for the substances asked for.

12.1.2.3.2. Salt Lake City Laboratory Quality Control Exchange program: The program is initiated by the Salt Lake City OSHA laboratory and usually contains samples for organic analysis. Samples are sent out four times per year. The results are then compared with the Salt Lake City Laboratory results.

12.1.2.3.3. DNPH formaldehyde WASP program: The samples are obtained through AIHA. The samples are

generated by the British Health Service. The samples are sent out four times per year.

12.1.2.3.4. Minicanister round robin: A round robin for VOC analysis using mini-canisters organized by Entech instruments. Samples are sent out twice a year.

12.1.2.3.5. NATTS program for ozone precursors: A testing program organized by the Great Lakes Consortium. Samples are sent to the laboratory at least twice per year for the analysis of ozone precursors by HPLC utilizing the DNPH derivative. Results are compared to the known values and the other laboratories in the consortium.

12.1.2.4. Environmental Microbiology:

12.1.2.4.1. EMPAT program: Samples are received 3 times per year for fungi and bacteria, and 4 times per year for direct microscopic examination. The direct microscopic examination is done via the internet using pictures of spores.

12.1.2.4.2. Spore trap sample round robin program. For each round, four spore trap slides, selected from field samples, on varying media (Air-O-Cell, Cyclex-d, Micro5, etc.) are counted and calculated by each analyst. The responsibility for starting each round is rotated among the participating laboratories. Results from all laboratories are compared and a report to all participants is generated by WOHL.

12.1.2.5. In addition to the various sample exchange programs that the laboratory is involved in we have onsite audits for the following accreditations: NVLAP for bulk asbestos analysis, National Environmental Laboratory Accreditation Program (NELAP) for TEM asbestos in water, American Industrial Hygiene Association (AIHA) and, ELLAP, and EMLAP. The AIHA audit is of the whole laboratory operation and occurs every two years. NVLAP audits the bulk asbestos section every two years. NELAP audits the TEM asbestos in water section every two years. The ELLAP audit is every two years and only pertains to analysis of environmental lead samples. The EMLAP audit is every two years and only pertains to analysis of environmental microbiology samples. The ELLAP and

EMLAP audits are conducted in conjunction with the AIHA audit.

- 12.1.2.6.** The laboratory is under contract with the Occupational Safety and Health Administration (OSHA), to provide analytical services to the 7c1-consultation program.

12.2. Quality Assurance: The QC group is also involved in areas of Quality Assurance (QA). The group performs audits of final reports, provides documentation of problem control samples and maintains the training records of laboratory personnel.

- 12.2.1.** The QC group normally meets weekly with the laboratory management and analysts from the individual laboratory sections to discuss policy items, monthly reports, audits, and any other areas of concern. The permanent members are the laboratory director, all section supervisors, and QC personnel. These meetings are documented through minutes that are stored on the computer network accessible by all employees.
- 12.2.2.** All studies are peer reviewed by another qualified analyst and the supervisor or designee ([WOHL Gen Op-010](#)). In some cases studies are only reviewed by the supervisor or designee. A final review is conducted by the analyst, when they sign the report. The supervisor or designee also signs the report.
- 12.2.3.** The QA/QC group reviews a final report ([WQ Op-017](#)) every month. The reports are checked for QC data, standard information, calibration data, and typographical errors. A random sampling of calculations is also performed. The analyst's notebook is reviewed and compared to the report. The findings of these reviews are written into a report, copies are given to the analyst, the section supervisor, the lab director, members of the QC team and the QC group retains a copy. The report is then discussed at the weekly QC meeting. At this meeting, all of the individuals involved can then make comments about the report and input from the other participants is solicited. Minutes of these discussions are kept. Where corrective action is needed, a plan will be created among all of the parties involved detailing what will be done and a deadline set. This plan will be incorporated into the audit report. Audits are saved in M:\ehd\wohl\qc_only\audits\studies\(\year)\open\ when completed they are moved to the "closed" directory. Reports in the open directory are periodically reviewed and new reports issued detailing the ongoing problems. Correspondence and/ or data is added to the audit report until it is complete and closed.

- 12.2.4.** WOHL maintains a list of employee signatures and initials ([WOHL Gen Op-027](#)). This greatly aids in determining who was responsible for doing work on a study that is being reviewed.
- 12.2.5.** All of the refrigerators, incubators and freezers used in the laboratory are checked each working day to ensure that they are in operation. These checks are recorded on the appropriate forms (QA forms). The Quality Control group monitors the records of these checks. If the refrigerators, freezers, or incubators are found to be out of the range specified in the logbook, the supervisor in charge of the particular refrigerator or freezer is notified immediately so that appropriate action can be taken. In addition, quarterly the temperatures are checked with a NIST traceable thermometer.
- 12.2.6.** All balances are calibrated each day of use. A minimum of three weights must be weighed and the results recorded in the logbook for that balance. The Quality Control group performs monthly checks of the balances using NIST traceable weights. There are weight sets near each balance, which are calibrated against the NIST traceable set on a yearly basis ([WOHL Gen Op-024](#)). The NIST traceable weight set is calibrated yearly by an external vendor.
- 12.2.7.** Instrument maintenance is recorded in the appropriate logbook. These records are also reviewed by the QC group and a report is generated with the findings. The same distribution as above is used. In areas where there are deficiencies a deadline will be given to get the appropriate records up to date.
- 12.2.8.** The environmental microbiology section monitors and keeps records of its culture media and microbial culture collection.
- 12.2.9.** The environmental microbiology section prepares and grows one ATCC stock fungal isolate each month, and selects one prepared slide of spores from another ATCC fungal strain, to be identified by each analyst to the genus level as continuing training for viable and non-viable identification proficiency.
- 12.2.10.** The environmental microbiology section also performs quarterly contamination checks of the laboratory.
- 12.2.11.** The metals area is audited yearly according to the guidelines of the environmental lead accreditation program. The findings of these audits are reported to management and corrective action is taken as needed.
- 12.2.12.** The environmental microbiology area is audited yearly according to the guidelines of the environmental microbiology accreditation program. This

audit also includes an evaluation of the media preparation group. The findings of these audits are reported to management and corrective action is taken as needed.

12.2.13.The asbestos area is audited yearly according to the guidelines of the National Voluntary Laboratory Accreditation Program. The scope of this audit follows the NVLAP site visitor checklist and the policy document. General documentation skills are also looked at. The findings of these audits are reported to management and corrective action is taken as needed.

12.2.14.The Asbestos in water by TEM is audited yearly according to the NELAP guidelines. The scope of this audit follows the NELAP checklist with special focus on the documentation of capability records.

12.2.15.The entire laboratory is audited yearly according to the AIHA policies using the site visitor checklist as a guide. The findings of these audits are reported to management and corrective action is taken as needed.

12.2.16.Monthly and yearly summary reports of all QC samples are generated. These reports provide data by instrument and by substance. From these data, the laboratory can see what the QC record of a particular instrument or assay is on a monthly basis. It is also possible to see the number of samples of each analyte that are within the warning range of our QC limits and allow follow-up to be made for those analytes that are showing problems.

12.2.17.Problems with QC samples that are in the computer system are also recorded through the QC program with comments made by the analyst describing the problem. Also, there is the 3 standard deviation report where the analyst, supervisor, and a QC representative make comments about samples. Comments are also made on sample records, where the sample was lost or improperly prepared. Samples that are not in this system follow the same logic as above except that these comments are captured on corrective action forms ([QC Op-009](#)). Using these records, the group can get an idea of which substance(s) have exhibited consistent problems. These records also provide a reference as to what has been tried as well as the possible solutions that were suggested to the observed problems. This allows a more informed decision making process to take place and hopefully solve the problems quickly.

12.2.18.The records of employee training are also retained by the group and are found on the computer network in [M:\EHD\WOHL\pub\docs\training\persrec\current](#) and former employees are in [M:\EHD\WOHL\pub\docs\training\persrec\former](#). The laboratory has made a strong effort to keep this up to date. Employees are

encouraged to keep their own record up to date whenever they attend a short course, seminar, or are trained in house. The laboratory also has training form that can be filled out and given to the Document Control Officer who will see to it that it is added to their record. Job specific training plans ([M:\EHD\WOHL\pub\docs\training\specific](#)) are completed and stored in an employees personnel file. The laboratory requires individuals to update their training records annually.

12.2.19.The laboratory management monitors the sample backlog, turnaround time, and sample volume per area of work. These factors are used as an indicator of overall customer service. In the interest of customer service, we have a toll free telephone number, direct telephone lines to many analytical personnel, and a dedicated FAX line. The laboratory also publishes a newsletter on at least a semi annual basis. This serves to keep our clients informed about laboratory activities and changes. We have established a customer complaint and compliment form ([WOHL Gen Op-014](#)). We take this customer feedback very seriously, and we use it to help make decisions on changes in our service.

12.2.20.The laboratory management conducts a yearly review of all of the laboratory operations ([WOHL Gen Op-036](#)). This report evaluates the work load, turn around time, quality control, and opportunities for improving the laboratory. This report is shared with the staff.

13. Corrective Action and Preventative Action: All instances of problems where the potential exists for either the sample integrity or the reporting of results to be compromised will be investigated. Through this process the laboratory will investigate the reason(s) why the problem occurred, develop a plan to prevent re-occurrence, and evaluate the effectiveness of any changes that were made ([WQ Op-009](#)). Potential or existing issues are frequently discovered through auditing. If corrective action is warranted the laboratory will develop a plan, make the corrections, and have timely follow-up in order to evaluate the effectiveness of the correction ([WQ Op-009](#)). These records will be stored in the computer system with supporting data stored in the QC files and archived yearly. Each specific instance will be evaluated for its impact on previous work. If it is determined that the laboratory may have reported incorrect data the clients will be notified of the potential problem with their sample results. Corrective action for QC samples is handled through the computer system ([WS003](#)) using the 3sd and >3sd reporting. The same types of information as above are recorded in comments of the analyst, supervisor, and QC personnel. These policies and procedures are fully described in WOHL [GenOp 22](#) and [23](#). QC samples that are going to be reported as greater than 3 standard deviations (outside of the control limits) will also be documented through the corrective action policy above ([WQ Op-009](#)). Preventative action includes routine instrument maintenance and calibration, using trend analysis of the QC samples, and looking for opportunities to improve laboratory operations. The maintenance information is contained in the maintenance manuals. The calibration information can be in maintenance records or in calibration logs depending on the type of instrument.

Other preventative actions include changes to methods, reporting, and calculating results. When these types of actions are identified the same form that is used for corrective action is filled out ([WQ Op-009](#)).

14. Documentation and Record Keeping:

14.1. Documentation:

- 14.1.1.** The laboratory will retain copies of all reports and the paper or electronic “raw” data used to generate the reports.
- 14.1.2.** All laboratory observations will be recorded in ink.
- 14.1.3.** The use of correction fluid on laboratory records is forbidden.
- 14.1.4.** All changed data will be crossed out with a single line, initialed and dated by the analyst making the change. The new value can be inserted above the lined out data ([WOHL Gen Op-029](#)).
- 14.1.5.** All instrument records which include handwritten notes, are considered "raw data" and must be retained. The notations must also be initialed and dated by the person making the notation.
- 14.1.6.** All laboratory's papers, notebooks, and notes are signed/ initialed and dated at the end of the day or batch of samples. Instrument generated printouts that do not have hand written notes are exempt from this requirement.

14.2. Record Keeping:

- 14.2.1.** All paper records will be archived following [WOHL Gen Op-028](#).
- 14.2.2.** All electronic data will be archived following [WOHL Gen Op-007](#).
- 14.2.3.** All other records are handled according to the policies (Appendix V, VI and VII) approved by the University of Wisconsin on 10/7/96.
 - 14.2.3.1.** All sample records prior to 9/93 will be microfilmed in their entirety. This is necessary because these files cannot be recreated using our current computer system.
 - 14.2.3.2.** All records since 9/93 will have the following documents maintained in hard copy form for a period of 3 years: 91A or client submission forms, 91B or client report, any special forms in the file (documentation of client contact, clarification, etc...)

14.2.3.3. All instrument data that does not contain hand written notes will be discarded from the files on an annual basis. The remainder of the file will be stored for 3 years.

14.2.3.4. All microfilmed data will be maintained for 3 years.

14.2.3.5. Data (spreadsheets, chromatograms, and instrument readouts) files are archived when the data is 60 days old. The files are moved to the archive directory. When there is enough data the files are burned to a DVD and stored indefinitely. The archive directory is then cleared of files and a file is created in the tapes subdirectory (**D:\pub\archives\tapes\year**) that contains the file names on the DVD.

14.2.3.6. Notebooks, calibration data, and information on the preparation of the standards are retained indefinitely. Instrument maintenance records are in the maintenance manuals and are retained indefinitely.

15. Sample Retention and Disposal: Sample retention and disposal is covered in WOHL Gen Op-018, [Appendix IV](#).

16. Procurement: WOHL uses these SOPs for procurement. They were developed for our division (Environmental Health) of the State Laboratory of Hygiene. These SOPs comply with the guidelines set by the University of Wisconsin System: Ordering Laboratory Supplies, [EHD Gen Op-004](#); Ordering Office Supplies, [EHD Gen Op-003](#) and Purchasing, [WO Op-009](#). In addition a list of acceptable vendors is in [WO Op 002](#).

17. Signatures

17.1. Procedure by:

Date:

17.2. Procedure Approved by:

Date:

17.3. Procedure Modified by: Derek Popp

Date: 4/2/02, 6/25/04, 2/2/05,
4/9/05; 9/9/05; 9/15/05,
1/18/06, 10/30/06
11/13/06, 4/14/08
9/6/07, 10/9/07

Donna R. Johnsen
Derek Popp

Format Changes: 4/4/2006

17.4. Modified Procedure Approved by: Terry Burk **Date:** 9/19/2001, 4/8/02, 7/3/02, 2/2/05,
9/9/05, 10/12/05, 3/23/06, 4/4/06 &
8/15/07, 9/25/07, 10/11/07
&

Appendix I

QUALITY ASSURANCE (QA) PLAN

Appendix II

Organization Chart

[Link to Chart](#)

Appendix III

General Operation Procedure Table of Contents

GOP #	Policy for	Revision	# of	Last Revision
WOHL Gen Op-001	Balance Operation	4.3	2	11/20/2006
WOHL Gen Op-002	Instrumental Policy	8.0	2	04/8/05
WOHL Gen Op-003	Electronic Calculation Verification	7.0	1	Reviewed 3/23/2006
WOHL Gen Op-004	Procedure Manuals	12.0	2	4/26/2007
WOHL Gen Op-005	LABUX Auxiliary Files		1	Archived 6/10/04
WOHL Gen Op-006	GC Desorption Data	9.1	1	Reviewed 2/9/2007
WOHL Gen Op-007	Electronic Data Archiving, Retrieval and Rearchiving	10.1	2	11/13/2006
WOHL Gen Op-008	Subcontracting Laboratory Services	6.0	1	Reviewed 3/23/2006
WOHL Gen Op-009	Policy for Sample Analysis	9.0	1	10/6/05
WOHL Gen Op-010	Data Review and Reporting	12.0	2	04/8/05
WOHL Gen Op-011	Training Records	9.0	1	06/09/2006
WOHL Gen Op-012	Training	16.0	5	07/09/2007
WOHL Gen Op-013	Sample Handling	16.0	5	5/10/2007
WOHL Gen Op-014	Customer Complaint/Compliment Forms	10.0	2	02/2/05
WOHL Gen Op-015	Blank Correction Policy	3.1	2	Reviewed 2/9/2007
WOHL Gen Op-016	Method Validation within the Laboratory	3.1	2	Reviewed 2/9/2007
WOHL Gen Op-017	Calculation of QC Limits	4.0	2	10/6/05
WOHL Gen Op-018	Retention and Disposal	8.0	3	02/13/2007
WOHL Gen Op-019	Writing of Analytical Methods and Operational Procedures	9.0	10	4/12/05
WOHL Gen Op-020	Labeling of Chemicals, Documentation of Reagents and Solutions	5.0	2	Reviewed 3/29/2005
WOHL Gen Op-021	Calibration Procedure for Adjustable Volume Pipettes	8.0	5	4/26/2007
WOHL Gen Op-022	Failed QC Samples >3 Standard Deviations	7.0	1	Reviewed 3/29/2005
WOHL Gen Op-023	QC Samples between 2 and 3 Standard Deviations	7.0	2	Reviewed 3/29/2005
WOHL Gen Op-024	Policy and Method for Calibration of Weights	2.0	2	Reviewed 3/23/2006
WOHL Gen Op-025	Policy and Method for Calibration of Thermometers	2.0	2	3/22/2007
WOHL Gen Op-026	Determining Minimum Detection Limits (MDL) and Minimum Quantitation Limits (MQL)	5.0	4	8/9/2007
WOHL Gen Op-027	Personnel's Signature Page	2.0	2	Reviewed 3/23/2006
WOHL Gen Op-028	Laboratory Notebooks and Paper Data Archiving and Retrieval Procedure	2.0	2	8/18/05
WOHL Gen Op-029	Documentation of Laboratory Data	8.0	2	06/09/2006
WOHL Gen Op-030	Ethics and Confidentiality Policy & Procedures	5.0	2	06/09/2006
WOHL Gen Op-031	Filling Out Biweekly Time Sheets	2.2	1	10/6/05
WOHL Gen Op-032	Accepting and Processing Contracts	3.0	4	3/15/05
WOHL Gen Op-033	Policy and Methods for the Calibration of Dispensers	1.0	5	Draft
WOHL Gen Op-034	Rotameter Calibration Policy and Procedure	1.2	4	Reviewed 2/9/2007
WOHL Gen Op-035	Pump Rental Procedure	4.0	8	07/02/2007
WOHL Gen Op-036	Annual Management Review	2.0	1	1/13/05
WOHL Gen Op-037	Significant Figures for Laboratory Analysis and Reporting	2.0	1	Reviewed 2/9/2007

The current revision of this SOP is located at O:\SOP\EHD\WOHL\Final\QC>manual\. Please confirm that this printed copy is the latest revision.

Appendix IV

File Name: WOHL Gen Op-018.8.0

Procedure: Retention and Disposal Policy

Policy for Wisconsin Occupational Health Laboratory Retention and Disposal

- A.** Wisconsin Occupational Health Laboratory (WOHL) policy for sample retention and disposal varies dependent on the type of sample. The following table, page 2, describes the policy for each sample type.
- B.** All sample disposal will be done in accordance with the practices outlined in the UW Safety Department's "Disposal Guide" located in the second floor library or on the UW Safety Department Web site:
http://www2.fpm.wisc.edu/chemsafety/GUIDE2005/table_of_contents2005.htm. Someone in each unit should be assigned the responsibility for disposing of the archived samples at the specified times to avoid unnecessary accumulation of hazardous waste in the laboratory.
- C.** A "*Waste Disposal Manifest*" is required to be filled out each time test samples are disposed following this procedure. The Manifest will be retained on file by the QC/QA personnel. See [Appendix 1](#) of this procedure for a copy of the "*Waste Disposal Manifest*."
- D.** To arrange for pick up and disposal of ACM, contact the UW-Safety Department at 262-8769.
- E. Procedure by:** Derek Popp **Date:** 5/26/99
- F. Procedure Approved by:** Terry Burk **Date:** 7/21/99
- G. Procedure Modified by:** Donna R. Johnsen **Date:** 7/21/99, 6/26/03, 12/01/03, 12/8/03
2/24/04 & 2/13/2007
Minor 6/10/04
Derek Popp 4/13/04 & 3/17/05
- H. Modified Procedure Approved by:** Terry Burk **Date:** 7/21/99, 6/26/03, 12/02/03, 12/9/03,
2/26/04 & 4/14/04 & 3/17/05 & 2/13/07

<u>SAMPLE TYPE</u>	<u>RETENTION TIME</u>	<u>DISPOSAL</u>
PVC filter for weight analysis	1 yr.	Normal trash pick-up
Asbestos air samples	3 yr.	Normal trash pick-up
Asbestos bulk samples	3 yr.	UW Safety Department. All Wisconsin DNR samples will be stored separately and logged on a chain of custody sheet. After the DNR sample storage box has been filled the form will be signed and along with the samples sent to the DNR.
TEM Asbestos in water	After 48hrs. - Bulk water 3 yr. for the TEM grids	The sample log books contain a disposal date and initials
Microbiology bulk & wipe samples	3 weeks	Disposal in Meri Barrels. The barrels are picked up twice a week by Wisconsin Infectious Waste Manifest
All other bulk samples Except for paints and coatings	1 yr.	Bulk is labeled with composition at time of analysis. Disposal is dependent on specific requirements for the compounds present.
Paints and Coatings	1 yr.	UW Safety Department. The Wisconsin DNR will notify WOHL of any potential legal cases (within the 1 yr. time frame) and request that those samples be held until the regulatory agency no longer need the samples.
Culturable microbial Air Sample	None	Disposal in Meri Barrels. The barrels are picked up twice a week by Wisconsin Infectious Waste Manifest
Microbial Spore Trap & Tape Samples	1 - 2 months	Disposal in glass waste. The waste glass is disposed of with normal laboratory waste.
Desorbed or digested air samples	Until data is reviewed by review chemist and released by supervisor	Disposal is dependent upon chemicals used for desorption or digestion. Solvents are sent to UW Safety in carboys. Diluted acids are further diluted using the Acid Neutralizer and then flushed down the drain. Injection vials are placed in 5 gallon pails and sent to UW safety.
Impinger solutions	Until data is reviewed by review chemist and released by supervisor	Disposal is dependent on nature of impinger solution.

Appendix 1

WASTE DISPOSAL MANIFEST

A. Pick-up Date:

B. Description of waste being disposed:

1. Waste Type:

- Asbestos Waste
- Solvent Waste
- Biohazard Waste
- Other: _____

Number of Containers:

Collection Period:

2. Waste Type:

- Asbestos Waste
- Solvent Waste
- Biohazard Waste
- Other: _____

Number of Containers:

Collection Period:

3. Waste Type:

- Asbestos Waste
- Solvent Waste
- Biohazard Waste
- Other: _____

Number of Containers:

Collection Period:

C. Waste Hauler:

D. Relinquished by:

E. Received by:

Appendix V

University of Wisconsin Policy of Record Keeping

UNIVERSITY OF WISCONSIN SYSTEM-MADISON
1423 Which sunset in 2015.
State Laboratory of Hygiene-Wisconsin Occupational Health Lab

RDA # 1403-

The Wisconsin Occupational Health Lab conducts environmental testing of workplace air samples for private organizations as well the Federal government. These tests are to determine occupational exposures to airborne contaminants.

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Appendix VI

Federal Employment Record Keeping Requirements

(A) Background data to environmental (workplace) monitoring or measuring, such as laboratory reports and worksheets, need only be retained for one (1) year so long as the sampling results, the collection methodology (sampling plan), a description of the analytical and mathematical methods used, and a summary of other background data relevant to interpretation of the results obtained, are retained for at least thirty (30) year: and